

If quality assurance technology of fruits, vegetables and flowers is improved, it will certainly help open more markets for Thai agricultural products ; particularly to the high quality and well regulated markets like Japan and the United States. It will also ease Thailand's chronic problem of trade deficit.

2. Responsible units :

The projects will be carried out

1. Postharvest Research Unit,
2. Plant Pest Clinic and Quarantine Unit,
3. Applied Microbiology Unit,
4. Environmental Science Unit,
5. Central Biochemistry Unit.

3. Importance and benefits :

At the completion of the project it is expected to :

- 1) Obtain objective techniques for the determination of maturity and quality of horticultural commodities
- 2) Obtain quality standards for specific uses
- 3) Develop techniques for handling, packaging, shipping and storage
- 4) Develop pre and postharvest treatments to prevent losses caused by insects and diseases including toxin
- 5) Extend the resarch outcome to the public
- 6) Promote agribusiness

4. Project work plan :

Research of economical commodities will be developed to solve problem in harvesting, and postharvest handling which includes postharvest physiology, entomology, pathology, packaging, storage and transport engineering, and retailing.

Postharvest research of export oriented commodities will begin with a survey and identification of postharvest losses and of factors affecting their shipping, keeping, and eating qualities. Subsequently the following topics will be performed.

Topic 1. Quality determination and storage of horticultural commodities

Quality is the most important aspect in marketing any product, and in particular perishable commodities. Although Thai fruits are regarded by most foreigners to have excellent taste and quality at home. It was often found to have low quality at destined markets abroad. The problem was due to many factors. In durians, for example, durians which were shipped to Hongkong and Singapore were repeatedly found to be immature and sometimes had internal disorders, which could not be detected from the outside. Although these defects may be distinguished by highly experienced persons. The techniques are rather subjective and are not easily transferred from one person to another.

Many objective techniques have been developed for the determination of fruit maturity, but most are destructive to the fruit. Thus, objective and also non-destructive techniques must be developed. It is our goal to accomplish that, by using principles which are currently used in the subjective techniques. For example, local farmers used to knock and listen to the sound characteristic of durians to reveal their maturity. Sonic characteristic of durians, therefore, will be analysed electrically. Subsequently, equipments or techniques to check quality and maturity of the fruit may be achieved.

Along with the above study, storage conditions for fruits and vegetables will be developed including the use of low temperature, modified and controlled atmosphere, waxes, and packaging materials. For cut flowers, the research will emphasize on developing preservative media and storage conditions for orchids and other flowers with high potential for export.

In Summary, research subjects included in this topic are :

1. Development of objective technique for the determination of maturity and quality of fruits.
2. Establishment of best storage conditions for fruits, flowers and vegetables.

Working Staff :

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Topic 2. Postharvest diseases and insect control

Losses from postharvest diseases and insects are in fact the major constraint on the exportation of Thai fresh fruits. These losses will be identified and measured in papaya and other export items. Environmental factors affecting disease development and insect infestation, particularly anthracnose disease and fruit-flies, will be contemplated together with physiological changes of the affected fruits. The data will be analysed and used to develop both physical and chemical techniques that could effectively reduce or control the losses.

Research subjects included in this topic are :

1. Determination of infection periods and behavior of pathogenic fungi which cause postharvest diseases in economic fruit crops.
2. Development of control measures for postharvest disease by field spray and/or postharvest treatments.
3. Development of residue-free techniques for controlling fruit flies and other insects.
4. Establishment of non-chemical preharvest treatment to reduce fruit flies infestation.

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Topic 3. Control of aflatoxin in economic crops

Recently, Thailand has faced a serious problem in exporting maize to several countries due to high percentage of aflatoxin contamination in the seeds exceeding the level allowed by the international standard. The major environmental factor contributed to this situation is the high moisture content of grains during storage, especially during the rainy season. Aflatoxin may occur at any time, before, during or after harvest, in the seeds that are not adequately dried and properly stored.

Several attempts have been made to reduce the aflatoxin contamination. Postharvest chemical seed treatment is one of reliable means in solving this problem. Many chemicals such as ammonia, propionic acid and its derivatives have shown a promising result but each of them has some degrees of defects. Therefore, an appropriate technology in reducing aflatoxin contamination is needed to be developed.

The research subjects are as follows :

1. To identify environmental factors in relation to the fungus, Aspergillus flavus and toxin production both before and after harvest.
2. To develop the rapid and effective analytical technique for determination of aflatoxin.
3. To study the method to minimize the level of aflatoxin by physical and chemical means.

- Working Staffs :
1. Mrs. Chintana Chana M.S. Leader
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Topic 4. Development of handling, packaging and storage systems for horticultural products

Thailand is prosperous with delicious tropical fruits and vegetables which impress not only local consumers but also foreigners. After harvest, those horticultural products destined to controlled quality market need cleaning, sorting, sizing, packing, in-process handling as well as precooling and storage. These processes are currently done by hands and labor intensive. Some processes are practically ignored such as precooling, and some are roughly practiced. As a result, there is no uniformity in size and color and the produce are often damaged. Hurry shipping of produce from the growers to remote markets under normal atmospheric conditions (which is hot and humid) easily damaged the produce and lowered market value. These make growers and the country losing reliability which is economically hazardous.

Normally the quality of the agricultural products can be achieved by machine with small number of operators (as evidenced in Japan and other developed countries). Thai horticultural products also require postharvest handling, packing machines and cold storage to secure their quality and production management. Even though, the so-called postharvest equipment are available but they are so expensive, complicated and not suitable for local socio-economic conditions.

It becomes essential to develop appropriate machines to do such postharvest operations utilizing a certain amount of labor, simple and well-known mechanical techniques, for farm level.

Of these concepts, the following research subjects are proposed :

1. Development of semi-mechanized precooler, sorter, sizer, cleaner and packing equipment.

2. Evaluation of modern packing house system.
3. Development of appropriate packing house for horticultural produce export and controlled-quality local markets.
4. Development of economic refrigerated mobile container for transporting fruits and vegetables.
5. Development of appropriate modified atmosphere storage system for farmer level.

Working Staffs :

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C. Equipment Requested

Sub-project	Title	Estimated Cost (β)
A	Management of Agricultural Environment	
	1. Pesticide residues deminishment in plant and soil and their microbial degradations	4,880,000
	2. A monitoring of soil adversary properties in tropical savanna climate for effective management	7,720,000
	3. Utilization and treatment of agricultural and industrial waste	6,630,000
	4. Physiological actives plant substances for animal therapy and plant pest control	7,911,000
B	Development of Quality Assurance Technology	
	1. Quality determination and storage of horticultural commodities	2,685,000
	2. Postharvest diseases and insect control	2,049,000
	3. Control of aflatoxin in economic crops	2,573,400
	4. Development of handling, packaging and storage systems for horticultural products	12,470,000
	Grand total	<u>46,918,400</u>

Topic II A, 1

Management of Agricultural Environment : Pesticide residues diminishment in plant and soil and their microbial degradations.

Priority	Item	Made-model	Quantity	Justification	Estimated Cost (₹)	Remark
1	Fume Hood		2		560,000	
2	Gas Chromatograph with ECD, FPD, FTD and NPD detectors and accessories (Complete sets)		1		1,500,000	
3	High Performance Liquid Chromatograph with UV and Fluorescence detectors and accessories (Complete sets)		1		1,200,000	
4	High Speed Thin layer Chromatograph Scanner		1		600,000	
5	Rotary Evaporator (Capacity 250-500 ml)		1		60,000	
6	Cooling Aspirator		1		80,000	
7	Blender (Explosure proof, low-high speed)		3		60,000	
8	Heating mantles (6 places type, capacity 250-500 ml)		2		80,000	
9	Deep Freezer (20 Cubicfeet)		1		300,000	
10	Analytical balances		1		90,000	
11	Dispenser (Ultra)		1		40,000	
12	a. Thin layer plates coating sets b. Chromatographic tanks c. Thin layer plates holder and carbinets		1 6 3		50,000	
13	Stabilizer (5 KV)		2		160,000	
14	Autometic Column Packing apparatus		1		100,000	
				Sub total	4,880,000	

(exclude taxes prices)

Topic II A, 2

Management of Agricultural Environment : A monitoring of soil adversary properties in topical savanna climate for effective management.

Priority	Item	Made-model	Quantity	Justification	Estimated Cost (P)	Remark
1	AA tubes for analysis of K, Mg, Ca, Na and Fe (one for each element)		5		125,000	
2	Block digester (each comprises 50 tube holders)		2		160,000	
3	Balance (Top-loading : three decimal point, digital, maximum loading not less than 50 grams)		2		200,000	
4	Ball mill mixer-grinder (capacity 4 x 100 ml)		1		200,000	
5	Automatic extractor (each capable to extract 10 samples of 200 gram simultaneously)		2		300,000	
6	Centrifuge : high speed (not less than 30,000 rpm)		1		100,000	
7	Vacuum pump (oil-less) ½ horse power		2		80,000	
8	Hydraulic press (not less than 20 tons)		1		40,000	
9	Two-channel x-ray chemical analyzer attached to scanning electron microscope		1		2,500,000	
10	Lapping machine (with accessories capable of grinding 6 samples simultaneously)		1		600,000	
11	Machanical soil analysis set for soil textural analysis by pipette method		1		30,000	
12	Shaker : heavy duty-continuous action capable of handling 50 samples in 250 ml. flask simultaneously		1		60,000	
13	Rotary shaker capable of handling 4 samples in 1000 ml tube simultaneously (tumble motion)		1		80,000	

Priority	Item	Made-model	Quantity	Justification	Estimate Cost (P)	Remark
14	Prespander (a bull processing machine for multipurpose recycling)		1		3,000,000	
15	Durometer : capable for checking soil penetrability not less than 25 kg/cm ²		1		40,000	
16	Macro-Kjeldhal-Distillation Apparatus (a set of six) including accessories		2		160,000	
17	Precision dispenser ; semi-automatic with amber glass reservoir of 1000 ml.		3		45,000	
				Sub total	<u>7,720,000</u>	

Topic no. II A, 3

Management of Agricultural Environment : Utilization and treatment of agricultural and industrial waste.

Priority	Item	Made-model	Quantity	Justification	Estimate Cost (P)	Remark
<u>Construction of pilot scale anaerobic digester plant which comprises of</u>						
1	Continuous flow completely mixed anaerobic digester of 10 m ³		1		100,000	
2	Gas holder (30 m ³)		1		100,000	
3	Gas compressors		2		1,200,000	
4	Variable speed mixer		1		55,000	
5	Gas leakage warner		1		25,000	
6	Hydrogen sulfide scrubber		1		10,000	
7	Carb dioxide scrubber		1		10,000	
8	Mixing pit		1		30,000	
9	Digested waste storage		1		30,000	
10	Mechanical dehydrater for dewatering the digested waste		1		300,000	
11	Dip-in type liquid pump		2		300,000	
12	Auger		1		30,000	
13	Air pump		1		30,000	
14	Controlling panel		1		40,000	
15	Digested sludge drying platform		1		10,000	
16	Algal ponds		1		10,000	
17	Accessories, e.g. pipelines, for the construction of the plant		1		1,000,000	
18	Gas meter		1		15,000	

Priority	Item	Made-model	Quantity	Justification	Estimate Cost (฿)	Remark
<u>Equipments for demonstrating gas and digested waste utilization</u>						
19	Exhausted gas analyzer, Toque, brake, horse power and fuel consumption tester		1		500,000	
20	Electric generator		1		50,000	
21	High pressure gas cylinders for carrying purified methane for use with farm tractors		5		15,000	
22	Motor propeller for lab scale digesters to be locally constructed at Central Laboratory and Greenhouse complex		5		50,000	
23	pH probe and pH controller		5		150,000	
24	Ball mill of 2 different sizes (1 litre and 5 litres)		2		50,000	
25	Chemical and glassware and accessories for the digester and G.C. which are unavailable in Thailand		1		1,500,000	
26	Gasoline engine		3		35,000	
27	Diesel engine		2		50,000	
28	Water pump		1		15,000	
29	Refrigerator		1		25,000	
<u>General equipments</u>						
30	Ultracentrifuge		1		500,000	
31	Microfuge	Beckman	1		150,000	

Priority	Item	Made-model	Quantity	Justification	Estimate Cost (P)	Remark
32	Autoclavable Warring blender, (1 set and 3 jars)		1		10,000	
33	Incubator, cabinet type		2		150,000	
34	CO ₂ and O ₂ meter		1		30,000	
35	Methane meter		1		15,000	
36	Dessicator		2		105,000	
37	Pipette man		5		25,000	
38	Variable speed automatic dispensor		1		10,000	
Sub total					6,630,000	

Topic no. II A, 4

Management of Agricultural Environment : Physiological active plant substances for animal therapy and plant pest control.

Priority	Item	Made-model	Quantity	Justification	Estimate Cost (₹)	Remark
1	Shearing Mills		1		50,000	
2	Chopper (Food cutter)		1		30,000	
3	Blender (explosure resisted, low-high speed)		2		40,000	
4	Heating mantle (capacity 5 litres)		3		36,000	
5	Soxhlet extractors		1		35,000	
6	Vaccumn dryer		1		60,000	
7	Rotary evaporators (capacities 5 litres)		1		60,000	
8	Cooling Aspirater		1		80,000	
9	Rotary spray power		1		70,000	
10	Topical applicator		1		100,000	
11	Centrifuge (high speed)		1		350,000	
12	Centrifuge (low speed)		1		100,000	
13	Freeze dryer		1		200,000	
14	G.C.-Mass Spectrophotometer		1		3,000,000	
15	Nuclear Magnetic Resonance		1		3,000,000	
16	Scanning U.V. spectrophotometer		1		700,000	

Sub total 7,911,000

Topic no. II B, 1

Development of Quality Assurance Technology : Quality determination and storage of horticulture commodities

Priority	Item	Made-model	Quantities	Justification	Estimate Cost (₹)	Remark
1	Gas chromatograph (TCD detector) with accessories		1		700,000	
2	Primary gas standards ; 1 and 10 % CO ₂ ; 2 % O ₂ 1 and 100 ppm CH ₄ and 0.5 % C ₂ H ₂ completed with Cylinder and regulator		6		60,000	
3	Current stabilizer (5 KV)		3		240,000	
4	12-channels temperature recorder with sensor probes ranges-10°C to 110°C		2		160,000	
5	High-Low temperature alarm instrument		6		25,000	
6	Digital hygrometer, 5-100 % range, 0.1 % resolution		2		60,000	
7	'Waters' Fast Fruit Juice column 7.8 mm. id x 15 cm. long		2		30,000	
8	BONDAPAK C ₁₈ Column 3.9 mm. id x 30 cm long		2		20,000	
9	Water distiller ; 2 l /hr		1		40,000	
10	Auto dispenser 1, 5, 10 and 25 ml		8		40,000	
11	Penetrometer (desk-top) 5 and 10 kg.		2		100,000	
12	Walk-in cold room, 0-20°C range with humidifier, 3x3 m.		1		150,000	
13	Ripening room ; gas tight, temperature controlled 10-40°C humidifier, 3 x 3 m.		1		200,000	

Priority	Item	Made-model	Quantity	Justification	Estimate Cost (β)	Remark
14	Top-Load digital balance ; 500 \pm 0.01 g.		1		50,000	
15	Clinical centrifuge ; max 6000 rpm, hold 8-15 ml tubes		1		30,000	
16	Tri-stimulus colorimeter		1		300,000	
17	Deep-freezer ; -50°C, 300 l capacity		1		300,000	
18	Air flow meter ; ranges 1-20, 10-100, 100-1000 ml/min		3		30,000	
19	In-transit temperature recorder		2		50,000	
Sub total					2,685,000	

Development of Quality Assurance Technology : Postharvest diseases and insect control

Priority	Item	Made-model	Quantity	Justification	Estimate Cost (₱)	Remark
1	Compound microscope with photographic unit and fluorescence attached	Olympus BH-2	1		300,000	
2	Transfer chamber	Labconco class II Biohazard, safety cabinet	1		270,000	
3	Oven, standard gravity convection lab oven	Isotemp, series 300	1		45,000	
4	Sterilizers (benchtop) - Napco Autoclave/dryer - Lightweightsterilizer		1		52,000	
5	Controlled environment chamber	Lab-line reach-in, environettes	1		180,000	
6	Vapor heat treatment system	Sanshu EHK-1000B	1		350,000	
7	Bath (Circulator) circulating water bath	Precision	1		70,000	
8	Freeze-dry apparatus (Freeze dryer 18)	Labconco floor-model	1		350,000	
9	Cryostat	IEC Minotome	1		210,000	
10	Automatic microtome knife sharpener		1		76,000	
11	Histostat Hand-hold digital thermometer	Comark Model 2001	1		9,000	

Priority	Item	Made-model	Quantity	Justification	Estimate Cos (P)	Remark
12	Hygrometer-Certified digital hygrometer/ thermometer		1		12,000	
13	Pipetter (automatic pipetter with accessories)	Sapco	1		35,000	
14	Ripening chamber (Hotpack)		1		85,000	
				Sub total	2,049,000	

Topic 11 B. 3

Development of Quality Assurance Technology : Control of aflatoxin in economic crops

Priority	Item	Made-model	Quantity	Justification	Estimate Cost (B)	Remark
1	Sampler-Fisher grain sampler		3		11,000	
2	Riffle sampler-Enclosed drawer riffle sampler		1		9,000	
3	Blender-Two speed explosion resistant blender		1		13,000	
4	Blender-Three-speed blender		1		23,000	
5	Fume hood, safety-flow fume hood 6 ft.	Fisher	1		57,000	
6	Shaker, orbital shaker	Precision LED	1		42,000	
7	Extraction, solvent	Tecator soxtec HT	1		240,000	
8	Evaporator, rotavapor rotary evaporation systems	New buchii Model RE-121A	1		46,000	
9	Spotter	DESAGA TLC-Spotter PS 01	1		74,000	
10	Densitometer with computer, printer and software	CD 60	1		860,000	
11	DESAGA standard seperating chamber		1		4,400	
12	DESAGA basic set		1		43,000	
13	DESAGA storage cabinet		1		7,000	
14	Ultraviolet-UVP longwave hand lamp with	IEC centra-4 Benchtop	1		2,000	
15	Centrifuges		1		42,000	
16	Laminar flow, Biohazard safety cabinets	Labconco class II	1		260,000	
17	Ovens, digital mechanical convection oven	Precision	1		55,000	

Priority	Item	Made-model	Quantity	Justification	Estimate Cost (B)	Remark
18	Controlled-environment chamber	Lab-line Reach-in	1		180,000	
19	Steriomicroscope with photographical unit	Olympus model ZX	1		250,000	
20	Moisture tester					
	1. portable-Protimeter gramini	Model D 275	1		16,000	
	2. desk top	Burrow brand	1		19,000	
21	Washer-Fisher jet-clean glassware washer with accessories		1		320,000	
				Sub total	2,573,400	

Title II B, 4

Development of Quality Assurance Technology : Development of handling, packaging and storage systems for horticultural products.

Priority	Item	Made-model	Quantity	Justification	Estimate Cost (P)	Remark
1	Temperature recorder (multichannel) with thermocouple sensors		1 set		500,000	
2	Fork lift (2-3 tons lifting capacity)		1		500,000	
3	Multichannel (16) signal conditioner		1 set		800,000	
4	Nitrogen generating equipment		1 set		200,000	
5	Humidity generating equipment		1 set		200,000	
6	Humidity sensor		1 set		100,000	
7	Solar radiation measuring equipment with recorder		1 set		200,000	
8	Anemometer with recorder		1 set		300,000	
9	Vacuum pump		1 set		100,000	
10	VOM high precision multimeter (digital)		1 set		20,000	
11	Low-level input A/C converter High-level input A/C converter + 16 bit Microcomputer + Complete peripherals		1 set		300,000	
12	Package paper cutter		1		100,000	
13	Edge-making machine		1		300,000	
14	Paper folder		1		500,000	
15	Graphic plotter		1		400,000	
16	Mechanical vibration machine		1		500,000	

Priority	Item	Made-model	Quantity	Justification	Estimate Cost (B)	Remark
17	Vibration damage simulator test jig		1		150,000	
18	Package strength measuring device		1		150,000	
19	Signal analyzer		1		200,000	
20	Transportation damage simulator		1		350,000	
21	Horizontal shock test set up		1		250,000	
22	Force and displacement transducer (High weight capacity tiny body high precision)		1		250,000	
23	Gas permeability analyzer		1		500,000	
24	Moisture permeability analyzer		1		400,000	
25	Compression tester		1		800,000	
26	Signal conditioner		1		300,000	
27	Viscoelastic test set-up		1		200,000	
28	Water vapour transmission rate-disk method		1		200,000	
29	Gas transmission rate-volumetric method		1		200,000	
30	Bursting tester		1		200,000	
31	Flat crush tester		1		150,000	
32	Cobb absorbency tester		1		200,000	
33	Tensile strength and elongation of films tester		1		200,000	
34	Basic weight of the component paper tester		1		200,000	
35	Water resistance of the glue bond tester		1		200,000	
36	Concova medium fluter		1		200,000	
37	Complete filled packages ; Vertical impact tester		1		350,000	

Priority	Item	Made-model	Quantity	Justification	Estimate Cost (B)	Remark
38	Complete filled packages ; Stocking tester		1		350,000	
39	Board puncture tester		1		200,000	
40	Incline impact tester		1		350,000	
41	Impact resistance tester		1		350,000	
42	Mechanical recording accelerometer		1		200,000	
43	Multi channel data logger		1		350,000	
				Sub total	12,470,000	

~~D. Operating Cost/year~~
Supplemental

Chemical, glassware etc.	<u>Estimated Cost(Baht)</u>
1. Sub-project II A	
Topic 1	500,000
Topic 2	250,000
Topic 3	200,000
Topic 4	400,000
2. Sub-project II B	
Topic 1	200,000
Topic 2	200,000
Topic 3	200,000
Topic 4	200,000
Topic 5	200,000

Research Project IIIAgricultural Mechanization Technology DevelopmentA. Key staffs

Group Leader

~~Project Coordinator~~: Dr. Thira Chaichanawongse

Subproject I : Land Preparation for Rice Transplanter

Subproject leader : Mr. Kanoksak Iam Opas

Subproject II : Rice Thresher

Subproject leader : Mr. Somyot Chirnakson

Subproject III : Corn Sheller under High Moisture Content

Subproject leader : Mr. Blanchaw Phaholyotin

Subproject IV : Whole Stalk Sugarcane Harvester

Subproject leader : Mr. Akradet Artachinda

B. Revised ProposalAGRICULTURAL MECHANIZATION TECHNOLOGY DEVELOPMENT

1. RATIONALE :

Since the completion of the Agricultural Machinery Center in June 1981, the Center has been supplemented and reinforced year by year under the KU-JAPAN joint project entitled as the "Agricultural Extension and Agricultural Mechanization Project". This was the five year program which had been terminated in June 1986. During this five year period the AMC has received much of help in form of technical assistance and equipment. But, after the completion of the project, more assistance is still in need since there are much more valuable technology to be learned in order to make AMC the most useful institute for Thailand and its neighbouring countries. Thus, further technical assistance is considered to be essential.

For the past five years the work of AMC is composed of research and study of the performance of agricultural machines along with some development of its parts and the surveys on agricultural mechanization in order to find the way to improve the application of machines to agriculture. These activities take longer time than the period limited in the project.

At present, the policy of AMC is to do the researchs to develop the machines used in agriculture, especially in planting and harvesting both lowland and upland crops. Since the existing machines, locally made or imported as well, are found not so suitable for the cropping condition in Thailand. More development and improvement are needed to

improve its efficiency and also development of new "low cost" and "simple to handle" machines are very much in need. And this is supposed to be the work that AMC has to be responsible for. By these reasons the Agricultural Mechanization Technology Development Project is proposed.

2. Project Workplan :

The main activity of this project is to conduct research on agricultural machinery and mechanization to develop the machines and equipments that suit the local conditions and environments.

Research involving in the design and improvement of some machines applied for the production of low land and up ; and creps, emphasizing rice, corn, and sugarcane, along with the modification of the existing machines locally made, will be done in order to improve and to promote the application of mechanization in agricultural practice in thailand. Details of the five year project are proposed at the end of this document.

3. Objectives :

1. To conduct research work in the field of agricultural machinery, mechanization and related fields. The main proposal will be toward land preparation for rice transplanter, thresher, corn sheller and sugarcane harvester.
2. To develop the agricultural machinery and/or implements which are suitable for using in local condition.

3. To improve the existing agricultural machinery and equipments locally made.
4. To develop, to improve, and to extend technology in application of agricultural machinery by means of some media such as publication training, seminar, etc.

4. Responsible Units :

Agricultural Machinery Center (AMC), Kasetsart University
Kamphaengsaen Campus.

5. Importance and Benefits :

Upon the completion of the project, the land preparation for rice transplanter, rice thresher, corn sheller and corn harvester will be improved and developed to suit the local conditions. It means that not only the agricultural production will be improved but also the living standard of Thai farmers will be upgraded as well.

6. Subproject I : Land Preparation for Rice Transplanter

6.1 Rationale :

Thailand is an agricultural country with the majority of farmer occupies in rice farming. And even though the rice production of this country is one of the world's largest but the rice cultivation method is considered not much modernized.

Mechanization is applied to rice producing process in land preparation, pest control, threshing and some post harvest processes. The other work is usually done by hand, especially transplanting and harvesting.

In the field of rice planting this country has hundreds of year of experience in transplanting by hand, which consumes much time and labour and hard work for farmers. So, the transplanting work should be mechanized.

The rice transplanter is widely used in Japan, Korea, and Taiwan. But according to the Japanese experts and Thai counter parts, it is difficult in Thailand due to improper land preparation.

To settle this problem, studies of rice field characteristics, land preparation method, and its effect to the application of transplanter should be done to find the most suitable method to prepare the rice field for transplanter.

6.2 Importance and Benefits :

Upon the completion of the project the following benefits are expected :

1. Rice cultivation process in Thailand should be improved.
2. Production cost will be reduced due to less labour required in rice cultivation.
3. More mechanization technology should be learned by farmers to increase their own yields.
4. Rice transplanting method should be changed from hand to machine which makes the rice production more efficient.

6.3 Project Work Plan :

1. Study of soil characteristics and physical properties should be made for soil and several paddy fields. Data and significant information will be collected.

2. Study of suitable soil condition for transplanter, such as soil hardness, density, plasticity, etc. must be done under laboratory condition. Results will be analyzed for application of transplanter in real fields.
3. Study of hard pan and surface uniformity of rice field will be done to observe the best condition for using transplanter, along with the study of the most suitable depth of soil that the transplanter will work efficiently.
4. Land preparation in the real field then will be done to observe the results when using transplanter Modification will be made if necessary. This step will be done for several types of transplanter.

Working Staff :

1. Mr. Kanoksak Iam Opas M.Eng Leader
2. Mr. Akrawuth Tasanasongchan Ph.D.
3. Mr. Sakda Intarawichai M.S.
4. Mr. Akradet Artachinda M.S.
5. Mr. Siri Leeyawattananupong B.S.

7. Subproject II : Rice thresher

7.1 Rationale :

At present Thailand has already stepped into the age of mechanization, both in agriculture and industry. In the field of agriculture, tractors and implements are widely used in both upland and lowland cropping. In rice cultivation, which is some what different from other crops, mechanization is applied to land preparation as a main part. The other application of mechnaization to rice production is postharvest operation such as threshing and hulling.

Modern domestic threshing machines are very popular among farmers. But even though they are much improved, those threshing machines still need more technology improvement. Losses were found in many steps of operation. Among these, loss of rice grains blown through straw blowing duct is considered significant.

According to the tests which were done by Japanese experts and their counterparts, Thai researchers, loss of grains through straw blowing duct should be reduced in order to improve the machine efficiency. To do this some modification should be made to some parts of the machine as well as the improvement of some mechanism. And if this project achieves its goal, more rice yield should be obtained which, in return, will improve the production quantity and gain more income to farmers.

7.2 Importance and Benefits :

Since the average income of farmers is considered low in almost everywhere in Thailand, so, any technology that when applied to rice growing process, will bring up their income level, will be accepted. Thus, increasing production by reducing losses which occur through postharvest process is one way to gain more income to farmers without increasing other expenses. So, if the loss of rice grains which are blown away with straws is reduced to noticeable level, it will help increasing the quantity of rice produced, and yields more benefit to farmers.

7.3 Project Work Plan :

1. Performance and mechanism of existing domestic rice threshing machines will be observed and studied. Essential data will be collected.

2. Modification will be done to some of the parts, and the machine will be put to test to observe the efficiency and performance.
3. If necessary, improvement will be made and prototype will again be put to test until the result is satisfaction.

Working Staff :

1. Mr. Somyot Chirnakorn M.Eng Leader
2. Mr. Kanoksak Iam Opas M.Eng
3. Mr. Prayouth Suwanchewakorn B.S. (Ag.Eng.)

8. Subproject III : Corn sheller under high moisture content

8.1 Rationale :

Shelled corn in tropical countries such as Thailand usually contains high moisture which will easily form fungus infestation if the storage procedures are not carefully controlled, Drying of shelled corn is, needed before storage. At present, ear corn after harvested well be dried to about 20 percent moisture content before threshing. From the test of sheller done by Japanese expert of AMC and the Thai counterparts it was found that drying of shelled corn should be done prior to drying of ear corn because most of moisture content was in corn cobs. If the corn was immediately shelled after harvesting and before drying, the damage occurred to shelled corn by fungus infestation will be lower. However, the existing corn sheller are designed to shell corn at below 20 percent moisture content level and inefficiently applicable to high moisture content ear corn. (approximately 20 percent of moisture content or above at harvesting time). Therefore, the corn sheller for high moisture content condition should

be developed for better quality shelled corn. Since corn is considered as one of the important exporting goods and oftenly has some trouble with aflatoxin which is formed by Aspergillus flavus during the process, this project should be helpful to solve the problem.

8.2 Importance and Benefits :

Shelled corn is on among the important exporting goods that brings significant income to Thailand. But, lately, the demand for shelled corn from customers decreased remarkable due to the effect of fungus infestation. So, the development of corn sheller which can be used for high moisture content ear corn will be one way to solve this problem since the former study indicates that the damage caused by aflatoxin will be decreased if corn is shelled with high moisture content, before drying process. The decrease of the fungus infestation will directly improve the quality of exporting corn to meet the market demand.

8.3 Project Work Plan :

1. Testing of the performance of the existing corn shellers, data will be collected for analysis.
2. Improvement of sheller to be used for shelling ear corn in high moisture content condition.
3. Testing and evaluation of the improved sheller.
4. Designing and construction of the prototype of sheller.

Working Staffs : 1. Mr. Bhanchaw Phaholyotin M.S.(Ag.Eng.) Leader
2. Mr. Somyot Chirnakorn M.Eng.
3. Miss. Jesadee Kedjarune B.S.(Ag.Eng.)

9. Subproject IV : Whole Stock Sugarcane Harvester

9.1 Rationale :

Sugarcane is one of the major field crops in Thailand. More demand of sugar in the world causes the rapid growth of sugar factories in many countries including Thailand. And this makes the sugarcane planting spread out widely in this country in order to supply raw material to those factories.

Sugarcane growing at present in Thailand does not have much application of modern technology. Land preparation is done by tractors. Planting is done by hand and cultivation is almost negligible since sugarcane does not need much care. Harvesting is also by hand without any application of mechanization. Cutting sugarcane stems by hand, one by one, along with leave and top cutting causes the harvesting process so slow in operation and requires much of the laboures to do the job. Although some cane harvesters were imported and tried out into the field, it did not seem to work efficiently. Almost every sugar factory refused to accept burned canes cut to short pieces by harvesters because they were not so clean and could not be kept long after harvested. Sugarcane harvested by machines must be sent to factory immediately. This causes trouble to farmers because the quality of sugar cane decreases due to of a long distance hauling and a long time that the trucks have to wait before unloading at the factory.

Sugarcane cut into full length can be kept longer than those short pieces cut by machines. This is the advantage but the hand-harvesting process is so slow. So, the invention of the full-length cut harvester, using appropriate technology will be of more benefit to farmers. Machine will be of low cost, more convenient to operate, and take less time than labours.

9.2 Importance and Benefits :

With simple cane harvesting machine using appropriate technology the full-length cut sugarcane stems will be obtained to fulfill the need of factories. Time and labour cost will be saved. Moreover, the large sugarcane harvester, which cause tremendous amount of expense and never work successfully will be of no need.

9.3 Project Work Plan :

1. Study of the mechanism of existing sugarcane harvesters. field surveys will be conducted to observe their performance.
2. Study of characteristics of various sugarcane varieties in Thailand in order to find the most suitable method of cutting.
3. Design and construction of simple sugar cane cutter, using appropriate technology. Improvement will be done after the field test.
4. Design and construction of sugar cane detrasher will be made and the machine will be put to test.
5. Improvement will be made for better functioning of the detrasher.

Working Staff :

1. Mr. Akradet Artachinda M.S.(Ag.Eng.) Leader
2. Mr. Tanong Patoompong M.S. (Mechanization)
3. Mr. Sudsaisin Kaewrueng B.S. (Mechanization)

C. Equipment Requested

Sub-Project Title	Estimated Cost (β)
1. Land Preparation for Rice Transplanter	
2. Rice Thresher	
3. Corn Sheller under High Moisture Content	
4. Whole stalk Sugarcane Harvester	
Grand Total	35,000,000

LIST OF EQUIPMENT REQUESTED
FOR THE AGRICULTURAL MECHANIZATION DEVELOPMENT PROJECT

No.	Item	Made-model	Quantity	Estimated Cost (P)	Remark
1	16 Bit Computer with accessories		1 set		For other work that can not be done on existing 8 bit NEC set.
2	Transceiver set (YAESU)		3 sets		
	- Mobile unit		6 sets		
	- Handheld unit with VOX system		1 set		
	- Base station antenna tower		1		
3	Trailer truck HINO		1		For hauling tractors and heavy equipment
4	Truck, capacity over 6 tons (ISUZU)		1		
5	Dump truck (ISUZU)		1		
6	Corn picker/sheller		1 set		
7	Sugarcane cutter and detrasher		1 each		
8	4-wheel drive tractor, 100 HP. (FORD or equivalence)		1 set		
9	Hydraulic controller land leveler		1 set		
10	Small combined harvester for wet rice field		1 set		
11	4-wheel drive station wagon (TOYOTA)		1		For travelling in rugged terrain that can not be reached by ordinary car.
12	Blacksmith furnace		1 set		
13	Hydraulic system for lifting and overturn test, with recorder.		1 set		For tractor performance test.
14	Dryer, circulation type, 5 ton capacity		1 set		
15	PTO torquemeter		3 set		
16	4-inch centrifugal pump with engine, portable type. (EBARA)		1 set		For irrigation and drainage purpose.

No.	Item	Made-model	Quantity	Estimated Cost (P)	Remark
17	Signal generator		1 set		
18	FFT-analyzer with plotter (ONO SOKKI Model CF920)		1 set		
19	X-Y plotter with accessories		1 set		To be used with 16 Bit computer system
20	Grain moisture meter		1 set		
21	Grain physical property measuring set		1 set		
22	Tachometers, handy type		1 set		
	- for diesel engines (ONO SOKKI, Model GE450)		1 set		
	- for gasoline engines (ONO SOKKI; Model SE230)		1 set		
23	Tachometer, portable type		1 set		
	- Normal Speed Range		1 set		
	- Low Speed Range		1 set		
	- High Speed Range		1 set		
24	Stroboscope		2 sets		
25	Vibrometer, with analyzer		1 set		
26	Microcomputer, pocket type with cassette and printer		1 set		
27	Agricultural product seperating set		1 set		
28	Seperation sieves for agricultural products.		1 set		
29	Engine tune-up set stationary type		1 set		
30	Spot welder, portable type		1 set		
31	Grinder, stationary type		1 set		For precision tool sharpening.
32	Straingauge extensiometer		1 set		
33	Hedge cutter		1 set		

No.	Item	Made-model	Quantity	Estimated Cost (B)	Remark
34	Rake		1 set		
35	Tool bars		1 set		
36	Combustion gas tester-Stationary type		1 set		
37	Bending test device		1 set		
38	Compact drill		2 sets		
39	Power drill, handy type		2 sets		Low speed and high speed
40	Load cells		5 pcs.		100,200,500,1000 and 2000 kg.
41	Strain gauge of various type		1 set		
42	Blower, axial type		4 sets		
43	Scale, hook type		2 sets		
44	Movable thresher, multipurpose type		1 set		
45	Seedling tray		1000 pcs.		
46	Bags for combine machine		100 pcs.		
47	Hand tractor		3 sets		
48	Hole saw (9/16" to 6" dia.)		1 set		
49	Electric hand saw		1 set		
50	Bench lathe (Computerized)		1 set		
51	Drill set for electronic circuit board		1 set		
52	DC power regulator, 0-24 V., 25A.		1 set		
53	Metal surface finisher		1 set		
54	Hydrostatic motor		2 set		
55	Voltage stabilizer/conditioner, 220V, 30-40 KVA.		1 set		
56	Voltage stabilizer/conditioner, 220V.				

For accurate function of electronic devices. Item 55 is necessary for controlling of 2 testing laboratories. Item 56 is for individual use outside laboratories. (Line voltage in Kamphaengsaen generally varies $\pm 12\%$)

III-15

No.	Item	Made-model	Quantity	Estimated Cost (B)	Remark
57	Rice Threshers		3 sets		Local made, 3 different models
58	Corn sheller		3 sets		Local made, 3 different models
59	2-wheel tractors, with accessories		5 sets		Local made, 5 different models
60	Rice Transplanter		3 sets		3 different models
61	DC welder, with accessories		3 sets		For welding machine-grade steel
62	Small pipe bender, motor driven type, pipe diameter less than 1½ inches.		1 set		

Note Items number 57, 58 and 60 are requested for studying of mechanical performance for the design of prototype in subprojects 1, 2 and 3

Total Price Estimated :

35,000,000

LIST OF EQUIPMENT OUT OF ORDER (CLQC)

No.	Equipment	Allocation	Troubles	Requirement
1.	Amino acid analyzer (JEOL JLC 200A)	CB (Central Biochem)	Analytical column broke, analysis cannot be done	Need new parts
2.	Autoanalyzer (Technicon)	SF (Soil/fertilizer)	Block digester did not function	Need new part
3.	Autoclave steam generator (Hirayama)	AM (Applied Microbiology)	Too low gas pressure, under operation	Need repairment
4.	Automatic bomb calorimeter (Shimadzu CA-3)	CB	a bomb is worned out, unperfect function	Need new part
5.	Centrifuge, refrigerated (Kokusai H-251)	ST (Seed Technology)	Vacuum oil dried	Need new vacuum oil
6.	Centrifuge, ultra high speed (Hitachi 85P-72)	CB	Have no swinging bucket rotors 27 and 13 ml.	Need new rotors
7.	Conductivity meter (digital) (TOA CM-2A)	ST	Electric lamp for digital display is burnt	Need new parts
8.	Degasser (to be use with HPLC.)	CB	Chamber is broken, unknown cause	Need repairment
9.	Dehumidifier (Dryomatic 25 CT)	ST	Not function, unknown cause	Need repairment
10.	Dispenser, parafin (Sakura PS-SB)	CB	Unspecified item, unsuitable for work	Need specified item suitable for work

No.	Equipment	Allocation	Troubles	Requirement
11.	Evaporator, rotary (Eyela type N-1)	AM	Motor is burnt	Need new part
12.	Fraction collector (Eyela DF 200T)	PH (Post harvest research)	Have no microtubing pump, no function	Need accessories
13.	Freeze dryer (Eyela FD-1)	AM(1) ST(1)	Vacuum pump not function	Need inspection Need new vacuum oil
14.	Fruit hardness tester (Penetrometer FT 011)	ST	Out of function, unknown cause	Need inspection
15.	Gas chromatograph (Shimadzu GC-9A)	ES (Environmental Science)	One FID detector did not function	Need inspection
16.	Gas chromatograph (Shimadzu R1A)	PH	Data processor did not function	Need inspection
17.	Germinator, thermostatic (Kiya Seisakusho TGL-30)	ST	Water filter is worn out	Need new part
18.	Glass knife maker (Messer sunkay)	CB	cutting knife blade is worn out	Need new part
19.	Ultramicrotome (JEOL JUM-7)	CB	out of function, cannot cut specimen	Need inspection
20.	Heater mantle (TGK type TS-F)	AM(2)	Out of function, unknown cause	Need inspection

No.	Equipment	Allocation	Troubles	Requirement
21.	Homogenizer (Nissei AM-9, AM-10)	PH(1) AM(2)	Speed controlling device is burnt	Need new parts
22.	Hot plate, magnetic stirrer (Tokyo Rikakikai)	CB(2)	Out of function, motor failed to drive	Need inspection
23.	Incubator, illuminated (Kiya Seisakusho Ltd.)	PH(2)	Temperature cannot be controlled	Need inspection
24.	Knapsack sprayer (OMK MD-50DX)	HH (head worn)	Starting device failure	Need new part
25.	Muffle furnace, autocontrol (Mitamura Riken Kogyo, MRK)	SF	Out of function, unknown cause	Need inspection
26.	Nitrogen determination apparatus (MRK VAPOR-STILL VS-FA-I)	SF	Out of function, unknown cause	Need inspection
27.	Oven, drying (Mitamura Riken Kogyo CM-2A)	ST	Digital display not function	Need new electronic parts
28.	Pipette, micro (Justor 1100 Y)	CB(1) ES(1)	Out of function	
29.	Salinity meter (TOA Ogawa seiki, SA-1K)	ES	Lack of electrode	Need specified electrode
30.	Shaker, incubator (Iwashiya)	AM	Out of function, parts are worn out	Need new parts
31.	Seed moisture tester (Seed buro equipment RCT-B)	ST	Unperfect	Need standard tables for calibration.
32.	Spectrophotometer, IR (Jasco A-302)	ES	Thermocouple is worn out	Need new part

No.	Equipment	Allocation	Troubles	Requirement
33	Spectrophotometer, UV-VIS (Hitachi Model 200-20)	CB	Have no continuous flow cell, and micro-quartz cells	Need accessories
34	Thermohygrostat machine (Takeda GL-64)	ST	Heating coil and boiling tank not function	Need new parts
35	Tractor (Kubota B7100)	ST	Several parts are worn out	Need new parts and inspection
36	Water distiller (Yamato WA-30, WA-715)	CB(1) SF(1)	Discharge is burnt	Need repairment



KASETSART UNIVERSITY

CONCISE INFORMATION

1987

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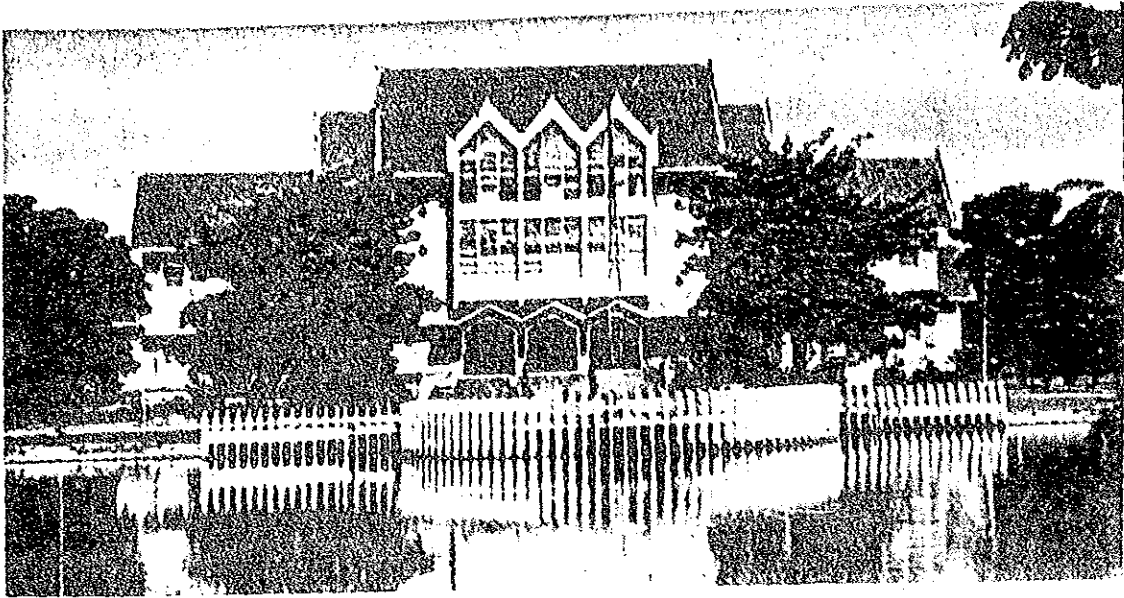
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*“Luang Suwan Monument”
(1946 - 1958)*

As the first full-time Rector of the University, Luang Suwan Vajokkasikij (Thongdee Resanonda) built up Kasetsart University into an internationally accredited institution. “Luang Suwan” as he was familiarly known, devoted himself on earning credibility for Kasetsart to gain much needed support among academicians, politicians and the general public that the university requires to move ahead in its role of community service.

BANGKHEN CAMPUS



Auditorium

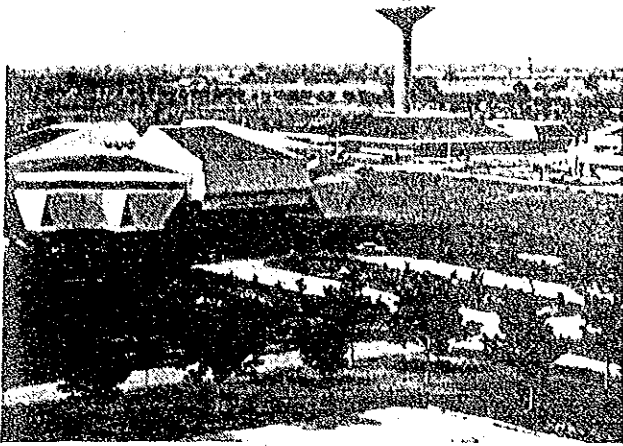


Main Library Bangkhen Campus

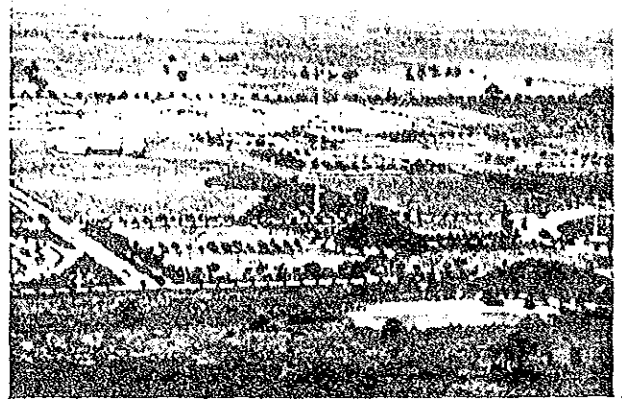


Administration Building

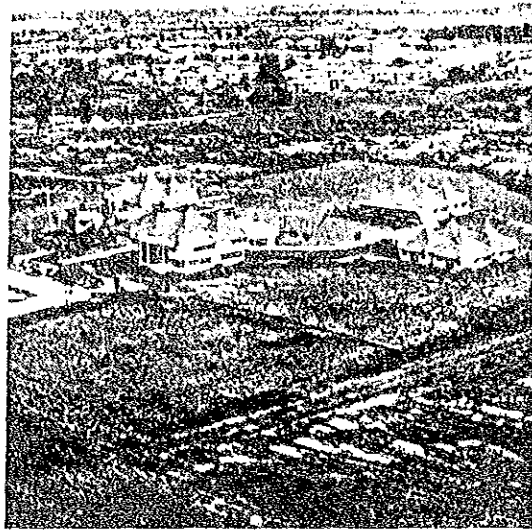
KAMPHAENGAEN CAMPUS



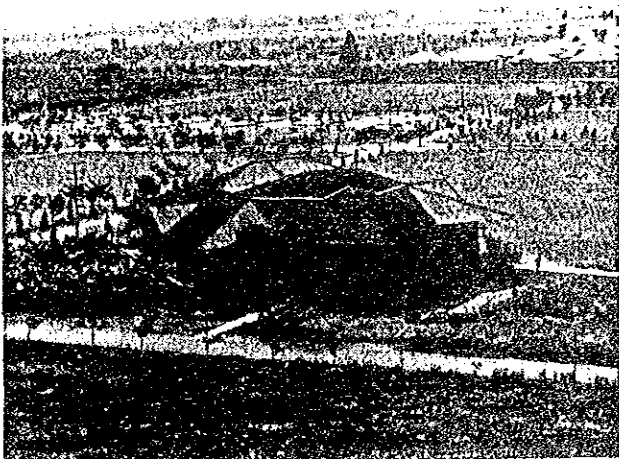
Central Lecture Hall



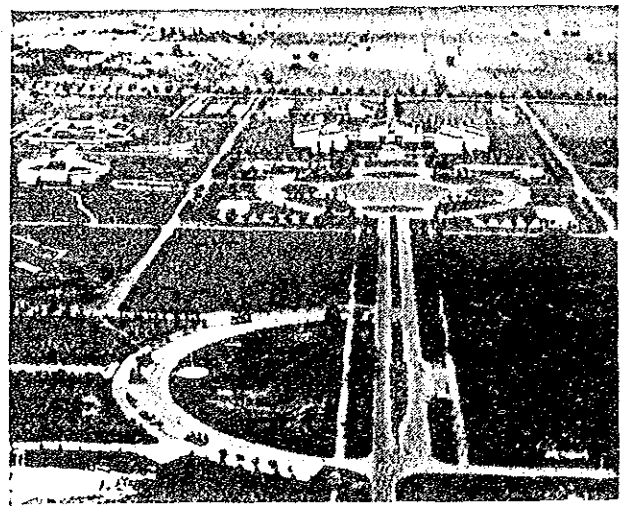
Gymnasium, Administration
Building and Canteen



Demonstration School



Student Affairs Division



Kamphaengsaen Campus

CONCISE INFORMATION ABOUT KASETSART UNIVERSITY 1987

GENERAL

Date of Foundation:	February 2, 1943
Postal Address:	50 Paholyothin Road Bangkhen, Bangkok 10900 Thailand
Cable:	UNIKASE 10900
Telephone:	5790113 (300 lines ext.) Rector's Office : 5792291, 5792292, 5792293 Kamphaengsaen campus : 034-242349
Type:	A government institution of higher learning under the Ministry of University Affairs
School Session :	First semester : June to October Second semester : November to March Summer session : April to May
Medium of Instruction:	Thai is the medium of instruction in practically all courses. English is also used in certain upper-division and graduate courses, but to a very limited extent.

BRIEF HISTORY

Kasetsart University emerged initially as College of Agriculture offering a 3-year non-degree curriculum under the Ministry of Agriculture (now Ministry of Agriculture and Cooperatives). On February 2, 1943, it was conferred a university status through amalgamation of the existing Colleges of Agriculture and Forestry of the Ministry of Agriculture at that time and creation of two additional faculties, namely Faculty of Cooperative Science (now Economics and Business Administration) and Faculty of Fisheries. Subsequent legislation in 1955 brought about the inclusion of two other faculties, namely, Faculty of Veterinary Medicine from the University of Medical Science (now Mahidol University) and Faculty of Engineering from the Royal Irrigation Department of the Ministry of Agriculture. In 1966, Faculty of Science and Arts, and Graduate School, a coordinating unit for graduate study program of all disciplines, were established; and in 1969, 1974 and 1980, Faculties of Education, Social Sciences and Agro-Industry came into existence, respectively. In 1981, the Faculty of Science and Arts was split into Faculty of Science and Faculty of Humanities. Thus, at present, there are altogether 12 faculties in the University, namely, Agriculture, Agro-Industry, Economics and Business Administration, Education, Engineering, Fisheries, Forestry, Humanities, Science, Social Sciences, Veterinary Medicine, and Graduate School.

Kasetsart University is the first university in Thailand to offer degree programs in agricultural sciences. Such offering was dictated primarily by the large demand for well-trained manpower for the development of agriculture and related fields in the country. The ensuing large increase in the need for degree holders in many other fields in addition to agriculture and related sciences as a result of the on-going intensive effort in national development has led Kasetsart University to develop into a full-fledged university during recent years. Additional faculties and units of faculty rank have consequently been instituted to take charge of the newly developed programs. Such units are Institute of Food Research and Product Development, Office of Extension and Training, Office of University Library, Research and Development Institute and Office of University Computer. On the basis of the history of its development, it may be noted that in many aspects Kasetsart University fits well with the "Land Grant" model of universities in The United States.

Recognizing the need to provide a leading role in manpower training for agriculture and rural development that Kasetsart University must contribute, it has conducted, with assistance from various appropriate sources --the Rockefeller Foundation, the University of California, the Oregon State University, and Cornell University teams, --the feasibility studies of university development and expansion to meet this need with an effective but flexible approach. Another compelling factor for the university expansion is the rapid enlargement of highschool graduates during 1960's and 1970's who must seek and compete for rather limited seats available at the country institutions of higher learning. This fact was more than confirmed when Kasetsart student enrolment surpassed the original projected target for 1980 of 5,800 by 1970. With the original campus at Bangkok Kasetsart University could not expect to make any substantial development in terms of accommodation and seating capacity, for it must share the premise with the Ministry of Agriculture and Cooperatives leaving an area of approximately 125 hectares for its exclusive use. With this prospect and constraints, the University finally adopted a development project, with the blessing of the Thai Government and with the financial assistance of the IBRD loan to develop the second campus on a 1,250-hectare site in Kamphaengsaen district, Nakhon Pathom province, 80 kilometres west-northwest of Bangkok. The Project called for the new establishment of strong teaching and research facilities in agricultural sciences. The original Bangkok campus would be developed in such a manner that it would strengthen instruction and research on both campuses. The project was officially started in May 1972 and completed in July 1980. Excellent additional research and extension facilities have been added through the grant-aid program of the Government of Japan that has greatly accentuated the service capability of the Kamphaengsaen Campus when employed in joint effort with other government agencies and universities.

Instruction on the new campus was started in November 1979 to some 1,000 junior students in agriculture, agricultural education, agricultural and irrigation engineering and veterinary medicine. The newly completed facilities provide the first phase of the second campus development which is to be continued stepwise in order to accommodate freshmen and sophomores in certain appropriate disciplines to bring the enrolment up to 3,000, 4,500, 6,000 until the full development is reached providing for 12,000 students. The Bangkok campus is now serving some 10,500 undergraduates and graduates. It is also anticipated that Bangkok facilities shall, in addition to strengthening the Kamphaengsaen development, also serve the new requirements that Kasetsart University must expand and strengthen services in the fields of business, education, industry and health.

FUNCTIONS AND ORGANIZATION

Kasetsart University is a government institution attached to the Ministry of University Affairs. Academic, budgetary and personnel matters of the University are under the supervision of the Ministry of University Affairs. The University Council is the governing body empowered to formulate academic policies and to issue rules and regulations on university administrative matters. With a membership of 35, including its Chairman, the University Council comprises two categories of members: *ex-officio* and appointed. The *ex-officio* members are the Secretary-General of the National Education Commission, the Rector, Vice-Rectors, Deans and Directors. The chairman and a varying number of members (*at least 4 but not more than 9*) are appointed by the Crown on grounds of merit and upon the recommendation of the Cabinet. The term of office for the appointed Council members is two years. The four primary functions of Kasetsart University as well as other state universities in Thailand are :-

1. *To implement high-level educational curricula in various technological and professional fields,*
2. *To conduct research pertinent to the educational curricula being implemented, the attainment of high-quality academic staff and upkeep of a dignified institution of higher learning, and the prevailing technical, economic and social needs of the nation,*
3. *To render technological services to the society and promote application of desirable research findings among members of the various occupational groups of the country, and*
4. *To assist in preserving national culture.*

Administratively, Kasetsart University is made up of a number of academic units called "*faculty*" and other units of faculty rank: the Rector is the chief executive, with Kasetsart University Civil Service Sub-Committee and Council of Deans as executive boards. With the exception of the Graduate School, all faculties are subdivided into academic departments in accordance with the distinct fields of study being offered. The Graduate School functions primarily as the coordinating unit for graduate study programs that are being implemented in various academic departments under its direct jurisdiction. Other units of faculty rank are subdivided into divisions or sections in accordance with the areas of their respective responsibilities.

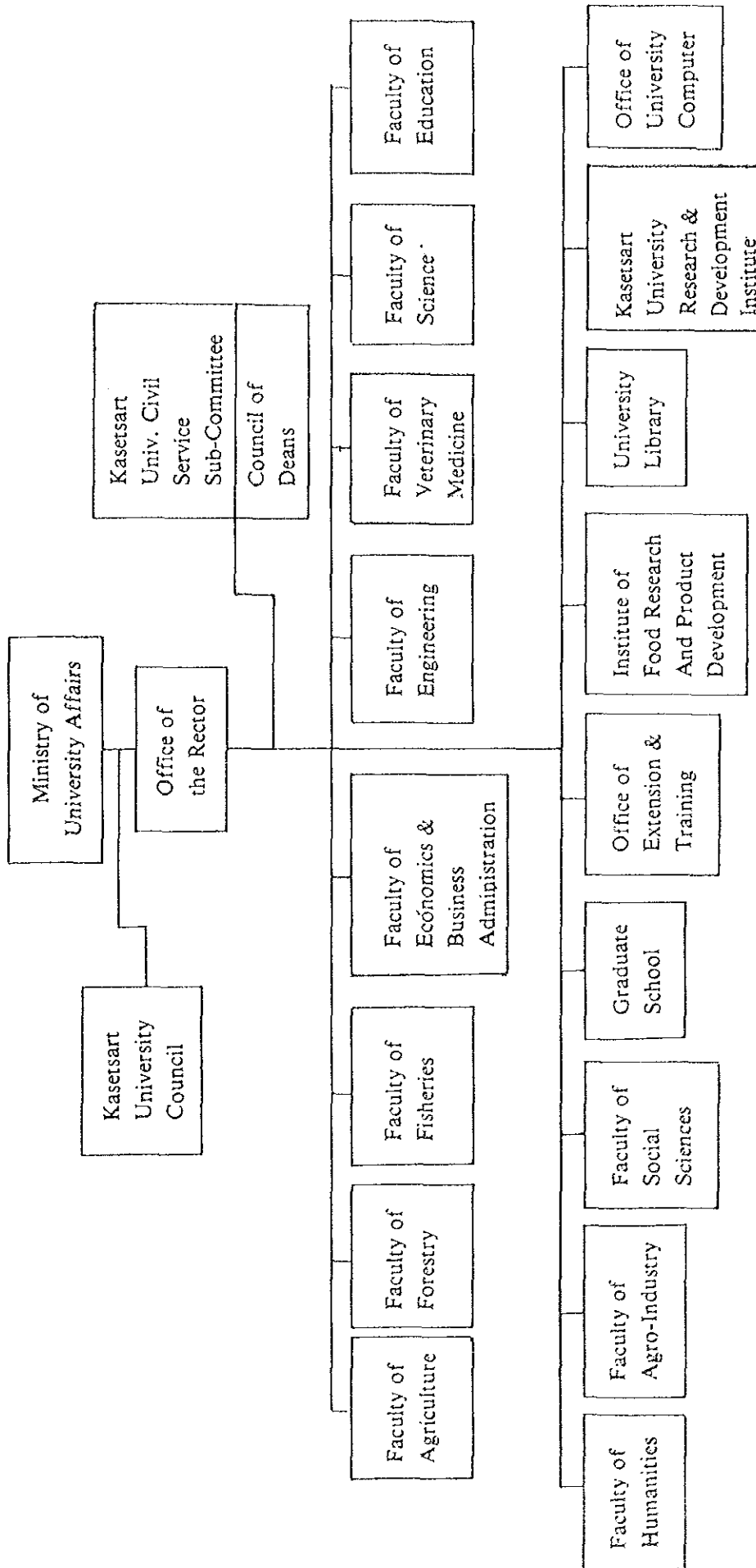
Each faculty is headed by a dean, who also serves as chairman of the executive board of the faculty. The heads of academic departments constitute *ex-officio* members of the executive board of the corresponding faculty. Likewise, each of the other units of faculty rank is headed by a director who chairs an executive board of nine selected university wide staff members. The Graduate School is headed by a dean; a group of university-wide graduate staff members constitute its executive board with the dean as chairman.

UNIVERSITY ADMINISTRATIVE OFFICERS

Rector:

Sutharm Areekul, B.S. (Kasetsart), M.S. (Oregon State University), Ph.D. (Washington State University); Professor of Entomology.

ORGANIZATION CHART



Vice-Rector for Special Activities:

Pavin Punsri, B.S., M.S. (University of California at Davis); Professor of Pomology.

Vice-Rector for Academic Affairs:

Charan Chantalakhana, B.S., M.S., Ph.D. (Iowa State University); Professor of Animal Science.

Vice-Rector for Administration:

Pibul Chai-anan, D.V.M. (Kasetsart); Associate Professor of Veterinary Medicine.

Vice-Rector for Research and Development Planning:

Kamphol Adulavidhaya, B.S. (honors), M.S. (Oregon State University), Ph.D. (Purdue University); Associate Professor of Agricultural Economics.

Vice-Rector for Kamphaengsaen Campus:

Sujin Jinahyon, B.S. (University of California), M.S., Ph.D. (Iowa State University); Professor of Agronomy.

Vice-Rector for Student Affairs:

Samnao Kajornsin, B.S., M.S. (Kasetsart), Ph.D. (Michigan State University); Assistant Professor of Education.

University Librarian:

Piboonsin Watanapongse (Mrs.), B.A., M.A. (Chulalongkorn).

Registrar:

Vicha Sukit, B.S. Agr. (Kasetsart), M.S., Ph.D. (University of the Philippines); Assistant Professor of Biology.

UNIVERSITY ADMINISTRATIVE STAFF

Director of Medical Service Center :

Bhinyo Kalayanamitr, M.D.

Chief of General Affairs Division :

Sermasuk Liewlom (Mrs.), B.A.

Director of Personnel Division :

Pichitchai Pongudom, LL.B.

Chief of Finance Division :

Panwipa Uasoontornwatana (Mrs.), B.Acc.

Chief of Planning Division :

Rungcharoen Kanchanomai, D.V.M.; Associate Professor of Veterinary Medicine

Chief of Student Affairs Division :

Preecha Tradtarntip, M.S.

Chief of Educational Service Division :

Vicha Sukit, Ph.D.; Assistant Professor of Biology

Chief of Vehicle, Building and Physical Plant Division :

M.L. Rakkiat Suksawasdi, B.S.

DEANS OF FACULTIES

Agriculture:

Somsak Yangnai, B.S. Agr. (Hons.) (Kasetsart), M.S. (University of the Philippines), Ph.D. (Oregon State University); Associate Professor of Soil Science.

Agro-Industry:

Tasane Sorasuchart (Miss), B.S. (Chulalongkorn), M.S. (Oregon State University); Assistant Professor of Fishery Products.

Economics and Business Administration :

Chamnien Boonma, B.S. (Kasetsart), M.S. (University of Hawaii), Ph.D. (University of Illinois); Assistant Professor of Agricultural Economics.

Education :

Yupa Veravaidhaya (Miss), B.Ed. (Chulalongkorn), M.A., Ed.D. (University of Northern Colorado); Assistant Professor of Education.

Engineering:

Boonsom Suwachirat, B.Eng. (Kasetsart), M.Eng. (SEATO Graduate School); Associate Professor of Civil Engineering.

Fisheries:

Wit Tarnchalanukit, B.S. Fisheries (Kasetsart); Associate Professor of Aquaculture.

Forestry:

Somsak Sukwong, B.S.F. (Hons.) (Kasetsart), M.F., Ph.D. (Colorado State University); Assistant Professor of Forest Biology.

Humanities :

Singthong Pornnikom, B.A. (Mahamongkut), M.A. (BHU); Instructor of Philosophy and Religion.

Science :

Sookpracha Vachananda, B.S. (Chulalongkorn), M.S., Ph.D. (Oregon State University); Assistant Professor of Chemistry.

Social Sciences :

Nipon Kantasewi, B.S., M.Ed. (University of California), Ph.D. (Pennsylvania State University); Professor of Sociology and Anthropology.

Veterinary Medicine :

Pirom Srivoranat, D.V.M. (Kasetsart); Associate Professor of Veterinary Pathology.

Graduate School :

Yougyut Chiemchaisri, B.S., M.S., Ph.D. (University of Wisconsin); Assistant Professor of Chemistry.

DIRECTORS OF UNITS OF FACULTY RANK

Institute of Food Research and Product Development :

Bulan Phithakpol (Miss), B.S. (University of California), M.S. (Cal Poly).

Office of Extension and Training :

Phorn Suwanvajokkasikij, B.S. Agr. (Kasetsart), M.S. (Utah State University); Associate Professor of Agricultural Extension.

Office of University Library :

Piboonsin Watanapongse (Mrs.), B.A., M.A. (Chulalongkorn).

Research and Development Institute (KURDI):

Thira Sutabutra, B.S. (Hons.), M.S., Ph.D. (University of California at Davis); Associate Professor of Plant Pathology.

Office of University Computer :

Yanyong Boonlong, B.S. (Cornell University), M.S. (University of Illinois); Assistant Professor of Civil Engineering.

DIRECTORS OF CENTERS**National Agricultural Extension and Training Center :**

Poom Khumgliang, B.S. Agr., M.A. (C.D.); Assistant Professor of Agricultural Extension.

National Corn and Sorghum Research Center :

Rachain Thiraporn, B.S. Agr., M.S. (Kasetsart), D. Agr. (University of Kiel); Assistant Professor of Agronomy.

National Swine Research and Training Center :

Somchai Chanswang, B.S. Agr., M.S. (Kasetsart), Ph.D. (Ohio State University); Instructor of Animal Science.

Agricultural Machinery Center :

Banchaw Phaholyothin, B.S. (University of the Philippines), M.S. (West Virginia University); Assistant Professor of Agricultural Engineering.

Central Laboratory and Greenhouse Complex :

Supat Attathom, B.S. (Kasetsart), M.S., Ph.D. (University of California); Assistant Professor of Plant Pathology.

National Biological Control Research Center :

Banpot Napompeth, B.S. Agr. (Panjab University), M.S., Ph.D. (University of Hawaii); Assistant Professor of Entomology.

Highland Agriculture :

Pavin Punsri, B.S., M.S. (University of California at Davis), Professor of Pomology.

The Center for Applied Economics Research :

Tongroj Onchandra, B.S. (Hons.) (Kasetsart), M.S., Ph.D. (University of Illinois); Associate Professor of Agricultural Economics.

CHAIRMAN OF STANDING COMMITTEES**Education Committee :**

Charan Chantalakhana, B.S., M.S., Ph.D. (Iowa State University); Professor of Animal Science.

Student Affairs Committee :

Vice-Rector for Student Affairs

Public Relations Committee :

Chakrit Julakasawee, B.S. Agr. (Kasetsart).

Textbook and Instructional Material Production Committee :

Vicha Sukit, B.S. Agr. (Kasetsart), M.S., Ph.D. (University of the Philippines); Assistant Professor of Biology.

Staff Housing Committee :

Seri Drabyasara, B.S. (Kasetsart); Assistant Professor of Agriculture.

Sports Committee :

Sammao Kajornsin, B.S., M.S. (Kasetsart), Ph.D. (Michigan State University); Assistant Professor of Education.

The University Academic Council Committee :

Kasem Chunkao, B.S.F. (Kasetsart), M.S. (Colorado State University), Ph.D. (University of Washington); Professor of Forest Conservation.

HEADS OF ACADEMIC DEPARTMENTS**1. Faculty of Agriculture :**

Department	Head
Agricultural Extension and Communication	<i>Pote Boonruang</i> , Ed.D. Assistant Professor
Agronomy	<i>Chairerg Maneephong</i> , Ph.D. Associate Professor
Animal Science	<i>Boonlua Rengsirikul</i> , M.S. Assistant Professor
Entomology	<i>Nit Kirtibutr</i> , Ph.D. Assistant Professor
Farm Mechanics	<i>Aram Varanyanont</i> , B.Sc. Assistant Professor
Home Economics	<i>Priya Ketudat</i> (Mrs.), M.S. Assistant Professor
Horticulture	<i>Suranant Supatarapun</i> , Ph.D. Associate Professor
Plant Pathology	<i>Vichai Korpraditskul</i> , Dr.Sc.Agr. Assistant Professor
Soil Science	<i>Amnat Suwanarit</i> , Ph.D. Associate Professor

2. Faculty of Agro-Industry :

Department	Head
Biotechnology	<i>Supapong Bhuwathanapan</i> , Ph.D. Instructor
Food Science and Technology	<i>Saisanom Praditduang</i> (Mrs.), M.S. Assistant Professor
Packaging Technology	<i>Thanong Pakrushpan</i> , Ph.D. Associate Professor
Product Development	<i>Vichai Haruthaithanasan</i> , M.Sc. Associate Professor

3. Faculty of Economics and Business Administration :

Department	Head
Accounting	<i>Vichitra Poonpermsub</i> (Mrs.), M.B.A. Assistant Professor
Agricultural Economics	<i>Chaiwat Konjing</i> , Ph.D. Instructor
Business Administration	<i>Chanpen Japakaset</i> (Mrs.), M.B.A. Assistant Professor
Cooperative Science	<i>Vinai Artkongharn</i> , M.A. Assistant Professor
Economics	<i>Prajoed Sinsup</i> , Ph.D. Professor
Marketing	<i>Prasit Yamali</i> , M.B.A. Instructor

4. Faculty of Education :

Department	Head
Education	<i>Kitiya Phornsadja</i> (Miss), Ph.D. Instructor
Educational Technology	<i>Chalongchai Surawatanaboon</i> , M.Ed. Instructor
Physical Education	<i>Sanong Nopasong</i> , B.Ed. Instructor
Vocational Education	<i>Kanchana Chuatongdee</i> (Mrs.), M.A. Assistant Professor

5. Faculty of Engineering :

Department	Head
Agricultural Engineering	<i>Kamnuan Tanpan</i> , M.S. Assistant Professor
Civil Engineering	<i>Sompothi Vivithkeyoonvong</i> , Ph.D. Assistant Professor
Electrical Engineering	<i>Jamnarn Hawkierti</i> , Ph.D. Associate Professor
Industrial Engineering	<i>Pichit Sukchareonpong</i> , D.Eng. Associate Professor
Irrigation Engineering	<i>Wiboon Boonyatharokul</i> , Ph.D. Associate Professor
Mechanical Engineering	<i>Santi Viriyawit</i> , Ph.D. Instructor
Water Resources Engineering	<i>Chukiet Subphaisal</i> , M.Eng. Assistant Professor

6. Faculty of Fisheries :

Department	Head
Aquaculture	<i>Wiang Chuapoehak</i> , Ph.D. Associate Professor

Fishery Biology	<i>Rassmee Sroiwattana</i> , M.Sc. Instructor
Fishery Management	<i>Kungwan Jantarashote</i> , M.S. Assistant Professor
Fishery Products	<i>Amnuay Chotiyawong</i> , M.S. Associate Professor
Marine Science	<i>Chaloemwilai Chuensri</i> , M.S. Assistant Professor
7. Faculty of Forestry :	
Department	Head
Conservation	<i>Kasem Chunkao</i> , Ph.D. Professor
Forest Biology	<i>Utis Kutintara</i> , Ph.D. Assistant Professor
Forest Engineering	<i>Chanchai Yarwudhi</i> , Ph.D. Instructor
Forest Management	<i>Lert Chantanuparb</i> , Ph.D. Associate Professor
Forest Products	<i>Niyom Petchpud</i> , M.A. Instructor
Silviculture	<i>Choob Khemnark</i> , M.S. Associate Professor
8. Faculty of Humanities :	
Department	Head
Career Sciences	<i>Kulasuk Chayangam</i> (Mrs.), Ph.D. Professor
Communication Arts	<i>Piengpen Panichapat</i> (Mrs.), M.A. Assistant Professor
Languages	<i>Chamai Durdarananda</i> (Mrs.), M.A. Associate Professor
Library Science	<i>Somboon Saichamjunta</i> (Mrs.), M.A. Librarian
Linguistics	<i>Kamala Nakasiri</i> (Mrs.), M.A. Associate Professor
Literature	<i>Wanna Nawigamune</i> (Mrs.), M.A. Instructor
Philosophy and Religion	<i>Phrom Srivongse</i> , M.A. Assistant Professor
9. Faculty of Science :	
Department	Head
Applied Radiation and Isotopes	<i>Sumin Smutkupta</i> , Dr. Sc. Agr. Associate Professor
Botany	<i>Ath Boonitee</i> , M.S. Associate Professor

Chemistry	<i>Sukanda Rojanasoonthon</i> (Mrs.), M.S. Assistant Professor
Genetics	<i>Paderm Ratisoontorn</i> , B.S. Assistant Professor
Mathematics	<i>Panmas Kunchai</i> (Miss), M.Ed. Instructor
Microbiology	<i>Malee Suwana-Adth</i> (Mrs.), Ph.D. Instructor
Physics	<i>Vidhurn Hongsumalya</i> , M.S. Associate Professor
Statistics	<i>Songsiri Taesombat</i> (Mrs.), Ph.D. Assistant Professor
Zoology	<i>Lamom Busapavanich</i> (Miss), M.S. Assistant Professor

10. Faculty of Social Sciences :

Department	Head
Geography	<i>Tasnee Anaman</i> (Miss), M.Ed. Assistant Professor
History	<i>Phuangphet Suratanakavikul</i> (Mrs.), M.A. Associate Professor
Law	<i>Somsith Wichitpong</i> , LL.B. Assistant Professor
Political Science and Public Administration	<i>Nuanjun Tasanachaikul</i> (Mrs.), M.S.W. Associate Professor
Psychology	<i>Aree Petchpud</i> (Mrs.), Ph.D. Associate Professor
Sociology and Anthropology	<i>Narong Srisawas</i> , Ph.D. Associate Professor

11. Faculty of Veterinary Medicine :

Department	Head
Anatomy	<i>Boontham Chongcharoen</i> , D.V.M. Assistant Professor
Medicine	<i>Choosri Promwarathorn</i> , D.V.M. Assistant Professor
Obstetrics, Gynaecology and Animal Reproduction	<i>Samutra Sirivejpandu</i> , D.V.M. Assistant Professor
Pathology	<i>Nisit Muangsri</i> , Dip in Vet. Path. Assistant Professor
Pharmacology	<i>Peerapol Euswas</i> , D.V.M. Assistant Professor
Physiology	<i>Sopa Sondae</i> , D.V.M. Assistant Professor
Surgery	<i>Prapant Kessank</i> , D.V.M. Assistant Professor

AFFILIATED INSTITUTIONS

1. National Corn and Sorghum Research Center

This Center is a joint undertaking since 1966 between Ministry of Agriculture and Cooperatives and Kasetsart University with a primary purpose of intensive utilization of the available technical know-how and resources of the two government agencies in the promotion of corn and sorghum production in the country. It is located at the Suwan Farm of the University in Pakchong District of Saraburi Province, about 150 kilometers northeast of Bangkok. Its activities have been supported by/in cooperation with many agencies --notably the Rockefeller Foundation, CIMMYT, and ICRISAT. Improved seeds of high yield and good downy mildew resistance together with new management techniques are now giving farmers better production. Training activities for local and international personnels of various levels have been conducted at the Center.

2. National Swine Research and Training Center

This is another joint effort between Ministry of Agriculture and Cooperatives and Kasetsart University with intensive research and non-degree training in the various aspects of swine production as the common interest. The Center aims to provide reliable breeding stocks, improved management for efficient production and coordinated efforts between farmers and government/private sectors in building a stable nationwide swine production. Its headquarters are located at Kamphaengsaen campus of Kasetsart University, with stations for breeding stock and for management research supported by the Ministry.

3. National Biological Control Research Center (NBCRC)

Through the agreement of the National Research Council of Thailand and Kasetsart University, the National Biological Control Research Center was established in 1973 to handle all works related to biological control of pests of agricultural as well as public health importance.

NBCRC is operated in initial phase by a subcommittee consisting of representatives from various institutional collaborators. The cooperating agencies include Departments of Agriculture, Fisheries, and Forestry of the Ministry of Agriculture and Cooperatives; Ministry of Public Health; and other Universities --Mahidol, Chiangmai, Khonkaen, and Prince of Songkhla.

Eventually the University will be solely responsible for operation and organization of NBCRC in close collaboration with cooperating agencies. The national headquarters will be located on Kamphaengsaen campus with regional subcenters representing various geographical areas of Thailand in Bangkok, Chiang Mai, Khonkaen and Hadyai. With its international context in nature and scope of work, NBCRC is also engaged in cooperative projects with other of institutions outside the country such as BIOTROP, Indonesia, State of Hawaii, Department of Agriculture, US Department of Agriculture. Cooperation is also being sought and given to other international agencies such as the Commonwealth Institute of Biological Control (CIBC), International Organization of Biological Control (IOBC), and other interested agencies.

SOME STATISTICS PERTINENT TO INSTRUCTION AND RESEARCH

1. Composition of Academic Staff (as of July 1, 1986)

Position	Highest Degree Earned			Total
	Bachelor's	Master's	Doctorate	
<i>1.1 Faculty of Agriculture</i>				
Professor	-	1	4	5
Associate Professor	2	12	26	40
Assistant Professor	13	52	48	113
Instructor	14	50	25	89
Total	29	115	103	247
<i>1.2 Faculty of Agro-Industry</i>				
Professor	-	-	-	-
Associate Professor	-	3	3	6
Assistant Professor	-	6	3	9
Instructor	-	11	5	16
Total	-	20	11	31
<i>1.3 Faculty of Economics and Business Administration</i>				
Professor	-	-	1	1
Associate Professor	-	11	8	19
Assistant Professor	7	29	13	49
Instructor	4	39	13	56
Total	11	79	35	125
<i>1.4 Faculty of Education</i>				
Professor	-	-	-	-
Associate Professor	-	3	5	8
Assistant Professor	3	27	12	42
Instructor	92	154	11	257
Total	95	184	28	307

Position	Highest Degree Earned			Total
	Bachelor's	Master's	Doctorate	
<i>1.5 Faculty of Engineering</i>				
Professor	-	1	-	1
Associate Professor	1	5	5	11
Assistant Professor	3	29	13	45
Instructor	8	34	6	48
Total	12	69	24	105
<i>1.6 Faculty of Fisheries</i>				
Professor	-	-	-	-
Associate Professor	1	6	3	10
Assistant Professor	2	11	5	18
Instructor	3	6	3	12
Total	6	23	8	40
<i>1.7 Faculty of Forestry</i>				
Professor	-	-	1	1
Associate Professor	1	11	11	23
Assistant Professor	-	6	12	18
Instructor	6	10	4	20
Total	7	27	28	62
<i>1.8 Faculty of Humanities</i>				
Professor	-	-	1	1
Associate Professor	-	4	-	4
Assistant Professor	2	29	6	37
Instructor	5	30	5	40
Total	7	63	12	82

Position	Highest Degree Earned			Total
	Bachelor's	Master's	Doctorate	
<i>1.9 Faculty of Science</i>				
Professor	-	1	1	2
Associate Professor	-	9	7	16
Assistant Professor	13	59	28	100
Instructor	19	60	14	93
Total	32	129	50	211
<i>1.10 Faculty of Social Sciences</i>				
Professor	-	-	1	1
Associate Professor	-	14	5	19
Assistant Professor	2	16	-	18
Instructor	3	18	-	21
Total	5	48	6	59
<i>1.11 Faculty of Veterinary Medicine</i>				
Professor	-	-	-	-
Associate Professor	4	2	6	12
Assistant Professor	13	4	16	33
Instructor	16	4	4	24
Total	33	10	26	69
<i>1.12 Graduate School</i>				
Professor	-	-	-	-
Associate Professor	-	-	-	-
Assistant Professor	1	-	-	1
Instructor	1	2	-	3
Total	2	2	-	4

Position	Highest Degree Earned			Total
	Bachelor's	Master's	Doctorate	
<i>1.13. Institute of Food Research and Product Development</i>				
Professor	-	-	-	-
Associate Professor	-	-	-	-
Assistant Professor	-	-	1	1
Instructor	-	-	-	-
Total	-	-	1	1
<i>1.14 Extension and Training Office</i>				
Professor	-	-	-	-
Associate Professor	-	4	2	6
Assistant Professor	1	6	2	9
Instructor	-	5	-	5
Total	1	15	4	20
<i>1.15 Office of the Rector</i>				
Professor	-	-	1	1
Associate Professor	-	-	-	-
Assistant Professor	1	1	-	2
Instructor	2	2	-	4
Total	3	3	1	7
<i>Grand Total</i>	<i>243</i>	<i>787</i>	<i>340</i>	<i>1,370</i>

2. Curricula of Instruction (Academic Year 1986)

Curriculum	Major Discipline	Duration (Years)	Total Units Required
<i>Faculty of Agriculture</i>			
(1) B.S. (Agriculture)	<i>Agricultural Extension and Communication</i> <i>Agronomy</i> <i>Animal Science</i> <i>Entomology</i> <i>Farm Mechanics</i> <i>Horticulture</i> <i>Plant Pathology</i> <i>Soil Science</i>	4	148
(2) B.S. (Home Economics)		4	149
(3) B.S. (Pest Management)		4	148
<i>Faculty of Agro-Industry</i>			
(1) B.S. (Agro-Industrial Product Development)		4	147
(2) B.S. (Biotechnology)		4	146
(3) B.S. (Food Science and Technology)		4	147
(4) B.S. (Packaging Technology)		4	147
<i>Faculty of Economics and Business Administration</i>			
(1) B.S. (Accounting)		4	143
(2) B.S. (Agricultural Economics)		4	147
(3) B.S. (Business Administration)		4	143
(4) B.S. (Cooperative Economics)		4	144
(5) B.S. (Economics)		4	145
(6) B.S. (Marketing)		4	143
<i>Faculty of Education</i>			
(1) B.A. (Home Economics Education)		4	142
(2) B.A. (Physical Education)		4	142
(3) B.Ed. (Business Education)		4	141
(4) B.Ed. (Health Education)		4	142
(5) B.S. (Agricultural Education)		4	145
(6) B.S. (Physical Education)		4	142
<i>Faculty of Engineering</i>			
(1) B.Eng. (Agricultural Engineering)		4	150
(2) B.Eng. (Civil Engineering)		4	150
(3) B.Eng. (Electrical Engineering)		4	149

Curriculum	Major Discipline	Duration (Years)	Total Units Required
(4) B.Eng. (Industrial Engineering)		4	150
(5) B.Eng. (Irrigation Engineering)		4	150
(6) B.Eng. (Mechanical Engineering)		4	150
(7) B.Eng. (Water Resources Engineering)		4	150
<i>Faculty of Fisheries</i>			
(1) B.S. (Fisheries)	<i>Aquaculture</i>	4	146
	<i>Fishery Biology</i>		
	<i>Fishery Management</i>		
	<i>Fishery Products</i>		
	<i>Marine Science</i>		
<i>Faculty of Forestry</i>			
(1) B.S. (Forestry)	<i>Forest Products</i>	4	150
	<i>Forest Resource</i>		
	<i>Social Forestry</i>		
<i>Faculty of Humanities</i>			
(1) B.A. (English)		4	147
(2) B.A. (French)		4	147
(3) B.A. (German)		4	147
(4) B.A. (Japanese)		4	147
(5) B.A. (Thai)		4	147
(6) B.A. (English Literature)		4	145
(7) B.A. (Thai Literature)		4	146
(8) B.A. (Translation)		4	145
(9) B.A. (Hotel Studies)		4	147
(10) B.A. (Mass Communication)		4	143
(11) B.A. (Music)		4	143
(12) B.A. (Philosophy and Religion)		4	149
(13) B.A. (Secretarial Science)		4	147
(14) B.A. (Tourism)		4	147
<i>Faculty of Science</i>			
(1) B.A. (Mathematics)		4	144
(2) B.S. (Biology)	<i>Applied Radiation and</i>	4	144
	<i>Isotopes</i>		
	<i>Biology</i>		
	<i>Botany</i>		

Curriculum	Major Discipline	Duration (Years)	Total Units Required
	<i>Genetics</i>		
	<i>Microbiology</i>		
	<i>Zoology</i>		
(3) B.S. (Chemistry)		4	144
(4) B.S. (Mathematics)		4	144
(5) B.S. (Physics)		4	144
(6) B.S. (General Science)		4	144
(7) B.S. (Statistics)		4	144
<i>Faculty of Social Sciences</i>			
(1) B.A. (Geography)		4	142
(2) B.A. (Political Science)		4	148
(3) B.A. (History)		4	145
(4) B.A. (Sociology and Anthropology)		4	143
(5) B.S. (Psychology)		4	144
<i>Faculty of Veterinary Medicine</i>			
(1) D.V.M.		6	219
<i>Graduate School</i>			
(1) M.A. (Adult Education)		2	45
(2) M.A. (Cooperative Economics)		2	45
(3) M.A. (Educational Psychology and Guidance)		2	45
(4) M.A. (Social Development)		2	41
(5) M.A.T.	<i>English Teaching</i>	2	45
	<i>French Teaching</i>		
	<i>Mathematics Teaching</i>		
	<i>Science Teaching</i>		
	<i>Social Studies Teaching</i>		
	<i>Thai Teaching</i>		
(6) M.B.A.		2	45
(7) M.Ed. (Educational Technology)		2	45
(8) M.Eng. (Civil Engineering)		2	45
(9) M.Eng. (Electrical Engineering)		2	45
(10) M.Eng. (Irrigation Engineering)		2	45
(11) M.Eng. (Water Resources Engineering)		2	45

Curriculum	Major Discipline	Duration (Years)	Total Units Required
(12) M.H.E.		2	45
(13) M.S. (Agriculture)	<i>Agricultural Education</i> <i>Agricultural Extension</i> <i>Agronomy</i> <i>Animal Science</i> <i>Entomology</i> <i>Horticulture</i> <i>Plant Pathology</i> <i>Soil Science</i>	2	45
(14) M.S. (Agricultural Economics)		2	45
(15) M.S. (Biology)		2	45
(16) M.S. (Biotechnology)		2	45
(17) M.S. (Botany)		2	45
(18) M.S. (Chemistry)	<i>Analytical Chemistry</i> <i>Organic Chemistry</i>	2	45
(19) M.S. (Economics)		2	45
(20) M.S. (Environmental Science)		2	45
(21) M.S. (Fishery Science)		2	45
(22) M.S. (Food Science)		2	45
(23) M.S. (Forestry)	<i>Forest Biology</i> <i>Forest Management</i> <i>Forest Products</i> <i>Silviculture</i> <i>Watershed Management</i>	2	45
(24) M.S. (Genetics)		2	45
(25) M.S. (Microbiology)		2	45
(26) M.S. (Resources Management)		2	48
(27) M.S. (Zoology)		2	45
(28) Ph.D. (Agronomy)		3	40
(29) Ph.D. (Entomology)		3	40
(30) Ph.D. (Plant Pathology)		3	40
(31) Ph.D. (Soil Science)		3	40

3. Number of Courses Offered (Academic Year 1985, 1986)

Faculty	2 nd. Semester	1 St. Semester
	1985	1986
Agriculture	216	231
Agro-Industry	40	44
Economics and Business Administration	165	175
Education	192	202
Engineering	146	165
Fisheries	56	50
Forestry	105	85
Humanities	142	152
Science	192	204
Social Sciences	125	140
Veterinary Medicine	25	29
Total	1,404	1,477

4. Student Enrollment (Academic Year 1985, 1986)

Faculty	Level	2 nd. Semester	1 st. Semester	
		1985	1986	
Agriculture		1,396	1,575	
Agro-Industry		244	270	
Economics and Business Administration		1,423	1,661	
Education		928	1,051	
Engineering		1,097	1,257	
Fisheries		317	318	
Forestry		564	578	
Humanities		327	368	
Science		555	745	
Social Sciences		614	729	
Veterinary Medicine		362	363	
	Sub-total	Undergraduate	7,827	8,915
Graduate School		Master's degree	1,923	2,163
		Doctorate	33	40
	Sub-total	Graduate	1,956	2,203
Grand Total			9,783	11,118

5. Number of Graduates (Academic Year 1984, 1985)

Degree	Number of Graduates 1984	Number of Graduates 1985
<i>Faculty of Agriculture</i>		
Bachelor of Science (Agriculture)	303	289
Bachelor of Science (Home Economics)	22	20
<i>Faculty of Agro-Industry</i>		
Bachelor of Science (Food Science and Technology)	24	29
Bachelor of Science (Biotechnology)	16	10
Bachelor of Science (Product Development)	15	16
<i>Faculty of Economics and Business Administration</i>		
Bachelor of Science (Accounting)	47	65
Bachelor of Science (Agricultural Economics)	70	72
Bachelor of Science (Business Administration)	69	70
Bachelor of Science (Cooperative Economics)	21	26
Bachelor of Science (Economics)	62	62
Bachelor of Science (Marketing)	27	31
<i>Faculty of Education</i>		
Bachelor of Arts (Home Economics Education)	40	25
Bachelor of Arts (Physical Education)	103	63
Bachelor of Education (Business Education)	13	7
Bachelor of Education (Health Education)	37	28
Bachelor of Science (Agricultural Education)	80	62
Bachelor of Science (Physical Education)	46	38
<i>Faculty of Engineering</i>		
Bachelor of Engineering (Agricultural Engineering)	27	31
Bachelor of Engineering (Civil Engineering)	66	37
Bachelor of Engineering (Electrical Engineering)	58	32
Bachelor of Engineering (Industrial Engineering)	-	15
Bachelor of Engineering (Irrigation Engineering)	38	41
Bachelor of Engineering (Mechanical Engineering)	27	35
Bachelor of Engineering (Water Resources Engineering)	-	6
<i>Faculty of Fisheries</i>		
Bachelor of Science (Fisheries)	60	64
<i>Faculty of Forestry</i>		
Bachelor of Science (Forestry)	122	127

Degree	Number of Graduates 1984	Number of Graduates 1985
<i>Faculty of Humanities</i>		
Bachelor of Arts (English)	-	34
Bachelor of Arts (French)	-	7
Bachelor of Arts (Japanese)	-	5
Bachelor of Arts (Languages)	71	-
Bachelor of Arts (Mass Communication)	-	8
Bachelor of Arts (Philosophy and Religion)	8	8
Bachelor of Arts (Tourism)	1	10
<i>Faculty of Science</i>		
Bachelor of Science (Biology)	36	14
Bachelor of Science (Chemistry)	23	15
Bachelor of Science (Mathematics)	5	9
Bachelor of Science (Physics)	8	6
Bachelor of Science (General Science)	15	10
Bachelor of Science (Statistics)	31	34
<i>Faculty of Social Sciences</i>		
Bachelor of Arts (Sociology and Anthropology)	33	25
Bachelor of Arts (History)	28	20
Bachelor of Arts (Geography)	17	15
Bachelor of Arts (Political Science)	53	54
Bachelor of Science (Psychology)	45	31
<i>Faculty of Veterinary Medicine</i>		
Doctor of Veterinary Medicine	46	58
<i>Graduate School</i>		
Master of Arts (Adult Education)	9	11
Master of Arts (Cooperative Economics)	13	16
Master of Arts (Educational Psychology and Guidance)	28	20
Master of Arts (Social Development)	11	16
Master of Arts (Teaching-Education)	101	91
Master of Engineering (Civil Engineering)	3	5
Master of Engineering (Electrical Engineering)	2	9
Master of Engineering (Irrigation Engineering)	3	6
Master of Home Economics	3	7
Master of Science (Agriculture)	156	164
Master of Science (Agricultural Economics)	28	29
Master of Science (Biology)	3	8
Master of Science (Botany)	12	6
Master of Science (Chemistry)	-	1

Degree	Number of Graduates 1984	Number of Graduates 1985
Master of Science (Economics)	6	16
Master of Science (Environmental Science)	46	42
Master of Science (Fishery Science)	5	14
Master of Science (Food Science)	7	5
Master of Science (Forestry)	29	23
Master of Science (Genetics)	1	2
Master of Science (Microbiology)	11	12
Master of Science (Zoology)	6	10
Doctor of Philosophy (Agronomy)	-	1
Doctor of Philosophy (Entomology)	3	-
Doctor of Philosophy (Soil Science)	1	3
Total	2,300	2,181

6. Research Programs and Research Fund (Fiscal Year 1986)

Master Project	Amount of Fund (Baht)
Agribusiness Management	66,500
Agricultural Biology	115,000
Agro-Industry	398,000
Analysis Technique	310,000
Animal Health and Diseases	283,000
Applied Engineering Technique for Agricultural and Industrial Development	217,000
Aquaculture	72,000
Beef Animals Production	781,000
Cereal Crops Production	310,000
Competency-Based Teacher Education: Reacher and Instructional Development	182,000
Curriculum Development	123,400
Dairy Cattle Production	130,000
Energy Resources	260,000
Industrial Entomology	175,000
Environmental Studies in Agriculture and Forestry	175,000
Forage Crops	257,400
Fiber Crops Production	233,900
Flower and Ornamental Plant Production	90,000
Forest Management	110,000
Fruit Crops Production and Utilization	333,000
High-Protein Crops Production	696,800
Oil Seed Crops Production	373,500
Poultry Production	108,000
Home Economics in rural area	36,000
Silviculture and Wood Properties	208,000
Social Sciences	200,500
Sugar Cane Production	596,000
Tuber Crops Production	303,400
Vegetable Seed Production	140,000
Vegetable Production	238,000
Watershed Management on the Highland	54,000
<i>Total</i>	<i>7,567,400</i>

ANNUAL BUDGET

Category of Expenditure	Budgetary Allocation (Baht) Fiscal Year 1986
Salary and Permanent Wages	220,815,400
Temporary Wages	1,782,600
Public Utility	20,700,000
Materials and Supplies	59,307,600
Equipment, Land and Construction	35,674,600
Subsidies	15,800,100
Others	1,124,300
Total	355,204,600

LIBRARIES

The Kasetsart Main Libraries of both campuses have a total of 102,742 volumes of books in English, 90,701 in Thai, 18,873 volumes of theses, 97 roles of micro-film and 19,833 sheets of micro-fiche. It subscribes to 1,179 periodical titles in English and 953 in Thai.

The faculty libraries have approximately 234,063 volumes of books and journals serving their respective fields.

Since 1980, the Kasetsart Central Library has become the AGRIS/CARIS National Center and International Buffalo Information Center (IBIC) with the assistance from the IDRC. It also serves as an agricultural library and information center.

LABORATORIES AND RESEARCH FACILITIES

Kasetsart University had adopted a centralized policy for its scientific laboratory system operation in order to maximize the utilization of research facilities.

Kasetsart University Research and Development Institute (KURDI) operates Central Scientific Laboratory on both Bangkok and Kamphaengsaen Campuses. The Central Laboratory on Bangkok Campus covers an electron and research microscope laboratory, tissue culture laboratory, controlled condition unit, chemical and physiological analysis laboratory. On Kamphaengsaen Campus, laboratory and greenhouses are both centralized and subject matter oriented. Among these facilities are central biochemistry laboratory, soil and fertilizer testing and applied research unit, plant pest clinic and quarantine unit, applied microbiology and culture collection unit, seed technology laboratory, postharvest research unit and environmental science unit.

Off campus there are eight experiment stations for agriculture, fisheries and forestry work and student training. Academic departments also are charged with the responsibility to operate specific laboratories, serving faculty members and in most cases, also serving the general public as part of extension activities of Kasetsart.

The Institute of Food Research and Product Development (IFRPD) presently located on the Bangkok campus offers research facilities in food science and technology for new food products development essential to economic, industrial and agricultural growth. It is charged with specific projects such as the development of low cost protein foods for the generally low income consumers, the development of baby food to effectively supplement early weaning or deficient nutrition level, the development of food products from low cost agricultural produces.

The Radio-Isotope Laboratory is established for research utilizing atomic energy in agriculture.

On Bangkok Campus are located laboratories and research facilities of the Ministry of Agriculture and Cooperatives for agriculture, fisheries and livestock. Through mutual agreement, these facilities are also made available to Kasetsart staff and graduate or advanced undergraduate students. A number of scientists attached to these various units also serve as part-time lecturers, especially at graduate level.

With the grant aid from the Government of Japan in 1978 and 1980 Kasetsart University has established the Central Laboratory and Greenhouse Complex (CLGC), the National Agricultural Extension and Training Center (NAETC) and the National Agricultural Machinery Center (AMC). All those are located at Kamphaengsaen Campus, Nakhon Pathom, 80 km. west of Bangkok. Three master research projects in agricultural science are being conducted at the CLGC with the assistance from JICA. We are also looking forward to additional joint research projects of mutual interest with any institution, national or international. The NAETC offers its service in technology transfer to youths, farmers, government officials and also serve scientists from our neighboring countries. The AMC is active in testing and doing development work on appropriate farm machinery. It is hoped that those shall contribute its fair share toward agricultural development of our country and the region.

FEES

Approximate total minimum a student is expected to spend annually for:

Tuition		
Undergraduate	800	Baht
Graduate and Post graduate	2,500	"
Non-citizenship fee		
Under graduate	2,500	"
Graduate	3,000	"
Post graduate	10,000	"
Miscellaneous fees	2,200	"
Room and board	5,500-10,000	"

SCHOLARSHIPS AND FINANCIAL ASSISTANCE

Graduate students : 34 scholarships

Undergraduate students : 210 scholarships

Part-time employment : part-time work are available for students as laboratory assistants, farm helpers, gardeners, field supervisors, etc.

STUDENT SERVICES

The university maintains 18 units of dormitory capable of housing some 2,368 students on Bangkhen campus and 16 units with capacity of 1,600 residents at Kamphaengsaen campus. These Bangkhen facilities can accommodate most of the first year students who are encouraged to live on campus and other upper-class students who wish to do so. All students at Kamphaengsaen campus live in dormitories.

The University Infirmary provides minor medical and dental care. A registered nurse is on duty all day. At night and on holidays a medical personnel is available on call. The university physician maintains regular hours for consultation and treatment.

COMMUNITY SERVICES

Kasetsart University has been playing a key role in serving the Thai community in many forms. It strives to assist through research and dissemination of knowledge that may be useful to many professions, for example, the Institute of Food Research and Product Development has taken the lead in producing textured and low cost vegetable protein, low cost infant food for nutrition and health of the low-income group of people, and processing local products for greater cash income. All these, together with marketing trials, are aimed at promoting private enterprises to carry on any promising work initiated by Kasetsart.

Our Highland Agriculture Project has been cooperating with the Royal Project in an effort to replace opium poppy cultivation normally practised by hilltribesmen in Northern Thailand by other suitable cash-crops and occupation, to conserve soil and water resources through discontinuance of excessive land loss resulted from such slash-and-burn practice, and to introduce new livelihood to those hilltribesmen.

Besides, in order to raise agricultural productivity of the country, Kasetsart University has distributed improved varieties of plants and animals resulting from their research works to the public and provided consultancy services to agricultural industry, farmers and local cooperative farming projects.

The Office of Extension and Training of the University is directly responsible for disseminating new knowledge to the public by coordinating programs in the various fields, including vocational short courses. In the year 1985 almost 1,600 persons had participated in 33 vocational training courses ranging from courses in artificial insemination, beef production, mushroom cultivation, fertilizer application, ice-cream and dairy production, bakery, wheat production, drawing, typing,

dancing, gymnastics, photography to television and radio repair and maintenance. It also issues regular newsprints and offers programs through the airwaves, e.g. radio-broadcast of agricultural information through the network of KU stations from four strategic locations in Bangkok, Khon Kaen, Chiang Mai, and Songkhla. This form of community service covers also an effective training program for students as well.

INTERNATIONAL COOPERATION

1. Membership

- The Asian Agricultural Colleges and Universities (AAACU)
- The Association of Southeast Asian Institutions of Higher Learning (ASAIHL)
- The Asian Vegetable Research and Development Center (AVRDC)

2. Academic cooperation

- The Commonwealth Scientific and Industrial Research Organization (CSIRO)
- The Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA)
- International Rice Research Institute (IRRI)
- Nagoya University
- Kyoto University
- University of Illinois at Urbana-Champaign
- Oregon State University
- Virginia Polytechnic Institute and State University
- State University of New York, Syracuse
- Massey University
- University of Karlsruhe
- Justus-Liebig-Universität Giessen
- Huazhong Agricultural University
- South China Agricultural University
- University of Alberta

PUBLICATIONS

1. Thai National Agricultural Bibliography (bi-monthly)
2. The Buffalo Bulletin (quarterly)
3. Kasetsart Libraries Newsletter (bi-weekly)
4. The Kasetsart Journal (Social Sciences) (yearly)
5. The Kasetsart Journal (Natural Sciences) (yearly or twice a year)
6. Pig Magazine (quarterly)
7. Kasetsart Veterinarians (tertiary)
8. Kasetsart Extension Journal (bi-monthly)
9. Animal Production (quarterly)
10. Kasetsart Research Reports (yearly)

11. Buffalo and Cattle Bulletin (quarterly)
12. Kasetsart Technical Bulletin (specific topic publication)
13. Research and Technology Newsletter (monthly)
14. Central Laboratory and Greenhouse Complex News (monthly)
15. Veterinary News (monthly)
16. Thai Agriculture (monthly)
17. Thai Journal of Forestry (tertiary)
18. Corn and Sorghum Newsletter (monthly)
19. Journal of the Faculty of Science (tertiary)
20. Construction and Civil Engineering Journal (tertiary)
21. Naew Kaset Magazine (yearly)
22. The Humanities Journal (twice a year)

Note : exchange publications should be addressed

to....The Librarian

Main Library

Kasetsart University

Bangkok 10900, Thailand

JICA