

**REPORT ON FEED ANALYSIS  
PIG AND POULTRY DEVELOPMENT PROJECT  
IN BURMA**

**NOVEMBER 1983**

**AGRICULTURAL DEVELOPMENT COOPERATION DEPARTMENT  
JAPAN INTERNATIONAL COOPERATION AGENCY**

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REPORT ON FEED ANALYSIS  
PIG AND POULTRY DEVELOPMENT PROJECT  
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## Preface

The Technical Cooperation for the Pig and Poultry Development Project in Burma has been conducted for the purpose of transfer of modern technology for improvement of production efficiency in pig and poultry breeding at the 10th Mile Farm of the Livestock Breeding Corporation, Rangoon from April 12, 1978 to April 11, 1983.

The main activities of the Project have been reproduction and supply of breeding pigs and chickens, production of formula feeds and technical training of Burmese staff of Livestock Breeding Corporation's Farm in Burma.

This report is a summary of the activities of Mr. Tetsuo Murakami who worked as an expert in the field of "Feed Analysis" from March 25, 1983 to September 23, 1983 in order to establish feed analysis laboratory's activities at 10th Mile Farm, and it is hoped to be utilized as a reference material for Burmese counterparts and related persons.

In closing, I express cordial gratitude to Mr. Tetsuo Murakami who compiled this report, the Burmese officials concerned and related organizations which extended the fullest support to the Project.

September 1983

Takashi Tauchi  
Director  
Agricultural Development  
Cooperation Department  
Japan International  
Cooperation Agency



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REPORT

September 23, 1983

Tetsuo MURAKAMI

Expert on Feed Analysis for Pig and  
Poultry Development Project in Burma

Central Research Laboratory, Japan  
Cereals Examination Association  
Foundation

Re: Technical Instruction for Pig and Poultry Development Project in  
Burma

I, Tetsuo Murakami, am a technical cooperation expert, acting  
between the Government of the Socialist Republic of the Union of Burma  
and the Government of Japan under the Pig and Poultry Development  
Project in Burma, have finished my duty in Burma on September 23, 1983  
and hereby report as follows:

Subject of instruction: Feed analysis  
Country and location of service: The Socialist Republic of the Union  
of Burma, 10th Mile Farm  
Dispatched period: From March 25, 1983 to September 23,  
1983 (6 months)

Outline of Cooperation:

To analyse materials and formula feeds as well as to transfer  
technological know-how allied to such analyses in order to improve the  
quality of formula feeds.

Items of Instruction:

- (1) Sampling method ... Materials and formula feeds
- (2) Crushing method of samples
- (3) Preparation method of samples to be analysed ... Fineness analysis  
with splitters and filters
- (4) General composition analysis  
Moisture                      Oven-drying method 2 hrs. at 135°C, 5 hrs. at 105°C  
Crude protein                Kjeldahl method

- |                                       |                                                                                                   |
|---------------------------------------|---------------------------------------------------------------------------------------------------|
| Crude fat                             | Ether extraction method                                                                           |
| Crude fibre                           | Henneberg-Stohman method (Filtration method, Standstill method)                                   |
| Crude ash                             | 2 hrs. at 600°C, complete ashing method                                                           |
| (5) Analysis of inorganic composition |                                                                                                   |
| Determination of P                    | Spectrophotometric Molybdovanado phosphate Method                                                 |
| Determination of Ca                   | Ammonium oxalate method by dry ashing                                                             |
| (6) Feed identification               |                                                                                                   |
| Empirical method                      | Characteristics noticeable by naked eyes                                                          |
| Physiochemical method                 | Filtering method, gravity clarification method, and confirmation of color reaction using reagents |
| Microscopic method                    | Microscopic observation of histological characteristics                                           |

1. Present Facilities of 10th Mile Farm under Livestock Industry Development Program of Burma

The project's cooperation period terminated on April 12, 1983, but the work of facilities yet to be completed is still being continuous by enforced, albeit slowly. The constructing status of various facilities as of September 20, 1983 is as shown on Fig. 1.

2. Outline of Nutrition Laboratory

(1) Constructing status of laboratory

When I arrived at the site in late March 1983, the building exterior had been completed. However, the concrete flooring of rooms was enforced from early June, while the electric and water work was enforced from late July through early August.

In late June, I requested the prompt completion of the Main Laboratory Room in order not to have my guidance in analysis inconvenienced. And the facilities as per originally planned were completed in the middle of August. However, the guidance could not be enforced due to the short capacity of electric breakers, etc.

The breaker was replaced in the middle of September and earnest

analysis became possible.

Due to the manual operation of the water system and the short capacity of the water tank, water could not be supplied around the clock. Also, the water pressure was too low to operate the water purifying apparatus. As to other laboratories, etc., window frames and electric wiring were completed, but the lighting equipment, water supplying equipment and sinks were yet to be installed. In other words, mostly not completed.

Furthermore, the rain leakage was found in the Office Room and the Main Laboratory Room in the middle of June. I requested repairs but none were made during my assignment.

(2) Installing and utilizing statuses of equipment provided

Equipment yet to be utilized and reasons for non-utilization

Draft chamber: Non-completed electric wiring in the Draft Room (there is no three-phase wiring)

High-speed mill (HOSOKAWA): Three-phased electricity wiring yet to be completed.

Automatic stiller: Too low pressure of water supplying

Pipet washer: Short capacity of electric wiring (workable by increasing breaker capacity)

Installing status of equipment provided

Equipment for analysis was carried into and installed in the Main Laboratory Room.

Equipment in other laboratory rooms and Storage Room is yet to be completed. The completion is unforeseeable.

3. Technical Guidance

Since the completion of facilities in the Laboratory Building is delayed, I made technical guidance on the moisture and crude protein analyses at the JICA Office Building. However, satisfactory guidance could not be made before the completion of the Laboratory Building. Since it was promised that the facilities of the Laboratory Building

would be completed at the end of June, I prepared and presented the Guidance Plan.

There had been repeated requests for reinforcing LBC counterparts, and I scheduled to accept it after the completion of the Laboratory Building and the arrival of equipment in need.

I began guidance in analysis by explaining the collation and uses of names of equipment and devices provided as well as the nature and remarks for the handling of chemicals. With the counterparts' knowledge being somewhat improved, actual guidance was made as from on the materials and chemicals carried in and as from on the analysable matters.

(1) Counterpart

They are the following three persons.

- U Soe Oo Majoring in chemistry. Came from Danyngon Feed Plant to be a counterpart of Feed Laboratory Room.  
On completing the guidance, is expected to be the Chief of Staff.
- U Nei Majoring in chemistry. Had been a primary school teacher Win before being assigned by LBC. Assigned to the Feed Division 10 Miles Farm.  
Being tied up with other work, had been guided 1 ~ 3 days per week but was scarcely guided in the last one month.
- Daw Saw Mynit Thwe  
Majoring in veterinary science. Had been in the meat processing division (producing ham, bacon and sausage) of the 10th Mile Farm before becoming a member of the Laboratory Room.

These above three counterparts have little experience on feed analysis, and seems to be passive attitude for new technology. These matters were always taken into account in transferring our technologies and improving their technologies by guiding the counterparts in keeping pace with their capability and by placing importance on their experience.

(2) Itemized outline of analysis guidance

The analysis guidance was enforced using samples picked (in May & June) from the Feed Plant of the LBC Farm.

◦ Moisture

First of all, I explained how to clean aluminium cans and to obtain a constant weight together with remarks on custody. And had each trainee obtain the constant quantity. Measurement was made for 2 hours at 135°C and 5 hours at 105°C on 2 and 3 grams of feed. After selection of the methods by counterparts themselves, they made them enforce the 135°C method individually for the sake of improving their skill.

◦ Nitrogen compound

Crude protein Titration which is the basic operation of analysis was enforced until succeed as was obtained in repeating the neutralizing titrative operation by a normal solution (0.1N, 0.05N) of acid or alkaline. After observing some improvement in skill, they began the analytical operation. In a further few days thereafter the operation were shared among them. The Kjeldahl method was applied. 3~4 kinds of auxiliary agent for dissolving were explained. Mixture of cupric sulfate and potassium sulfate (9:1) was used as auxiliary agent for the sake of being jointly used for disposing waste liquid and for measuring phosphate. The distilling titration was made by the reversed titration method. Methyl red was used as the indicator. As to the method with boric acid absorptive liquid, only the preparation of the absorptive liquid was guided. No guidance was made in the course of feed analysis.

True protein Since materials for protein feed have many problems, analysis was made especially for poultry feeds and fish meals. By the Barnstein Method, one (1) gram of sample was analysed in view of the mouth diameter, etc. of the dissolving bottle.

Water-soluble nitrogen (Protein) The cold-water percolation method was employed for feed materials.

Basic volatile nitrogen The test solution was prepared by the percolation method as for fish meal. Measurement was made by the distilling method using magnesium oxide heavy type. This was performed only a few times.

Phosphorus The dissolving liquid for crude protein was jointly used. Measurement was made by the variance method using Molybdovanado-phosphate acid (yellow).

It took much time for the counterparts to understand the variance method. The explanation began from the measured value and the operation ability through comparative measurement using the same sample as used in the method by calibration measurement of inorganic phosphate was enforced as to maize and beans. The result was 0.018 ~ 0.025% P.

Crude fat Explanation of the method of analysis and distribution of the operation manual.

The temperature of cooling water was so high that ethyl ether, solvent for extraction, little condensed and much volated. Therefore, a device which would cool and circulate the cooling water was necessary. Since the device received late, it was simply installed with no further operation.

Crude fibre Analysed through wirenet, filter-paper according to Hanneberg-Stoman Method.

Since the analysis equipment was received and carried in late, no guidance was made beyond explaining the analysis method and distributing the operation manual.

Preparation of reagent finished.

Crude ash Explained how to obtain a constant weight of and how to clean ceramic crucibles. Distributed the operation manual thereof. Since the analysing equipment was received and carried in belatedly, no analysis could be made.

The Burner Method was tried, but the counterparts showed no interest and it was also highly dangerous. Therefore, I refrained from further attempts.

Calcium The equipment was received and carried in too late to do anything but prepare the reagent, explain the operating method and to distribute operation manuals. The ammonium oxalate/macro method (method by directly adjusting pH) was employed for formula or other feeds containing rather much calcium, while the ammonium oxalate/Urea method for cereal seeds or other feeds containing or little calcium.

Identification of feeds Samples were such Burmese feed materials as maize rice bran, groundnut cake, sesame cake, fish meal, prawn dust, and shells, as well as such feed materials I brought in from Japan as hoof dust, meat/bone meal, feather meal, alfalfa, kapok seed cake, leaf meal (made in China), and castor seed meal.

Empirical method Observation by eye and a characteristics observation with a stereo-microscope of feed materials.

Microscopic method Preparations (microscopic specimens) of samples processed by diluted acid sulfuric acid/hydrochloric acid) and diluted alkaline (sodium hydroxide solution) were prepared and their histological features were microscopically observed.

They were interested in the observation because they had had no microscopic experience. They earnestly engaged in photo-taking, too. They, however, were not interested in preparing specimens, and they did not understand the necessity of identification.

This is presumably due to the fact that all object materials were domestic products.

Physiochemical method Filtering method, gravity classification method, and confirmation of color reaction using reagents.

Above were yet to be enforced because no reagent was available and also because the number of items subject to analysis guidance was small since it had been planned to make connection with the analytical values of formula feeds.

### (3) Transfer of technological know-how

This duty could not be fulfilled during my assignment which was greatly affected by physical restrictions such as insufficient equipment and the imperfect setup on the Burmese side (non-completed/delayed

construction of buildings/facilities). However, transfer of techniques for moisture, nitrogen compounds (crude protein, true protein) and total phosphorus analysis was made to a certain extent. (see Table 1 for analytical results.)

(4) Effect of green feed on eggs (feed trial)

With the sudden increase in the numbers of domestic animals and poultry raised under the Pig and Poultry Development Program of Burma, feed materials became short, prices of materials, especially maize and dried fries, soared, while qualities lowered and supply unstabilized.

In particular, due to the maize shortage, the yolk of eggs became milky white and of lower taste. A green feed trial was enforced upon the request from the LBC side. Originally, the trial had been planned to be made at the time when it was possible to conduct the nutrient and harmful element analysis along feasible with the nutrient test (digestion). Two species of trees - Pant Pan Pyu (legume) and Koke Ko (also legume) - were selected considering their easy raising and the effects on vegetation. Their leaves were dried in sunshade, further dried in a dryer, and then crushed. Formula feed containing such dried-crushed leaves in 5% was given to broilers (Burma NORIN), while that containing no such leaves to those at the newly established Pant Pan Pyu Section and Koke Ko Section respectively. We started a three-week trial on 10 broilers at each section. In the course of trial, however, we suspended the trial availing ourselves the opportunity of the death of one broiler at the Koke Ko Section.

This death was beyond the responsibility of the counterpart, because three broilers had already died in the Koke Ko Section.

The test result is as shown on Table 2. This result was considerably effective on the Burmese side, I believe. However, the eggs had been sold without surveying against the contrast section.



#### 4. Basic Training for Farm Managers

The 6th Basic Training Course for Farm Managers sponsored by LBC was enforced for 65 trainees at the 10th Mile Farm for three months from June 15, 1983.

Lectures on livestock nutrition were made for 1 hour each from 9 a.m. for 4 days from June 26 to 29. This course was given to the LBC staff for the purpose of their rough grasping of the necessity of nutrition control in stockraising through lectures on nutrition analysis.

I let the trainees observe the raising/management status of live-stock/poultry at the 10th Mile Farm centering around the matters for which academic education is like by necessary.

Content of lecture:

- (1) Living body composition of livestock;
- (2) Nutrition, digestion, absorption and excretion of livestock;
- (3) Nutrient composition and nutrient evaluation of feeds;
- (4) Composition and nutrient analysis of feed elements (outline);
- (5) Explanation and demonstration of major equipment at the Nutrition Laboratory; and
- (6) On natural and mould poisons contained in feed.

#### 5. Current and Future Statuses of Feed Production and Management at LBC

Knowledge of nutrient and harmful compositions of feeds and their materials are on increase through their analyses.

- (1) In view of the current status of the lowered quality of fish meal and the mould poison contamination of sesame cake, soybean, soybean cake, broken bean and yeast are being used as feeds.
- (2) Utilization as feeds of coconut cake, cotton seed cake, potato runner, wild banana, etc.
- (3) Development/introduction of green feeds to offset maize shortage.
- (4) Modernizing plan of formula feed producing facilities at the 10th Mile Farm.

At other farms, studies are likely being started on the following matters:

- 1) As a disposing method of livestock/poultry waste, a method utilizing the energy by fermentation for feed production, etc. (Biomass Project)
- 2) A plan to make poultry by products into feed.

6. Future Problems Allied to Feed Analysis

- (1) During my assignment, due to the equipment and chemical shortage and as well as the insufficient Burmese facilities, I could not transfer the know-how by making guidance on the fundamental nutrient composition of feeds. It would be necessary to transfer by regarding after the completion of facilities, etc. in Burma.
- (2) Chemical waste use for analysing feeds are currently disposed of by neutralization only. However, since they include copper or other harmful substances, it is necessary to improve the environmental facilities.
- (3) It is necessary to establish a supplying routes for maintenance and repair of provided equipment until when such a set-up would be established on the Burmese side.

## Appendix

1. City Map of Rangoon
- 1' 1 Km      1 mile
- 1" Storage
2. Layout of Nutrient Analysis Laboratory Building (as of Sep. 20, 1983)
- 2' Balance Room
3. Nutrient Analysis Laboratory Building and Its Interior
4. Nutrient Analysis Laboratory (front)
5. Main Analysis Room
6. Maintenance/checking of equipment (air-gas generator)
7. (Upper left) Preparation for measuring (distilling) protein  
(Upper right) Measuring the weight of sample (crude ash) with  
(automatic) electronical balance (Lower left) Measuring phosphate
8. Morning gathering of participants to the 6th Basic Training for  
Farm Managers
9. List of Provided Equipment, etc. (allied to feed analysis)
10. Green Feed Test
11. Pant Pan Pyu tree (stems and leaves were tested for green feed  
at Ywathagy1 Farm)
12. Broilers for egg collection (BURMA-NORIN) being tested by green  
feed at 10th Mile Farm
13. Eggs under green feed test
14. Analytical Result of Formula Feed
15. Analytical Result of Formula Feed (10th Mile Farm, LBC)
16. Result of Nutrient Analysis, etc. of Materials for Formula Feed  
on 10th Mile Farm
17. (Tokyo Fertilizer and Feed Inspection Station, Ministry of  
Agriculture, Forestry and Fisheries of Japan, 1983)
18. Result of Nutrient Analysis of Materials Used for Green Feed Test

City Map of Rangoon

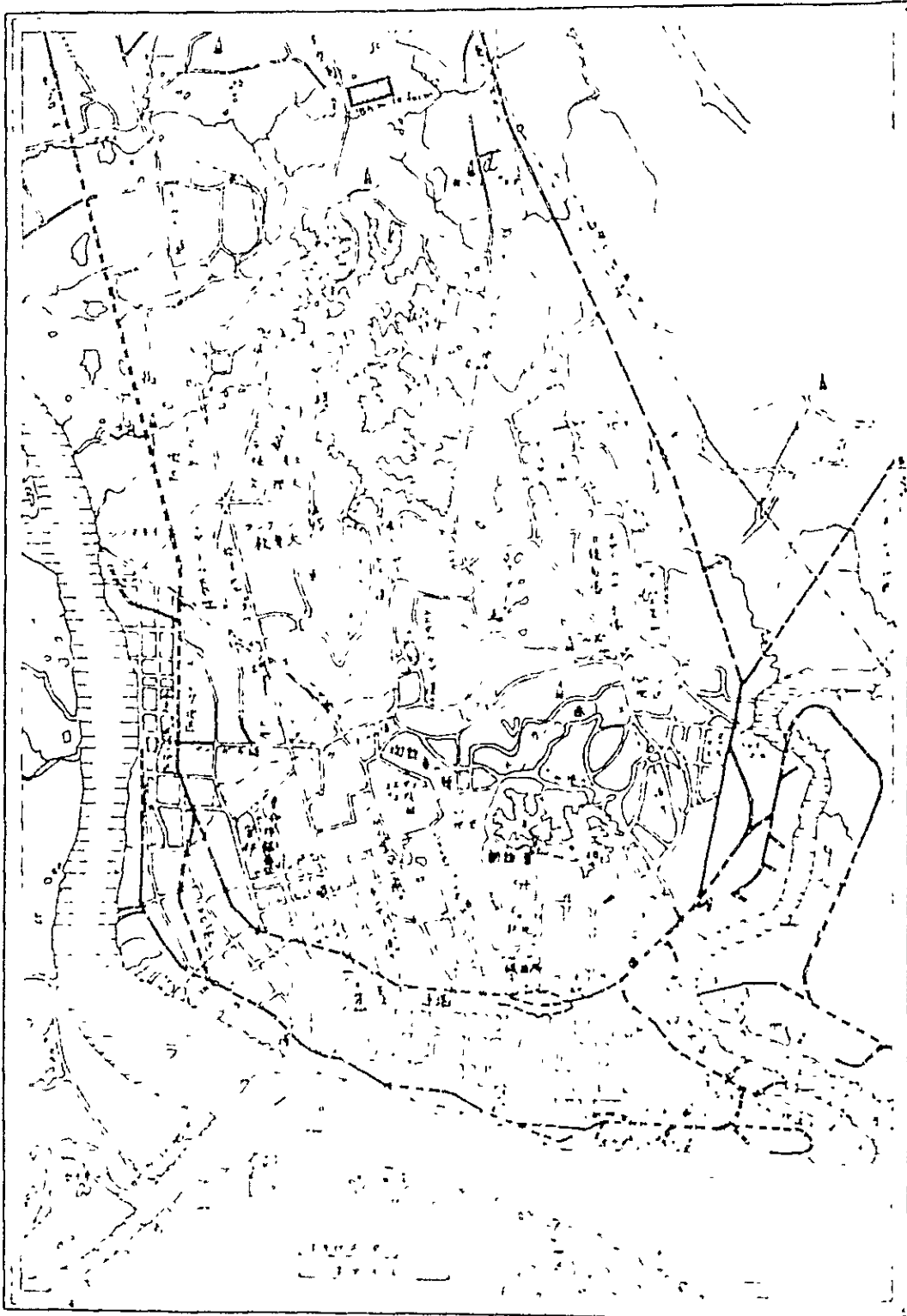
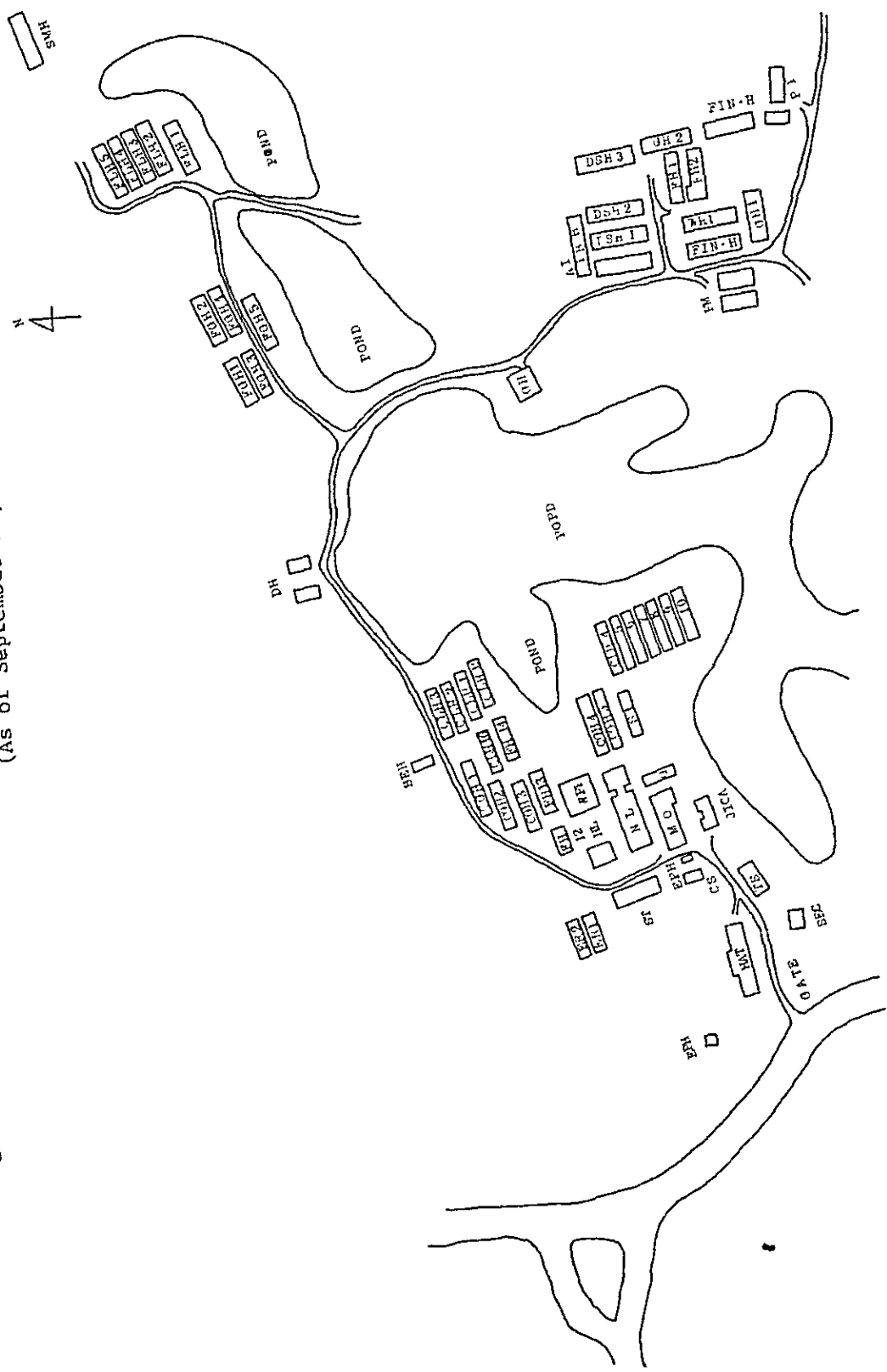




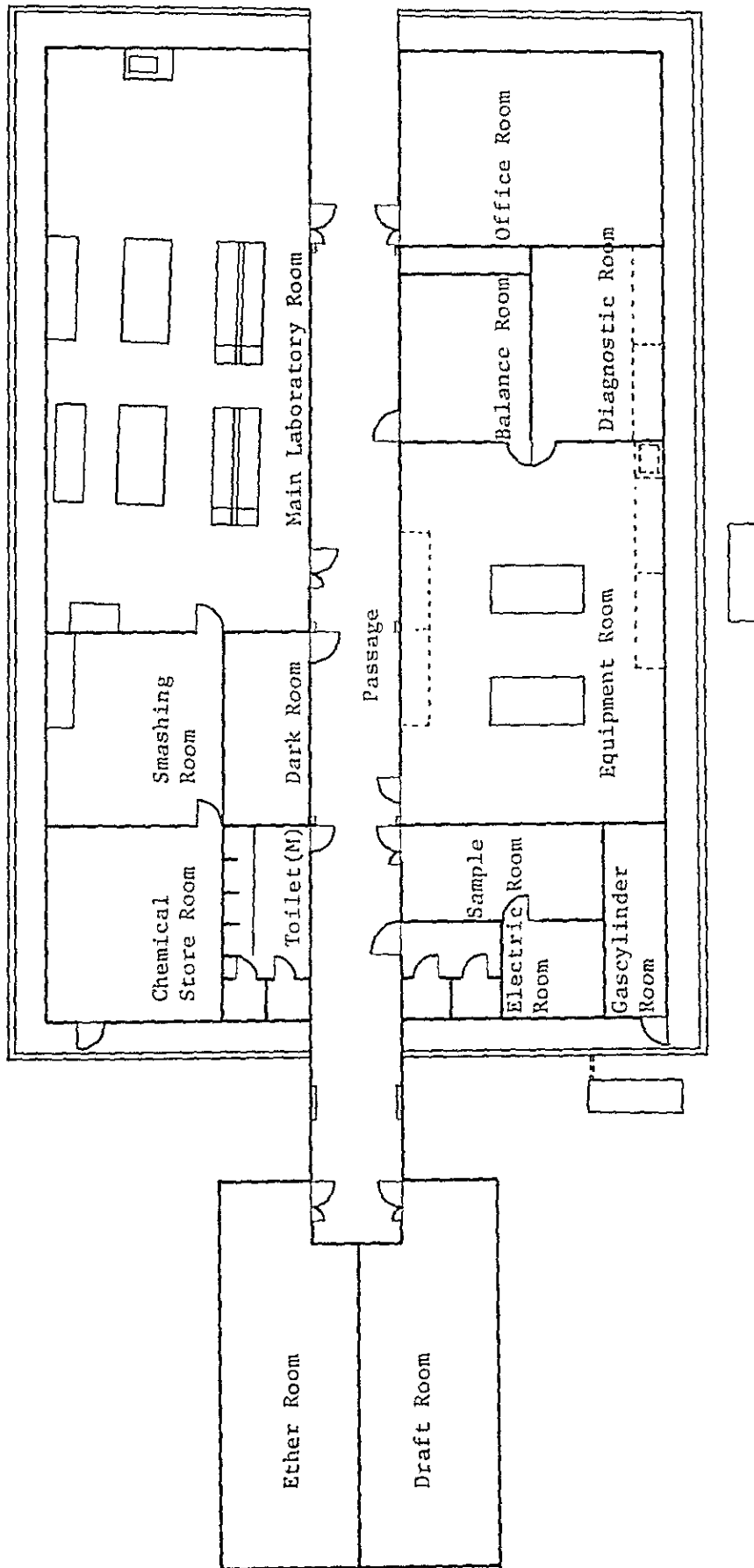
Fig.1 Layout of 10th Mile Farm  
 (As of September 20, 1983)



Layout of 10th Mile Farm (As of Sept.20,1983)

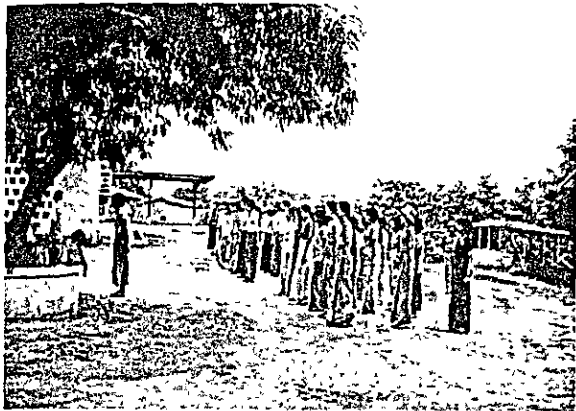
Office	M O	Main Office
	JICA	JICA Office
	SEC	Security Office
Laboratory	N L	Nutrition Laboratory
	H L	Hygiene Laboratory
	A I	Artificial Insemination Laboratory for Pig
Pig Sector	B H	Boar House
	D S H	Dry Sow House
	F H	Farrowing House
	FIN H	Finisher House
	G H	Grower House
	W H	Weaner House
Poultry Sector	B E H	Broiler Experiment House
	B H	Brooding House
	C G H	Cage Growing House
	C L H	Cage Laying House
	F G H	Floor Growing House
	F L H	Floor Laying House
	F H	Floor House
	HAT	Hatchery
	P P	Processing Plant
	S M H	Single Male Mating House
Feed Mill Sector	F M	Feed Mill
Others	C S	Cold Storage
	D H	Dormitory House
	E P H	Electric Power Plant House
	G	Garage
	G H	Guest House
	ST	Stove House
	W P P	Water Purification Plant
		Completed
	Under Construction	

Layout of Nutrient Analysis Laboratory Building  
 (As of Sep. 20, 1983)

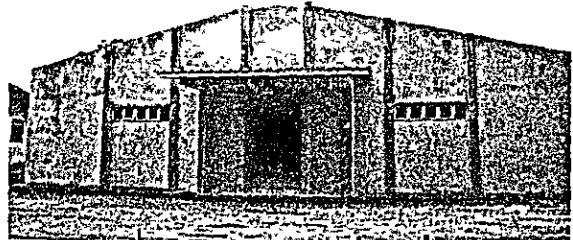




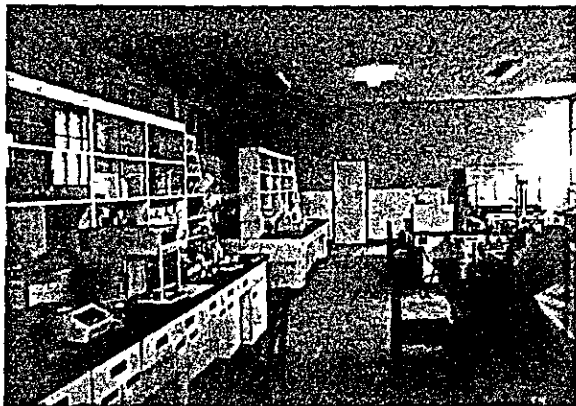




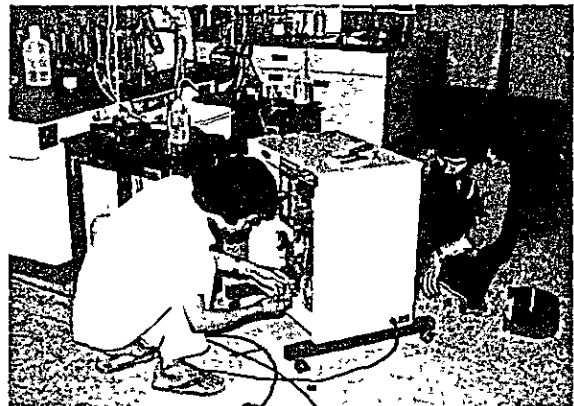
Morning gathering of participants to the 6th Basic training for Farm managers



Nutrient Analysis Laboratory (Front)

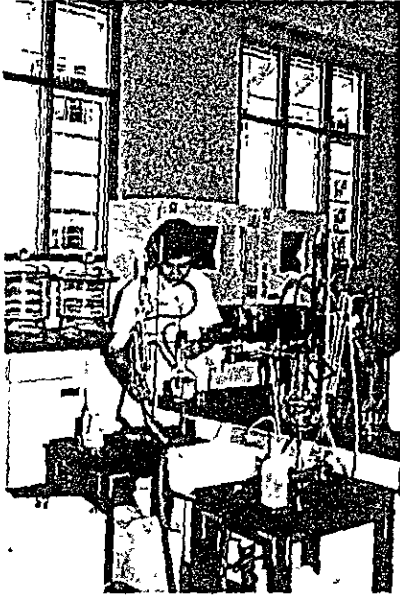


Main Analysis Room



Maintenance / checking of equipment (Airgas generator)





(Upper left)  
Preparation for measuring  
(distilling) protein

(Upper right)  
Measuring the weight of  
sample (crude ash) with  
(Automatic) electrical  
balance

(Lower left)  
Measuring phosphate



List of Provided Equipment, etc.  
(Allied to feed analysis)

Description of Goods	Quantity	Date of Receiving Goods
Rotary Drying Oven, Yamato DN-61	2 sets	April '1, 1983
Centrifugal Mill "MITAMURA" UCM	1 set	
High-Speed Mill "HOSOKAWA" AP-S	1 set	
P.H Meter "TOA" HM-20E	1 set	
water Bath "YAMATO" BS-48	2 pcs.	
Pipet Cleaner "YAMATO"	1 set	
Dry Boad "TOYO" L-S	1 pc.	
Container	10 pcs.	
Pipet Case corona-10	1 pc.	
Centrifugal Dehydrator "SAKUMA" 90-22	1 set	
Air-Gas Generator "HIRANO"	3 sets	
Gas-Burner	10 pcs.	
Kjeldahl Digesting Apparatus (Electric)	2 pcs.	
Kjeldahl Distilling Apparatus (Gas)	2 pcs.	
Auto-Buret 50ml	6 pcs.	
Dispenser 10ml	1 pc.	
ditto 50ml	1 pc.	
ditto 100ml	1 pc.	
Soxhlet's Extraction Apparatus	6 pcs.	
Desiccator 30cm	6 pcs.	
Sterilizer "YAMATO" BS-64	2 pcs.	
Funnel stand (wood)	2 pcs.	
filtering Apparatus	2 pcs.	
Aspirator (glass)	10 pcs.	
Crucible Tongs 25cm	3 pcs.	
Crucible 10cc	50 pcs.	
Optical Microscope "OLYMPUS" BHT with photograph machine PM-10AD	1 pc.	
Stereo Microscope "OLYMPUS" SZ-Tr	2 pcs.	
Sieve I.D. 150mm 6, 8, 9, 10, 12, 20, 28, 32, 60 mesh	1 set	
Polyethylene Container	2 sets	
Beaker 20ml	40 pcs.	
ditto 100ml	100 pcs.	
ditto 300ml	60 pcs.	
ditto 1000ml	40 pcs.	
ditto 2000ml	20 pcs.	
Beaker Tall Type 50ml	100 pcs.	
ditto 100ml	150 pcs.	
ditto 300ml	80 pcs.	
ditto 500ml	100 pcs.	
Beaker Conical Type 500ml	100 pcs.	
Flask 100ml	100 pcs.	
ditto 200ml	120 pcs.	
ditto 300ml	80 pcs.	
ditto 500ml	60 pcs.	
ditto 1000ml	40 pcs.	
ditto 2000ml	30 pcs.	
Pipet, volumetric 0.2ml	20 pcs.	
ditto 0.5ml	20 pcs.	
ditto 1ml	20 pcs.	
ditto 2ml	20 pcs.	
ditto 3ml	20 pcs.	
ditto 5ml	20 pcs.	
ditto 10ml	40 pcs.	
ditto 15ml	40 pcs.	
ditto 20ml	40 pcs.	
ditto 25ml	20 pcs.	
ditto 30ml	20 pcs.	

Description of Goods	Quantity	Date of Recieving Goods
Glass Filter 17G-4	10 pcs.	Sept.19,1983
Rubber Bulb	10 pcs.	
Dishes Evaporating I.D.70mm(Porcelain)	10 pcs.	Sept.19,1983
ditto 90mm	10 pcs.	
Stainless wire Net for riber"SANSHIN"	10 pcs.	Sept.19,1983
Test Tube	10 pcs.	
Test Tube Stand	1 pc.	Sept.19,1983
Watch Glasses I.D.90mm	20 pcs.	
Dishes,Petri I.D.90mm	10 pcs.	Sept.19,1983
Brush	5 pcs.	
Crucible Stand	1 pc.	Sept.19,1983
Glass Tube I.D.7mm	10 pcs.	
ditto 8mm	10 pcs.	Sept.19,1983
Glass Sticks I.D.6mm	10 pcs.	
Weighing Bottle I.D.40mm	10 pcs.	Sept.19,1983
Brush, for Blance	10 pcs.	
Filter Paper No.5A	5 pcs.	Sept.19,1983
ditto No.131	5 pcs.	
Sample Bottle 120cc	50 pcs.	Sept.19,1983
Sample Reduction Instrument(JIS-15)	1 pc.	
Desiccator I.D.21cm	1 pcs.	Sept.19,1983
Brush(Vinyl Coating) Large	10 pcs.	
ditto Medium	20 pcs.	Sept.19,1983
ditto Small	10 pcs.	
Brush for Buret	10 pcs.	Sept.19,1983
Mat(RUbbber-Black)	20 m	
Rubber Stopper No.1	10 pcs.	Sept.19,1983
ditto No.3	10 pcs.	
ditto No.4	10 pcs.	Sept.19,1983
ditto No.6	10 pcs.	
ditto No.7	10 pcs.	Sept.19,1983
ditto No.8	10 pcs.	
ditto No.14	10 pcs.	Sept.19,1983
ditto No.16	10 pcs.	
ditto No.18	10 pcs.	Sept.19,1983
ditto No.20	10 pcs.	
Asbestos Coating Wire Net I.D.15cm	10 pcs.	Sept.19,1983
ditto 12cm	10 pcs.	
Glass Ball for Buret	50 pcs.	Sept.19,1983
Label(in 100 sheet)	5 set	
Rubber Tube I.D.8mm	20 m	Sept.19,1983
Vaccum Pump 100ml "KOMEI"Kitagawa-Type	1 pc.	
Ether Inspecting Pipe	1 box	Sept.19,1983
Polyethylene Container 20 L	3 pcs.	
Soxhlet Stand	10 pcs.	Sept.19,1983
Labodryer	2 pcs.	
Gas Tube	100 m	Sept.19,1983
Operating Gown	7 pcs.	
Cork Borers	1 set	Sept.19,1983
Flexible Ribbon Heaters	2 pcs.	
Stand	2 pcs.	Sept.19,1983
Double Buret Holder	5 pcs.	
Clamps	1 pcs.	Sept.19,1983
Air Conditioner"NATIONAL"CS-170PG	1 unit.	
Enlarged Photograph	1 set	May 18,1983
Transformer 100KVA,220V-100V 50HZ	1 unit	April 1,1983
Gas Tube 1m	100 pcs.	
Soket for Gas Tube	10 pcs.	April 1,1983
Metal Rittings Gas Tube	100 pcs.	

Description of Goods	Quantity	Date of Recieving Goods
Pipet, volumetric 40ml	10 pcs.	April 1, 1983
ditto 50ml	10 pcs.	
ditto 100ml	10 pcs.	
Pipet, Komagome 2ml	40 pcs.	
ditto 5ml	40 pcs.	
ditto 10ml	40 pcs.	
Cylinder, measuring 10ml	20 pcs.	
ditto 20ml	20 pcs.	
ditto 50ml	20 pcs.	
ditto 100ml	20 pcs.	
ditto 200ml	20 pcs.	
ditto 500ml	10 pcs.	
ditto 1000ml	10 pcs.	
Flask 25ml	20 pcs.	
ditto 50ml	20 pcs.	
ditto 100ml	100 pcs.	
ditto 200ml	20 pcs.	
ditto 250ml	100 pcs.	
ditto 500ml	20 pcs.	
ditto 1000ml	20 pcs.	
Funnel Short Stem I.D. 65mm	40 pcs.	
ditto 100mm	20 pcs.	
Funnel Long Stem I.D. 65mm	40 pcs.	
ditto 100mm	20 pcs.	
Mortar I.D. 135mm	10 pcs.	
Silicone Stopper	20 pcs.	
Hose	10 m	
Fire Extinguisher ABC-10NL	8 pcs.	
Flashlight	2 pcs.	
Spectacle for Dust	5 pcs.	
Alcohol Detector	1 pcs.	
Silicone Tube I.D. 7mm	10 m	
ditto 8mm	10 m	
ditto 10mm	10 m	
Gum Tube I.D. 9.5mm	10 m	
Spoit Cap 2g	10 pcs.	
ditto 5g	10 pcs.	
ditto 10g	10 pcs.	
Pipeter (Black Gum) 50ml	10 pcs.	
Spatula Spoon, steel	30 pcs.	
Rubber Bulb	10 pcs.	
Tweezer L 150mm	30 pcs.	
Agitato Bar	10 pcs.	
Brush	10 pcs.	
Scrubbing Brush	10 pcs.	
Kimwipe	72 pcs.	
Slide Glass 72	50 sets	
Cover Glass 22 x 40	10 sets	
Reagent Bottle, wide Mouth 500ml	100 pcs.	
washing Bottle 500ml	70 pcs.	
Reagent Bottle, Narrow Mouth 250ml	50 pcs.	
ditto 1 L	20 pcs.	
ditto 2 L	20 pcs.	
ditto 5 L	10 pcs.	
ditto 20 L	10 pcs.	
Polyethylene Container	10 pcs.	
Extraction Thumbles 30 x 100mm	50 pcs.	
Filter Paper No.2	80 pcs.	
Cotton 500g	4 pcs.	
PH Test Paper, Roll 1 - 14	10 pcs.	

Description of Goods	Quantity	Date of Recieving Goods
Beaker with Handle 500ml(polyethylene)	20 pcs.	April 1, 1983
ditto 2 L	10 pcs.	
Spoit Bottle 60ml	20 pcs.	
Rubber Gloves	10 pcs.	
Asbestos-Gloves	6 pcs.	
Cotton-Gloves	30 pcs.	
Protected Face	5 pcs.	
Flask Seat(Cork)	10 pcs.	
Stenless Funnels	5 pcs.	
Alminium Hoil	30 pcs.	
Wrapping Paper	30 pcs.	
Tool Set	1 pcs.	
Glass Marking Scribes with Diamond	5 pcs.	
File Set	1 set	
Pench,Vice	1 set	
Vise	2 pcs.	
Tool Set for Electric	1 pc.	
Mask,Paper Disposable	200 pcs.	
Color Tape	100 pcs.	
Glass Wool 1kg	1 pc.	
Pinchcock	100 pcs.	
Buret,Mohr Type 25ml	20 pcs.	
Filing Cabinet	3 pcs.	
Letter Case	2 pcs.	
Laboratory Board Glaselite 3600 x 1500 x 45mm	2 pcs.	
Laboratory Board Glaselite 2400 x 750 x 45mm	13 pcs.	
Analysis Balance"SHIMADZU"AEL-160-11	1 unit.	May 18, 1983
Table Balance"SHIMADZU"ED-H-200-02	1 unit.	
Distiller"YAMATO"WO-42	1 unit.	
Spectrophotometer"SHIMADZU"UV-120-02	1 unit.	
Alminium Can 55 x 25(D)mm	100 unit.	
Central Testing Bench CR-360C	2 sets	
ditto CF-300C	2 sets	
Sink Bench	1 set	
Testing Bench "T" type	1 set	
Physics,Chemistry,Physical-Geograph Testing Bench"YAMATO"CFT	2 sets	
OpARATION Bench"YAMATO"KM-2A	1 set	
Druft Chanber"YAMATO"NKD-120S	1 set	
Ventilation Arrangement"NATIONAL"	14 pcs.	
Air Conditioner 4-TV-2	2 unit.	
Electric Hot-Water Heater	1 unit.	
Electric Muffle Furnaces"TOYO"ESF-3PD	1 set	Sept. 19, 1983
Fiber Testing Set"SANSHIN"	1 set	
Liquid Cooling Circulator"TOYO"LCH-130F	1 set	
Safty Cabinet	1 pc.	
Reduce and Pressure Pumps	1 pc.	
Magnetic Starrer"TOYO"MS-16B	2 pcs.	
Bell Jars	2 pcs.	
Balance 0.1g (200g)	2 pcs.	
Balance for Tube 500cc	1 pc.	
Sieves Parts I.D.150mm Cover&Reciever	1 pc.	
Y-Tube 8mm	10 pcs.	
Duct Pipe	1 pc.	
Flask,Kjeldahl 150ml	50 pcs.	
Centrifugal Tube Stand	2 pcs.	
Centrifugal Tube 50ml	30 pcs.	
Glass Filter 3G-4	10 pcs.	



Description of Goods	Quantity	Date of Recieving Goods
Cleaning Material	36 kg	April 1, 1983
Sodium Hydroxide, Pellets, S500g	100 pcs.	
Sulfamic Acid S25g	10 pcs.	Sept. 19, 1983
Sulfuric Acid S500ml	100 pcs.	
Copper Sulfate, Cryst. S500g	20 pcs.	
Potassium Sulfate S500g	20 pcs.	
Ethyl Ether S500ml	100 pcs.	
Ethyl Alcohol S500ml	20 pcs.	
Potassium Permanganate .5SG500g	5 pcs.	
Sodium Oxalate S25g	10 pcs.	
Ammonium Acetate S500g	40 pcs.	
Ammonium Chloride S500g	40 pcs.	
Ammonia Water S500ml	40 pcs.	
Ammonium Vanadate, Meta S500g	4 pcs.	
Ammonium Molybdate, Powder S500g	20 pcs.	
Ammonium Phosphate S500g	4 pcs.	
Nitric Acid S500ml	100 pcs.	
Phenolphthalein S500g	5 pcs.	
Methyl Red S25g	5 pcs.	
Bromothymol Blue S25g	5 pcs.	
Strontium Chloride, Anhyd. S500g	10 pcs.	
Calcium Carbonate S500g	5 pcs.	
Hydrochloric Acid S500ml	100 pcs.	
Developer	100 pcs.	
Ion Exchange Resin 1kg	10 pcs.	

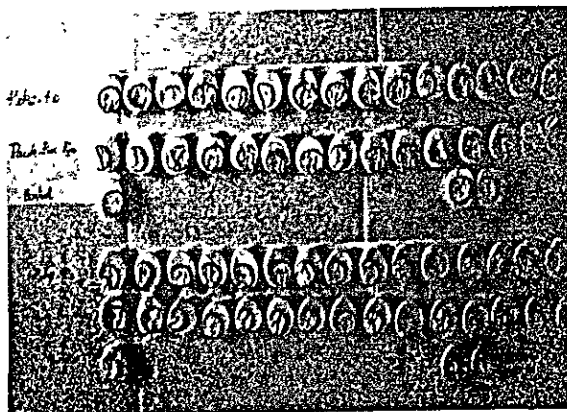




Pant Pan Ryu tree  
(Stems and leaves were tested for green feed at Ywathagyi Farm)



Broilers for egg collection(BURMA-NORIN)  
being tested by green feed at 10th Mile Farm



Eggs under green feed test



Table-2 Feeding trial with dried Koke Ko & Pant Pan Pyu leaves  
(27th June to 11th July, 1983)

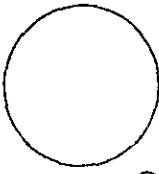
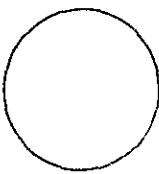
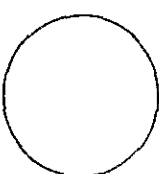
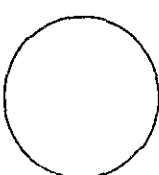
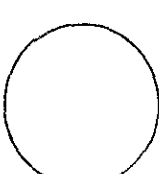
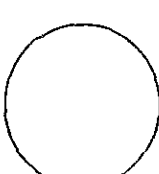
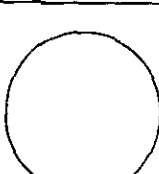
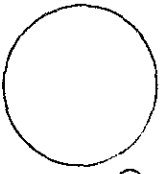
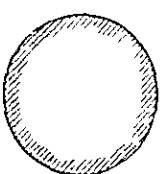
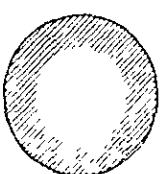
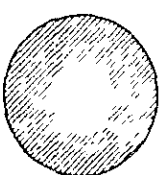
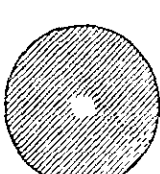
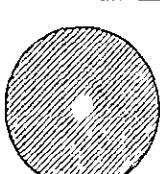
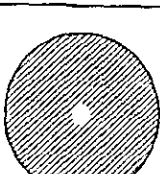
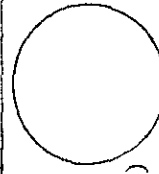
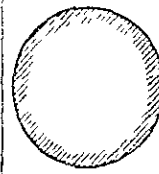
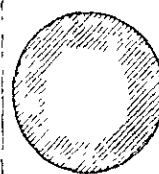
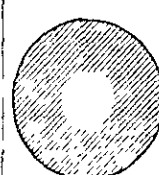

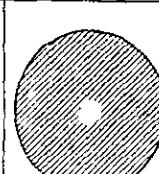
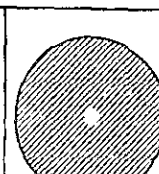







	after 2 days	after 4 days	after 6 days	after 7 days	after 10 days	after 12 days	after 14 days
	29th june, '83	1st july, '83	3rd july, '83	4th july, '83	7th july, '83	9th july, '83	11th july, '83
Control (Yolk Color)							
Koke Ko (Yolk Color)	 <10%	 15-24%	 45-60%	 85-86%	 82-92%	 98-100%	 98-100%
Pant Pan Pyu (Yolk Color)	 <10%	 12-38%	 56-81%	 80-87%	 84-96%	 98-100%	 99-100%
Taste	Cont K K	+	++	++	+++	+++	+
		-					+++
		+	++	++	+++	+++	+++
Egg weight	Cont K K	41.45G	43.80G	43.53G	44.67G	43.49G	-
		42.92G	42.05G	44.38G	45.12G	42.30G	-
Color Grade	 <1	 1-2	 2-3	 3-4	 3-4	 5	 5

Table 1. Analytical Result of Formula Feed  
(10th Mile Farm, LBC)

	Moisture	Crude Protein	True Protein	Crude Fat	Crude Fiber	Crude Ash	NFE	Phosphorus	Calcium
10th mile Farm									
Broken Rice	12.13	7.60	10.19					0.28	
Rice Bran	12.25		7.57					1.42	
Maize	11.03	31.35	26.25					0.39	
Groundnut Cake	11.55		15.97					0.62	
Sesame Cake	11.25	40.35	32.59					1.35	
Fish Meal	13.46	23.10							
Koke Ko	8.03	50.21	48.78					1.02	
Algae									
Danyingon Farm									
Layer Starter	11.26	16.76	14.32					0.54	
Broiler Starter	11.51	16.77						0.68	
Adult Pig Feed	11.24	15.20						0.63	
Pinmarbin Farm									
Broiler Starter	12.34	17.91						1.22	
Broiler Finisher	10.46		16.44						
Piglet Feed	12.23	18.12	15.87						
Adult Pig Feed	11.90	16.01	13.95						
Milking Cow Feed	10.02		14.40						
Claf Feed	11.67	19.48						0.98	
Cow Feed	11.93	17.34						0.66	
Piglet Feed	11.49							0.91	
Kalape Pea(Donkey)	11.32	12.09						0.009 (Energy)	
Ywathagy1 Farm									
Layer	11.78	15.10						1.16	
Layer	11.07	16.47						0.75	0.92
Broiler Starter	11.51	17.41						1.18	
Broiler Starter	12.64							0.60	

Result of nutrient analysis, etc. of materials for Formula Feed on 10th Mile Farm  
 (Tokyo Feed Examination Station, Ministry of Agriculture, Forestry and Fishery, 1983)

	Moisture	Crude Protein	Crude Fat	Crude Fiber	Crude Ash	NFE	Aflatoxin B <sub>1</sub>
Broken Rice	12.6	7.2	1.9	0.9	1.1	76.3	
Rice Bran	9.7	12.1	15.1	7.3	7.6	49.2	
Maize (Corn)	10.5	10.9	4.2	2.1	1.7	70.6	86ppb
Croundunt Meal	9.0	41.1	7.9	5.3	8.1	28.6	593ppb
Sesame Meal	8.7	31.0	11.2	15.3	9.5	24.3	351ppb
Fish Meal	11.9	44.5	5.0	2.7	21.9	14.0	NaCl 8.7%

Result of nutrient analysis of materials used for Green Feed Test

	Moisture	Crude Protein	Crude Fat	Crude Fiber	Crude Ash	NFE	Carotenoid (mg/kg)
Koke ko	8.1	22.9	8.5	31.5	5.2	23.8	Car. 50.1 Xan.188.2
Pant Pan Pyu	9.1	34.8	5.9	7.4	8.6	34.2	Car.784.8 Xan.816.0

Car. : Carotene  
 Xan. : Xanthophyll

Feed Formulation in Feed Sector, LBC

	Broken Rice	Rice Bran	Maize	Wheat Bran	Groundnut Meal	Sesame Cake	Fish Meal	Prawn Dust	Oyster Shell
<u>10th mile Farm</u>									
Layer Starter	35	12	29		5	5	12.5		--
Layer	34	4.5	35		5	6.15	9		5.2
Grower	34	11.5	34		5	7	4.25		0.5
Grower Breeder	25	20	40		3.4	5	4		1
Grower Finisher	19.5	5	37		25		12		
Broiler Starter	40	5	19		15	14	5		0.5
Broiler Finisher	41	10.7	16		10	10	10		1
<u>Danyngon Farm</u>									
Layer Breeder	38	15	14		10	5	8	5	5
Breeder Grower	51	7	16		10	8	4	4	
Breeder Grower	55	10	9		10	6	6	4	
Broiler Starter	60				15	15	7		
Broiler Finisher	63				15	15	7		
Grower	44.5	18			20		7		10
Layer	20	10	15	5	25		20	10	5
Starter	40	13	5		22		20		
Pig Grower	58	10	2		15	5	6		4
<u>Payagyi Farm</u>									
Layer	31	10	15		15	10	12		7
Pullet	45	20			15	10	8		2
Starter	35	7	20		15	10	12		1
Sow	45	20			25		5		5
Piglet	40	2	20		30		8		2



Nutrition Laboratory's Testing Plan

June 22, 1983  
(Mr. T. Murakami)

Item	Month	June	July	August	September	October
Basic ingredients						
Moisture						
Crude Protein						
Crude Fat						
Crude Fiber						
Crude Ash						
Inorganic ingredients						
Calcium						
Phosphorus						
Judgement of Feeds						
Macroscopic feather						
Low magnification feather						
Histological feather						
Sieves test						

true protein, water-soluble protein, volatile basic nitrogen, urea, salt, sand & silica, water soluble acidity.





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