additional equipment and facilities.

(d) The expert in organization and management of extension and training services will be assigned to the Extension and Training Service Center. He will advise and assist the director and other personnel of the center in the formulation of organizational framework, administration schemes and operational activities, and the procurement and installation of equipment and other facilities. He will also give suggestion and/or recommendation on improvement of operation and procurement of additional equipment.

(e) The three experts in supervision of sub-project operation will be assigned separately to the Soil and Fertilizer Research Center, Agro-industry Research Center and Fresh-water Fisheries Research Center. Each of them will take responsibility in advising and assisting the director and other personnel of the center to which he is assigned in the procurement and installation of equipment and other facilities, formulation of organizational framework and administration and operation schemes, and planning and implementation of research projects during the initial period of operation. Assistance in providing suggestion and/or recommendation on improvement of operation and procurement of additional equipment and facilities for the corresponding center will also be required of each expert.

4.2 Fellowship

Field of study/training	Total		1978		1979		1980	
	No.	m/m	No.	m/m	No.	m/m	No.	m/m
A. Study tour								
(1) Organization, administration and operation of research and extension agencies	6	6	-	-	6	6	-	-
B. Research and Training								
(1) Organization and management of central laboratory and greenhouse for research	2	12	1	6	1	6	-	-
(2) Laboratory instrumentation	18	108	6	36	6	36	6	36
(3) Agricultural machinery operation	2	12	-	-	1	6	1	6
(4) Farm mechanics	2	12	-	-	1	6	1	6
(5) Production of printed materials	2	12	1	6	-	-	1	6
(6) Production of technical films	2	12	1	6	1	6	-	-
(7) Operation of audio-visual equipment	2	12	-	-	1	6	1	6
(8) Textile and fiber testing	2	12	1	6	1	6	-	-
Total	38	198	10	60	18	78	10	60

Remarks: An overall review of the project will be conducted in the later part of 1980 with possible request for additional fellowships thereafter following consultation with appropriate authorities of Japan International Cooperation Agency.

4.2.1 Justification for requesting Fellowships:

(a) Considerable experiences are essential to effective planning, organization, administration, management and operation of research and extension units and facilities. Although staff members of Khasetsart University who have been assigned the various important tasks in the project being requested may have had some pertinent experience, the nature of their routine responsibility requires only intermitent and

small-scale utilization of such experience so that it is both difficult and time-consuming for most of them to be adequately efficient in performing the assigned tasks. To facilitate recollection of pertinent past experiences and acquirement of additional necessary ones, a study tour for key persons of the project is logically necessary

(b) Rapid advancement in all disciplines of agriculture and related biological sciences is a persistent daily occurrence. Not only new discoveries are constantly revealed but also new instruments and techniques are unceasingly introduced in all such disciplines. To upkeep their knowledge and competence, researchers and extension and training workers in agriculture and related biological sciences require sufficient, regular exposure to such discoveries, instruments and techniques. The training fellowships will also greatly facilitate persistently efficient functioning of each center or complex under this project as a result of the necessary experience gained by leading members of the personnel involved.

4.3 Equipment

Because the components of equipment needed for efficient functioning of each center or complex under the project are excessively numerous, it will not be possible for the anticipated Grant-Aid assistance from the Government of Japan to provide for all of them as the emphasis thereof is on construction of buildings and other types of structure

and procurement and installation of necessary furniture. Thus, assistance for those items of the necessary equipment that cannot be obtained through the Grant-Aid assistance are hereby requested. Since it is not appropriate to give an itemized, detailed listing of such equipment in this request, a categorized presentation of those items of high priority is chosen, which is as follows:-

Type	Quantity sets	Unit Price US $	Estimated Total Cost US $	1978 US $	1979 US $
1. Environmental Control Unit	10	varied	65,000	32,500	32,500
2. Biological Analysis Unit	14	varied	147,000	73,500	73,500
3. Soil Testing Equipment	13	varied	100,000	50,000	50,000
4. Fiber & Textile Testing Equipment	4	varied	70,000	30,000	40,000
5. Agro-Chemical Analysis Equipment	5	varied	30,000	20,000	10,000
6. Fresh Water & Pollutant Analysis Equipment	4	varied	40,000	20,000	20,000
7. Fresh-Water Environment Control Unit	5	varied	60,000	30,000	30,000
8. General Farm Machinery and Equipment	5	varied	10,000	5,000	5,000
9. Conventional Farm implements	5	varied	30,000	15,000	15,000
0. Specialized Mechanical Machinery & Equipment	5	varied	60,000	30,000	30,000
1. Public Address System	1	7,550	7,550	7,550	-
2. General Audio-visual Aid Equipment	1	30,000	30,000	30,000	-
3. Photographic Equipment	1	13,550	13,550	13,550	-
4. Vedeo-cassettes Production System	1	35,000	35,000	-	35,000
5. Audio-tape Duplication System	1	7,500	7,500	-	7,500
6. Service Vehicle	1	3,000	3,000	-	3,000
Grand Total	-	-	708,600	357,100	351,500

Remarks: In the later part of fiscal year 1979, an overall review of the equipment situation will be conduct and a request for additional necessary will be made [illegible]

4.3.1 Justification for requesting equipment:

Adequate supply and ready availability of necessary equipment and other facilities are essential for efficient implementation and meaningful results of research, extension and short-term training activities. At present, there is a critical shortage of such equipment and facilities at Kasetsart University. Because many of the highly desirable items of the equipment are highly sophisticated and, hence, extremely expensive, the annual national budget allocated for the University cannot shoulder the cost of procurement. To make successful achievement of the objectives of each center or equivalent under the project being requested possible, it is necessary that the types of equipment listed above be urgently procured, and serious effort be exerted in seeking ways and means of obtaining continued assistance for those necessary items not listed for reason of insufficiency of fund during the three-year period of anticipated assistance.

5. Thai Government Contribution to the project:

(Baht)

Description of Government Counterpart Contribution	Total Contribution		1978	1979	1980
	Already available	To be requested			
1. Project personnel					
1.1 Professional staff	40	-	-	-	-
1.2 Administrative staff	12	-	-	-	-
2. Equipment					
2.1 Premises and buildings	-	-	-	-	-
2.2 Expendable equipment	-	-	-	-	-
2.3 Non-expendable equipment	-	-	-	-	-

(Baht)

Description of Government Counterpart Contribution	Total Contribution		1978	1979	198
	Already available	To be requested			
3. Other					
3.1 Housing for experts	-	To be filled by DTEC	To be filled by DTEC	To be filled by DTEC	To be filled by DTEC
3.2 Local transportation for experts	-	-do-	-do-	-do-	-do-
3.3 Miscellaneous expenses for experts	-	-do-	-do-	-do-	-do-

Remarks: With possible request for additional experts as pointed out earlier under the section on expert, there may be a need for additional contribution by the Royal Thai Government.

6. Related projects/activities:

Kasetsart University has submitted a proposal for Grant-Aid assistance from the Government of Japan. Official negotiation with the Embassy of Japan for this Grant-Aid assistance is being conducted by the Department of Technical and Economic Cooperation. Thus, the present request for technical assistance is supplementary to the Grant-Aid assistance being negotiated so that the necessary manpower competence and equipment and other facilities that cannot be adequately realized through the Grant-Aid assistance can be appropriately taken care of. It is also envisioned by Kasetsart University that close cooperation and mutually benificial exchanges of knowledge and personnel between Kasetsart University and similar institutions of higher learning of Japan will be started and continued for a long time following completion of the project.

7. Remarks:

All details given in this request are subject to change following consultation with the feasibility study team from Japan which has been agreed in principle by both the Department of

Technical and Economic Cooperation and the appropriate authorities of the Embassy of Japan.

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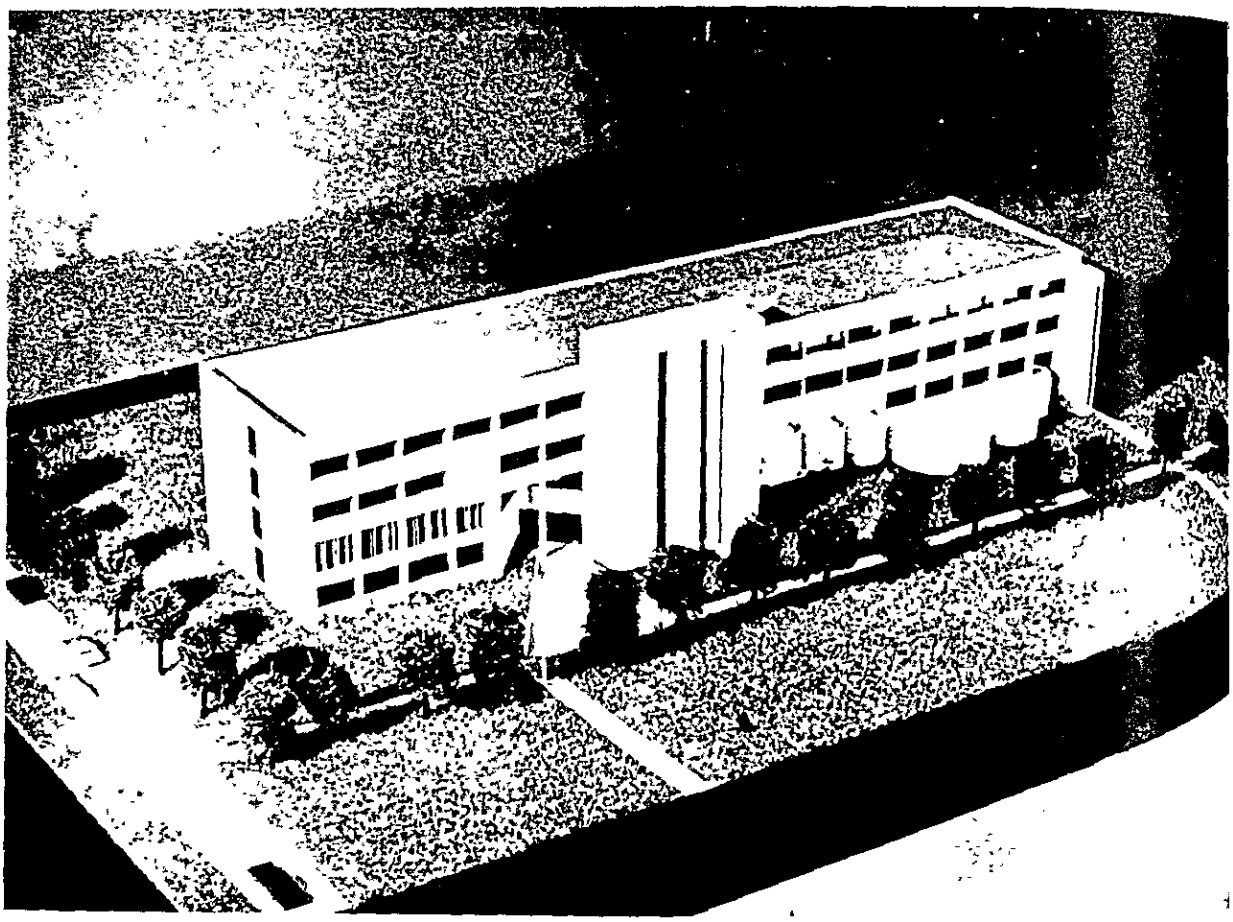
7　カセサート大学環境科学プログラム案内

MASTER OF SCIENCE (ENVIRONMENTAL SCIENCE)

GRADUATE SCHOOL　KASETSART UNIVERSITY



ENVIRONMENTAL SCIENCE GRADUATE PROGRAM PLANNING COMMITTEE

DEPARTMENT OF CONSERVATION
FACULTY OF FORESTRY　KASETSART UNIVERSITY

BANGKOK 9, THAILAND

1977

CATALOG

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FOREWORD

Nowadays environmental problems are receiving wide interest from people in all circles. Especially during the past decade there has been increasing public awareness, with every country recognizing the dangers of environmental problems, some of which are readily apparent and others not. For example, air pollution as found in the big city, sometimes not immediately detectable, may be harmful in the longer term. The most evident form of pollution is water pollution, arising from factory wastes or human carelessness. The resulting water may be neither potable nor fit for other uses unless first purified. Noise pollution is also a serious matter. Whether resulting from automobiles, aircraft, or industry, noise can cause nervous disorders, and hence is no less harmful than other kinds of pollution. Light may also be harmful, since most people lack adequate knowledge of its use, and this can be dangerous to health. The Thai people still lack of knowledge and understanding regarding environmental pollution, including air, water, noise, light, and other forms. since there is very little education in this subject.

Kasetsart University, recognizing the importance of and dangers to the national environment, has opened an environmental curriculum program on the M.S. (Environmental Science) level. This program will seek to convey advanced knowledge and capability to students so that they may each work toward environmental conservation in their own professional field. Thus the Kasetsart University environmental study curriculum aims to produce experts on social service in national environmental conservation.

BACKGROUND

The seminar on educational planning held at Kasetsart University during November 21-23, 1975 approved an M.S. level program in environmental studies.. The Graduate School was assigned the task of preparing the curriculum. At the subsequent monthly meeting of the Graduate School it was mutually agreed that the Kasetsart University Department of Conservation should be the responsible department. Concurrently the Graduate School appointed a curriculum drafting committee, which met frequently, holding extensive discussions and comparing the curricula of various institutions currently teaching environmental studies. These were used as guidelines in adapting a curriculum to Thai conditions for the benefit of students, their employing agencies, and the general public. The drafting committee then submitted to the Graduate School the results of its discussions, the draft curriculum, and the suggestion that a meeting of department heads be held to select an executive committee comprising lecturers from various disciplines to conduct educational planning. The Department of Conservation would be only the executing agency. This suggestion was agreed to.

THE EDUCATION PLANNING COMMITTEE

On February 1, 1977 the Graduate School established an executive committee, titled the Environmental Science Graduate Program Planning Committee, with the following membership:

1. Dr. Kasem Chunkao — Chairman
2. Dr. Somsak Sukwong — member

3. Dr. Yongyuth Chiemchaisri	member
4. Dr. Somsak Vangnai	"
5. Mr. Sandis Virathian	"
6. Dr. Banpot Napompeth	"
7. Dr. Tongroj Onchan	"
8. MR. Wutilert Devakul	"
9. Dr. Pricha Sommani	"
10. Dr. Rung Jenjit	"
11. Mrs. Napha Lotong	"
12. Mr. Samakkee Boonyawat	Secretary

This committee will function for two years, with a mandate to determine the curriculum and to fix education planning in environmental sciences.

EDUCATION POLICY

The Kasetsart University program aims to give its students specialized environmental knowledge, due to the present limited number of environmental specialists, and the comparatively greater number of generalists, and also since other insitutions such as Mahidol University have opened general courses in environmental studies. Thus a student with a B.A. or a B.Sc. in any field wishing to join the program may choose his own field, with the major courses, which are the required courses, applied to his own discipline. For instance a student with a B.Sc. will have to take required courses withother students to obtain credits of the Master of Science in invironmental sciences, but he may

take minor courses in his own or related fields, at the discretion of his advisor. Likewise with students who have finished their graduate study in economics, business administration, forestry, engineering, accountancy, agriculture, law, political science, social studies, etc. However the Executive Committee will adhere to the rule of the Graduate School that students must gain at least 36 credits in class. Of these the courses in the student's major field will compose 24-27 credits (including two semesters of seminar courses), 9-12 credits in elective courses, and at least 9 credits for the thesis. Courses in the major field have been divided by the committee into two parts. The first part is compulsory for every student, consisting of 17 credits. This is considered the basic knowledge of environmental sciences. The second part consists of subjects recommended for the major, in accordance with the student's own discipline, and totalling 7-10 credits. These courses can be taken from any of the 16 departments of Kasetsart University participating in the project. Minor courses will also consist of 9-12 credits from these 16 departments, so that the student may choose what he is best at. If a student does not change his discipline, the committee firmly believes that he will have an adequate foundation to succeed in specialized subjects with the 7-10 credits from the major courses and 9-12 credits in minor courses. The other 17 required credits in environmental sciences will educate the student to employ knowledge gained toward preserving the environment in accord with his own discipline. Students are permitted to change fields but this will require additional time.

It is the declared intention of the program not to change the

occupational fields of enrolled students. Rather, additional knowledge will be offered in specialized areas of environmental sciences so that each discipline may improve in conserving the environment, resulting in general improvement for the public. Educators, for example, will remain educators, but will have additional experience in environmental sciences to impart to their students. Study plains will vary from student to student in the major courses, since the objectives of each student will be different, as will the thinking of the student's advisor. Consequently the program has a flexible structure, with the student;s success depending on his own diligence and interest. It is believed that success will be assured if each student faithfully informs his advisor of his level of basic knowledge and of his professional needs and preferences.

ADMISSION

The general rule is that of the Graduate School, i.e. the average grade must be at least 2.50 or 75%. Alternatively, courses in the major field (minor field in environmental science program) must attain a minimum of 3.00 or 80% throughout. Further details can be obtained from the Graduate School Handbook. There will be both written and oral examinations, except for the first group in 1977, who will be tested only orally. Student application forms will show their major as "environmental science." Elective courses will depend on the former discipline, because without a sufficient basis of knowledge in his chosen field, the student may fail the examination. The committee will announce details through the graduate school as to how many students will be admitted each year in what fields, so that intending students can make

intelligent decisions before applying.

STUDENT ADVISORY COMMITTEE

Once admitted to the program, each student must report to the chairman of the education planning committee, to be interviewed as to his preferences so that the chairman may appoint the most appropriate advisor. The appointed advisor will then form the student's advisory committee consisting of:

Student's advisor	chairman
Major course representative	member
Minor course representative	member

The major course representative will be a lecturer expert in environmental studies. Should the student have any difficulty in selecting the Major course advisor, the chairman will recommend a suitable lecturer in environmental studies whose basic knowledge is related to the elective field the student wishes to pursue, or wishes to emphasize. Minor courses will be in accordance with Graduate School regulations and the student's preferences (further details on electives in given below). Thus the student's advisory committee consists of at least three lecturers belonging to the Graduate School. In order to follow closely each student's progress, it is necessary to add another member to the committee representing the education planning committee, unless one of the three members noted above is already a member of the education planning committee. As a rule, the Student Advisory Committee will be formed no longer than two months after the

beginning of the first semester.

Once the committee is formed, the student meets with them to formulate his complete study plan for the entire program. Both major field and elective courses must be chosen in accordance with suitability and the student's preference, and the thesis subject should also be selected at this time. This is done in order that the course of study may meet both student desires and the needs of his career on completion of studies.

STUDY PLAN

Student study plans will vary according to the basic knowledge and needs of the individual, but each should contain:

FIRST SEMESTER

Conservation 581 (Environmental Science Overview)	3	Units
Anthropology 442 (Human Ecology)	3	"
Economics 486 (Environmental Economics)	3	"
Elective Majoring Course	3	"
Elective Minor Course	3	"
Total	15	"

SECOND SEMESTER

Conservation 582 (Environmental Systems Analysis)	3	Units
Elective Majoring Courses	3	"
Elective Minor Courses	6	"
Total	12	"

THIRD SEMESTER

Conservation 583 (Environmental Management)		3	Units
Conservation 597 (Seminar I)		1	"
Conservation 599 (Thesis)		3	"
Elective Majoring Courses		3	"
Elective Minor Courses		3	"
	Total	13	"

FOURTH SEMESTER

Conservation 597 (Seminar II)		1	Units
Conservation 599 (Thesis)		6	"
	Toatl	7	"

CURRICULUM COURSES

A. Major Courses. The major courses in this program are divided into two groups as follows:

1. Required courses. Each student must take all of the following courses totalling 17 credits (not counting thesis credits).

1. Anthropology 442 (Human Ecology)	(3)	Credits
2. Economics 486 (Environmental Economics)	(3)	"
3. Conservation 581 (Environmental Science Overview)	(3)	"
4. Conservation 582 (Environmental Systems Analysis)	(3)	"
5. Conservation 583 (Environmental Management)	(3)	"
6. Conservation 597 (Seminar)	(1,1)	"

2. Elective courses in major field. Each student shall choose his own field and must gain 7-10 credits from these cources. The Environmental Science Graduate Program Planning Committee will select these courses from an area of study in the environmental sciences for the student in accord with his study plan as approved by the student's advisory committee which included 6 groups of 70 courses as follows:

1. Toxicology:

Ent. 481	(Pesticides and Their Application)	(3)
Ent. 581	(Insect Toxicology)	(3)
Ent. 681	(Advanced Insect Toxicology)	(3)
Soils 481	(Soil Pollution)	(3)
Soils 581	(Advanced Soil Pollution)	(3)
Chem. 455	(Environmental Chemistry)	(3)
Chem. 456	(Chemical Pollutants)	(3)
Chem. 542	(Water Pollution and Control)	(3)
Bio 482	(Pollution Biology)	(3)

2. Soil and Water Conservation:

Soils 422	(Soil and Plant Relationship)	(3)
Soils 451	(Soil Microbiology)	(3)
Soils 562	(Water Relations of Soil and Plant)	(3)
Conserv. 421	(Principles of Watershed Management)	(3)
Conserv. 471	(Principles of Land Use)	(3)
Conserv. 598	(Special Problems)	(1-3)
Irr. E. 411	(Soil and Water Conservation Engineering)	(3)
Irr. E. 415	(Water Management)	(3)

3. Conservation Education and Extension:

Psych. 454	(Psychology of Communication and Persuation)	(3)
Psych. 473	(Human Relation)	(3)
Psych. 551	(Advanced Social Psychology)	(3)
For. Mgt. 461	(Public Relation in Natural Resources)	(3)
Conserv. 584	(Conservation Education)	(3)
Conserv. 585	(Administration of Environmental Conservation)	(3)

4. Socio-Economics

Econ 586	(Advanced Environmental Economics)	(3)
Ag Econ 453	(Agricultural Resource Economics)	(3)
Ag Econ 552	(Analysis of Agricultural Resource Conservation and Development)	(3)
Socio. 511	(Population Studies)	(3)
Socio. 542	(Advanced Urban Sociology)	(3)
Socio. 563	(Social Organization and Planning)	(2)

5. Natural Environment

Ent. 421	(Aquatic Entomology II)	(3)
Ent. 461	(Insect Ecology)	(3)
Ent. 561	(Environmental Entomology)	(3)
Ent. 571	(Biological Control of Insect Pests and Weeds)	(3)
Ent. 572	(Principles of Pest Management)	(4)
Ent. 661	(Population Ecology)	(3)

Bot. 481	(Plant Ecology)	(3)
Zool. 481	(Animal Ecology)	(3)
Zool. 531	(Marine Ecology)	(3)
Zool. 582	(Marine Animals)	(2)
Fish Bio. 441	(Principles Aquatic Ecology)	(3)
Fish. Bio. 546	(Biology of Polluted water)	(3)
Mar. Sci [illegible] 2	(Coastal Ecology)	(3)
Conserv. 435	(Planning of Wildlife Reserve)	(3)
Conserv. 443	(Planning and Design of Recreation Area)	(3)
Conserv. 452	(Range Ecology)	(3)
Conserv. 481	(Forest Environmental Management)	(3)
Conserv. 482	(Effects of Forest Destruction to Environment)	(2)
For. Bio. 422	(Ecology of Tropical Forests)	(2)
For. Bio. 523	(Systems Ecology)	(4)
For. Bio. 535	(Pesticides in the Forest Environment)	(3)
For. Bio. 581	(Forest Environmental Biology)	(3)
For. Bio. 582	(Air Pollution Biology)	(3)
Silvic. 422	(Amenity Tree Planting)	(2)
Silvic. 431	(Forest Protection)	(2)
Silvic. 432	(Forest Fire and Controls)	(2)
Microb. 433	(Sanitation Microbiology)	(3)
Microb. 438	(Aquatic Microbiology)	(3)
Microb. 482	(Environmental Microbiology)	(3)

6. Urban Environment

CE	441	(Sanitary Engineering)	(3)
CE	463	(Architectural Design)	(3)
CE	541	(Municipal Water System)	(3)
CE	542	(Sewage Treatment)	(3)
CE	543	(Public Health Engineering)	(3)
CE	544	(Urban System Analysis)	(3)
CE	545	(Residential Area Planning)	(3)
CE	546	(Water Quality Control and Management)	(3)
CE	547	(Industrial Waste Pollution and Control)	(3)
CE	548	(Industrial Wastewater Pollution and Control)	(3)
CE	573	(Traffic Engineering)	(3)

B. MINOR COURSES. The Graduate School stipulates that students may take 9-12 credits of electives in minor subjects at the 400 level, subject to department approval. For example, a student wishing to pursue physics must have at least one-half his minor subject courses in 400-level physics courses. Should he decide to pursue physics courses entirely, this presents no problem. However, should he seek to add subjects in other fields to his minor courses, these may comprise only 20-30% of the minor courses, i.e. one or two courses. Students in the Environmental Sciences Program must also abide by this rule, though they may choose minor subject courses from any of all departments participating in this program or from other departments. Courses may however be chosen only from departments possessing.

COMPREHENSIVE EXAMINATION

A student having completed a minimum of 27 credits will be obliged to undertake a comprehensive examination conducted by representative of the Graduate School. Though the comprehensive examination ordinarily consists of both oral and written portions, the Environmental Sciences Program requires only an oral examination since the graduate must be able to speak, answer questions on, explain, and disseminate environmental knowledge in the future.

THESIS AND FINAL EXAMINATION

Each student must conduct research and complete a thesis at least 9 credits. On completion of the thesis he will take his final oral examination, covering his thesis and other subjects at the discretion of his advisory committee.

BOOKS AND TEXTBOOKS

Kasetsart University's Environmental Science Program has access to many books and texts as follows:

1. Kasetsart University Central Library This is a standard university library with no less than 60,000 journals, research documents and textbooks, according to a 1976 survey.

2. The Faculty of Forestry Library, which now has 4,200 textbooks, 65 journals in the English language, 35 Thai journals, 4,500 foreign research documents, and 125 research documents of the faculty itself. In particular there are no less than 200 books and textbooks in the environmental field (as surveyed in 1976).

3. Other departments participating in the program provide access to further related resources of books, journals, and research documents.

CAREER

The Executive Committee of the Environmental Sciences Program is confident that in the near future the need for environmental scientists will markedly increase both in the private and public sectors. Consequently graduates will be able to work in their own field while contributing to the upgrading of the environment. At present the National Environmental Board is setting standards for all agencies which will serve to enhance awareness of the importance of the environment and will recommend the employment of environmentalists in assisting in the planning of each project. With this in mind the Kasetsart University Environmental Sciences Program has a policy to disseminate knowledge of this matter to various agencies and organizations so as to expand employment opportunities in the future.

COURSES DESCRIPTION

1. DEPARTMENT OF CONSERVATION

Conservation 421 Principles of Watershed Management (3), 2-3 (Semester II)

Definition and scope of watershed management including principles and practices in managing the land area for water quantity, quality, and its regime. Soil erosion control together with outcoming of other products, rehabilitation of denuded areas, and planning policy are also studied for multiple use.

Prerequisite: Soils 111

Conservation 435 Planning in Wildlife Reserve (2), 2-0 (Semester II)

Surveying and designing the wildland for preservation the wildlife habitats by consideration the environmental and species composition. Field trip is required.

Prerequisite: Conserv. 431

Conservation 443 Planning and Design of Recreation Area (3), 2-3 (Semester I)

Planning and designing the outdoor recreation area for wise use of natural resources in recreation aspects. Topography, communication, and community as well as plant species soils and water resources will be considered design outdoor recreation in specific area.

Conservation 452 Range Ecology (3), 3-0 (Semester I)

General characteristics of soils, vegetation, climate, and environment of rangeland. Structure of rangeland and its relation to animals and other environment parameters concerned.

Prerequisite : Bot. 111, Zoo. 113

Conservation 471 Principles of Land Use (3), 2-3 (Semester II)

Definition, objectives, and principles of land uses in relation to economic aspects in proper area. Principles of land use patterns by aerial photo and remote sensing technique.

Prerequisite : For. Mgt. 331 or 431

or consent of the department.

Conservation 481 Forest Environmental Management (3), 3-0 (Semester I)

Definition, objectives, and scope of forest environment. The use of mathemetics for evaluation and correlation to provide the information as a guideline in management basis. Field Trip is required.

Conservation 482 Effect of Forest Destruction to Environment (2), 2-0 (Semester I)

Influences of plant cover especially forest on environment. Problems of drought in dry season, flood in wet season, and land degradation both in upland and lowland including water and air pollution. Field trip is required. (Non-forestry student only)

Conservation 581 Environmental Science Overview (3), 3-0 (Semester I)

Scope of environmental science An evaluation the interaction of environment to all subject fields in order to fulfill the objectives of environmental study. Field trip is requaired.

Conservation 582 EnvironmentalSystemsAnalysis (3), 2-3 (Semester II)

Methodology of various ecosystems, its relation in individual system, and control measures. Field trip is required.

Prerequisite : Conserv. 581 or consent of the department.

Conservation 583 Environmental Management (3), 3-0 (Semester I)

Principles of environmental management, particulary, water, land area, land use, and their effects to environment. Field trip is required.

Prerequisite: Conserv. 581 or consent of the department.

Conservation 584 Conservation Education (3), 2-3 (Semester II)

Importance of conservation education and its teaching method for extension methodology. Field trip is required.

Conservation 585 Administration of Environment Conservation (3), 3-0 (Semester I)

Principles and management processes of natural resources such as soils, water, forest, range, wildlife, minerals, man, and others which are related to environment, including rules of environment.

Prerequisite: Conserv. 581 or consent of the department.

Conservation 597 Seminar (1, 1)

Conservation 598 Special Problems (1-3)

Conservation 599 Thesis (1-9)

2. DEPARTMENT OF FOREST BIOLOGY

For Bio 422 Ecology of tropical forests (2), 2-0 (Semester II)

Ecology of major tropical forest communities; application of ecological basis to utilization and management, field trip is required.

For Bio 523 Systems ecology (4), 2-6 (Semester II)

Development, dynamics, and discription of ecosystems; mathematical analysis and modeling of ecological phenomena; computer applications to ecosystem studies.

Prerequisite: For. Bio. 321 and Stat. 451 or consent of the department.

For Bio 535 Pesticides in the forest environment (3), 2-3 (Semester I)

Role of pesticides and other toxic compounds in the forest environment, pesticide interactions to forest biological system; biological methods and equipments for analysis of pesticides in the forest environment; field trip is required.

Prerequisite: For. Bio. 532 or consent of the department.

For Bio 581 Forest environmental biology (3), 3-0 (Semester I)

The response and dynamics of the - - - - biota to the modification of forest ecosystems and to environmental stress induced by pollutants; the measurement and evaluation of the biotic response.

Prerequisite: For. Bio. 321 and Silvic. 441 or consent of the department.

For Bio 582 Air pollution biology (3), 2-3 (Semester II)

Types and sources of air pollution; organisms/ environment interaction in stressed system; ecological indicator; tree planting for environment quality improvement.

Prerequisite: For. Bio. 581 or consent of the department.

3. DEPARTMENT OF SILVICULTURE

Silvic 422 Amenity Tree Planting (2), 2-0 (Semester I)

Species selection, planting and tending techniques of the ornamental tree species in public areas for environmental and beautifying purposes.

Silvics 43.. Forest Protection (2), 2-0 (Semester II)

Effects of human, animals, diseases, insects, catastrophical event and fire on forest damage, protection and control principles.

Silvics 432 Forest Fire and Controls (2), 2-0 (Semester I)

Forest fire behavior, its effect on forest resources and control techniques.

4. DEPARTMENT OF FOREST MANAGEMENT

For. Mgt. 461 Public Relation in Natural Resources (3) 3-0 (Semester II)

Principles and techniques of practice of effective public relation and public information applicable to natural resources.

5. DEPARTMENT OF ENTOMOLOGY

Entomology 421 Aquatic Entomology II (3), 2-3 (Semester II)

Effect of chemistry, physics and physiology of environment to aquatic insects; food and relationships between aquatic insects and their environments which affect the growth, reproduction and colonization. Importance of aquatic insects in relation to fresh-water fisheries and the analysis of insects for nutritive value in fish cultural; Field trip is required.

Prerequisite : Ent. 324 or consent of the department.

Entomology 461 Insect Ecology (3), 2-3 (Semester I)

Influences of environmental factors and other living organisms on insect outbreak, and relations to environment of insects; Field trip is required.

Prerequisite : Ent. 231 and Stat. 422 or consent of the department.

Entomology 481 Pesticides and Their Applications (3), 2-3 (Semester II)

Physical and chemical properties, chemical reaction and formulation of insecticides; the application in the controlling of insect pests.

Prerequisite : Ent. 231 or consent of the department.

Entomology 561 Environmental Entomology (3), 2-3 (Semester I)

Role and effect of entomological venture to the environment; entomological operations as cources of environmental deterioration, their improvement and solution; entomological operations improving the quality of environment; relationship of entomology and other disciplines related to the preservation of the quality of the environment.

Prerequisite : Ent. 461 or consent of the department.

Entomology 571 Biological Control of Insect Pests and Weeds (3), 2-3 (Semester II)

Principles of biological control; Organisms as natural enemies of insect pests and weeds; introduction and conservation of natural enemies; modern approach to biological control, coordination and integration with other control measures.

Prerequisite : Ent. 461 or consent of the department.

Entomology 572 Principles of Pest Management (4), 2-4 (Semester I)

Characteristics of pest population; ecological factors affecting population density; Views of natural population regulation and population dynamics; Density of insect pest outbreaks; analysis of population; economic threshold level; implementation of pest -

management.

Prerequisite : Ent. 231, Ent. 461

Suggested courses : Stat. 421 or consent of the department

Entomology 581 Insect Toxicology (3), 2-3 (Semester I)

Physical and chemical properties, formulation, ingredients and filed and laboratory methods of evaluating efficiency of insecticides; factors affecting toxicity to insects of insecticides; chemical reaction of some important insecticides; insect resistance to insecticides and others.

Prerequisite : Ent. 442 and Chem. 331

Entomology 661 Population Ecology (3), 2-3 (Semester II)

Estimation, distribution of insect population; population changes and regulatory factors controlling insect population; theories on insect populations; analysis of life table data; population dynamics and its utilization in insect control and management.

Prerequisite : Ent. 461 or consent of the department

Entomology 681 Advanced Insect Toxicology (Semester II)

Structural formula, synthetic, production, and analysis of insecticides; evolution of resistance to toxic subtances.

Prerequisite : Ent. 482

6. DEPARTMENT OF SOIL SCIENCE

Soils 422 Soil and Plant Relationship (3), 3-0 (Semester I)

Relations of organic and inorganic matters, physical-chemical and biological properties of soils to availability of plant nutrients and growth and yield of plants.

Prerequisite - Soils 111

Prerequisite - (recommended) - Soils 421

Soils 451 Soil Microbiology (3), 2-3 (Semester I)

Relations of soil microorganisms to the environments: Roles of soil microorganisms on transfomations of plant nutrients and other agricultural chemicals; nodule bacteria; Influences of soil microorganisms on soil fertility.

Prerequisite - Soil 111, Micro. 111

- Micro. 214 or consent of the department

Soils 481 Soil Pollution (3), 3-0 (Semester I)

Composition of soil; soil formation; soil pollutants from parent materials, natural environments and other changes of chemicals in soil; roles of soil pollutants on the ecological systems.

Prerequisite: Soil 111 or consent of the department.

Soils 581 Advanced Soil Pollution (3) 3-0 (Semester II)

Mechanisms of liberation and adsorption of pollutants in soils; techniques and methods of soil pollution studies; mechanisms of inhibitory effects of soil pollutants on organisms and ecological systems.

Prerequisite: Soils481

Soils 562 Water Relations of Soil and Plant (3), 3-0 (Semester II)

Water in soil and plant; relationship between soil and plant water; movement of soil, plant and atmospheric water; Physiological effects of soil water on plant.

Prerequisite : Soils 111, Bot. 251

7. DEPARTMENT OF FISHERIES BIOLOGY

Fish Bio 441 Principles of aquatic ecology (3), 2-2 (Semester I)

Environmental effect on organisms, the interrelationship among plants, animals, and non-living factors in natural, especially aquatic systems.

Prerequisite: Zool 113, Bot 114

Fish Bio 546 Biology of polluted water (3), 2-2 (Semester II)

Types of wastes; ecological changes in aquatic environments resulting from domestic, industrial and agricultural wastes; uses of aquatic organisms as indicators of water pollution.

Prerequistite: Fish Biol 441 and 442 or consent of the department.

8. DEPARTMENT OF MARINE SCIENCE

Mar Sci 542 Coastal ecology (3), 2-2 (Semester I)

Types of environment in the shallow tropical seas; effects of environmental changes on breeding cycles, plankton, food chains, and population; application of ecological techniques to local problems.

Prerequisite: Fish Bio 441 and Mar Sci 111 or consent of the department.

9. DEPARTMENT OF CHEMISTRY

Chemistry 455 Environmental Chemistry (3), 3-0 (Semester II)

A study of the quality of the environment and factors affecting it. Air and water pollution. Chemical changes in the environment as affected by agricultural, industrial and social activities.

Prerequisite : Chem. 221 or Chem. 224

Chemistry 456 Chemical Pollutants (3), 2-3 (Semester I)

Chemical pollutants in air, water and soils. Their generation, reactivity and action on the environment. Detection chemical pollutants. Chemical and instrumental methods used in pollution measurements.

Prerequisite : Chem. 221 or 224

Recommended course - Chem. 455

Chemistry 551 Air Pollution (3), 3-0 (Semester II)

Nature and sources of atmospheric emissions. Effects of air pollution, mobile and stationary sources. Emission control technology, benefit and cost effects. Air quality standard and criteria setting.

Prerequisite : Chem. 221 or 224 or consent of the department.

Chemistry 552 Water Pollution and Control (3), 3-0 (Semester I)

Water quality standards. Nature and sources of pollutants. Studies of water pollutants and their analysis, their identifications and measurements. Their effects on water bodies, morphology, physiology and ecology of aquatic lives. The theory and methods of treating eliminating or reducing the pollutants. Lecture and field trips.

Prerequisite: Chem. 221 or 224 consent of the department.

10. DEPARTMENT OF MICROBIOLOGY

Microb. 433 Sanitation Microbiology (3), 2-3 (Semester I)

Destruction of microorganisms, principle of sanitation, biological waste treatment.

Microb. 438 Aquatic Microbiology (3), 2-3 (Semester II)

Major groups of marine and fresh-water microorganisms and their activities involved in biological environments.

Microb. 481 Environmental Microbiology (3), 2-3 (Semester II)

Equilibrium of environment, environmental changes by microorganisms, effects of environmental changes to microorganisms and microbiological methods in pollution control.

11. DEPARTMENT OF BOTANY

Botany 481 Plant ecology (3), 3-0 (Semester I)

The relationships of plant and environment, ecosystem, plant communities, energy flow etc.

Prerequisite : Bot.341 or consent of the department.

12. DEPARTMENT OF ZOOLOGY

Zoology 481 Animal ecology (3), 2-3 (Semester II)

Studies of animal behavior, population dynamics and involved environmental factors. Field study required.

Prerequisite: Zool. 113

Zoology 581 Marine and Estuarine Ecology (3), 3-0 (Semester I)

Scientific studies of relationships between marine biota and environment in the sea and estuary. Experimental analyses from literature discussed, field study required.

Prerequisite : Zool. 113

Zoology 582 Marine Animals (2), 2-0 (Semester II)

Life cycle, habit and habitat of marine animals discussed in details. Emphasis is placed on tropical forms. Field study required.

Prerequisite : Zool. 113, Zool. 442

13. DEPARTMENT OF BIOLOGY

Biology 482 Pollution Biology (3), 3-0 (Semester I)

Pollution and its effects on living things prevention and protection of the environment.

14. DEPARTMENT OF IRRIGATION ENGINEERING

Irr E 411 Soil and Water Conservation Engineering (3) 3-0 (Semester I)

Runoff; soil erosion and soil erosion control; various types of soil water conservation structures; engineering planning and design for conservation of soil and water.

Irr E 415 Water Management (3), 3-0 (Semester II)

Organization and administration of conservancy districts, metropolotan districts and other water distribution institutions; water distribution, operation and maintenance of irrigation systems budgeting for construction, operation and maintenance; legislation for regulations concerning water rights.

15. DEPARTMENT OF CIVIL ENGINEERING

CE 441 Sanitary Engineering (3), 3-0 (Semester I)

Water supply, sewerage and waste water treatment

Prerequisite : Hydraul 111

CE 463 Architectural Design (3), 2-3 (Semester I)

Principles of architectural design with emphasis on development of structures as an integral part of design. architectural drawing; layout of projects in lanscape architecture.

Prerequisite : Third Year Standing

CE 541 Municipal Water System (3), 3-0 (Semester II)

Elements of design, construction, and maintenance of waterworks systems; treatment of public water supplies.

Prerequisite : Hydraul 111

CE 542 Sewage Treatment (3), 3-0 (Semester II)

Principles of design, construction and maintenance of sewer systems. Treatment of sewage by physical, chemical and biological action and methods of final disposal.

Prerequisite : Hydraul 111

CE 543 Public Health Engineering (3), 3-0 (Semester II)

Environmental categories for urban and municipal area; solid waste collection and disposal; health and community hygience; establishment and organization of air pollution, water distribution, and reuse system.

Prerequisite : Fourth Year Standing

CE 544 Urban System Analysis (3), 3-0 (Semester II)

Study of the physical nature and characteristics of the urban environment and its subsystems; the interrelationship of land use activities and urban physical systems such as transportation, communication, energy generation, food distribution, and waste collection, examination of attempts to reduce the metropolis to simple systematics.

Prerequisite : CE 543

CE 545 Residential Area Planning (3), 2-3 (Semester I)

Theory and principles of residential area planning for good neighborhood community unit, and suitability of economic and local conditions for both old culture and new development.

Prerequisite : Fourth Year Standing

CE 546 Water Quality Control and Management (3), 3-0 (Semester I)

Ecological approaches to resource development; effects of water pollution; methods of controlling water quality, economic on environmental quality; organization of control agencies.

Prerequisite : Fourth Year Standing

CE 547 Industrial Waste Pollution and Control (3), 3-0 (Semester II)

Pollution from various industrial wastes; characteristics and controls of gaseous, liquid, solid, thermal and pollution; site selection and long term planning assimilative and economic problem.

Prerequisite : Fouth Year Standing

CE 548 Industrial Waste Water Pollution and Control (3), 3-0 (Semester I)

Characteristics of industrial wastewater; inplant management treatment unit processes;reclamation and reuse process; joint treatment of raw industrial wastewater with domestic sewage.

Prerequisite : Fouth Year Standing

CE 573 Traffic Engineering (3), 3-0 (Semester II)

Analysis of traffic problems including field studies; surveys and the interpretation of survey data; regulation and control methods and equipment; traffic and transportation planning design.

Prerequisite : CE 411

16. DEPARTMENT OF ECONOMICS

Econ 486 Environmental Economics (3), 3-0 (Semester I)

Economics as applied to environment, environmental problems resulting from economic and social development and population growth and the role of government in preventing and solving the pollution and other environmental problems.

Prorequisite: Econ. 111 or consent of the department

Econ 586 Advanced Environmental Economics (3), 3-0 (Semester II)

The application of economic theory in the analysis of decision making process and policy formulations with respect to our delicate environmental structure. Impacts of the National Economic and Social Development Plans on the environment long term planning of national energy policy and natural resources use, and also international cooperation in solving environmental problems.

Prerequisite. Econ. 486

17. DEPARTMENT OF AGRICULTURAL ECONOMICS

Ag Econ 453 Agricultural Resource Economics (3), 3-0 (Semester II)

Economic principles and problems of agricultural resource uses. Role of agricultural resource uses. Public policies in agricultural resource development. Agricultural resource development planning. Project evaluation in agricultural resource development. Problems in the project development.

Prerequisite: Ag Ec 351 or consent of the department.

Ag Econ 552 Analysis of Agricultural Resource Conservation and Development (3), 3-0 (Semester II)

Cost-Benefit relationship in agricultural resource conservation. Improvement of efficiency in both public and private agricultural resource uses. Economic analysis relevant to policies and planning in agricultural resource conservation and development. Emphasis is given on forestry and fisheries resource and the economic impact of the resource development on the quality of the environments.

Prerequisite: Ag Ec. 553 or consent of the department

18. DEPARTMENT OF SOCIAL SCIENCE AND ANTHROPOLOGY

Sociology 511 Population Studies (3), 3-0 (Semester I)

Patterns of population growth among various coutries. Relationships between population and socio-economic, political and environmental factors. Demographic aspects of economic and social development, urban growth, urbanization and its roles.

Sociology 552 Advanced Urban Sociology (3) 3-0 (Semester II)

Theories and researchs in resettlement, urbanization, influences of urban on groups behavior, urban patterns in different places.

Prerequisite : Socio. 212

Sociology 563 Social Organization and Planning (2), 2-0 (Semester II)

Functions of social norms, status, and social groups; their roles and functions in promoting social order and social security, emphasis on social planning administered by governmental agencies in controlling crimes, sanitation services and city planning.

Prerequisite : Socio. 561

Anthropology 442 Human Ecology (3), 3-0 (Semester I)

Adaptation of Human being to the environment. Environmental factors effected the way of living and on the changing of socio-economic and cultural structure.

19. DEPARTMENT OF PSYCHOLOGY

Psych. 454 Psychology of Communication and Persuation (3), 3-0 (Semester II)

Psychological principles of communication and persuation. Effects of advertising upon individual's thought, attitude and personality.

Prerequisite : Psych 451

Psych. 473 Human Relation (3), 3-0 (Semester I)

Theories of interpersonal and intergroup relations. Philosophy and policies in work practice. Process of developing good working climate. Moral and evalution.

Prerequisite : Psych 111

Psych 551 Advanced Social Psychology (3), 3-0 (Semester II)

Survey of social rules. Social perception and languages. Attitude, personality, individual in society. Topics also include: communication, characteristics of leader, theories on leadership, group characteristics, behavior of people in different castes.

Prerequistite : Psycho. 451

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นายประเสริฐ โลหะวณิชย์ Prasert Lohawanit	Ph.D. Zoology
นายสมจิตต์ สุพรรณทัสน์ Somchit Suphantas	ค.บ., ค.ม., M.P.H., Dr. P.H. (California)
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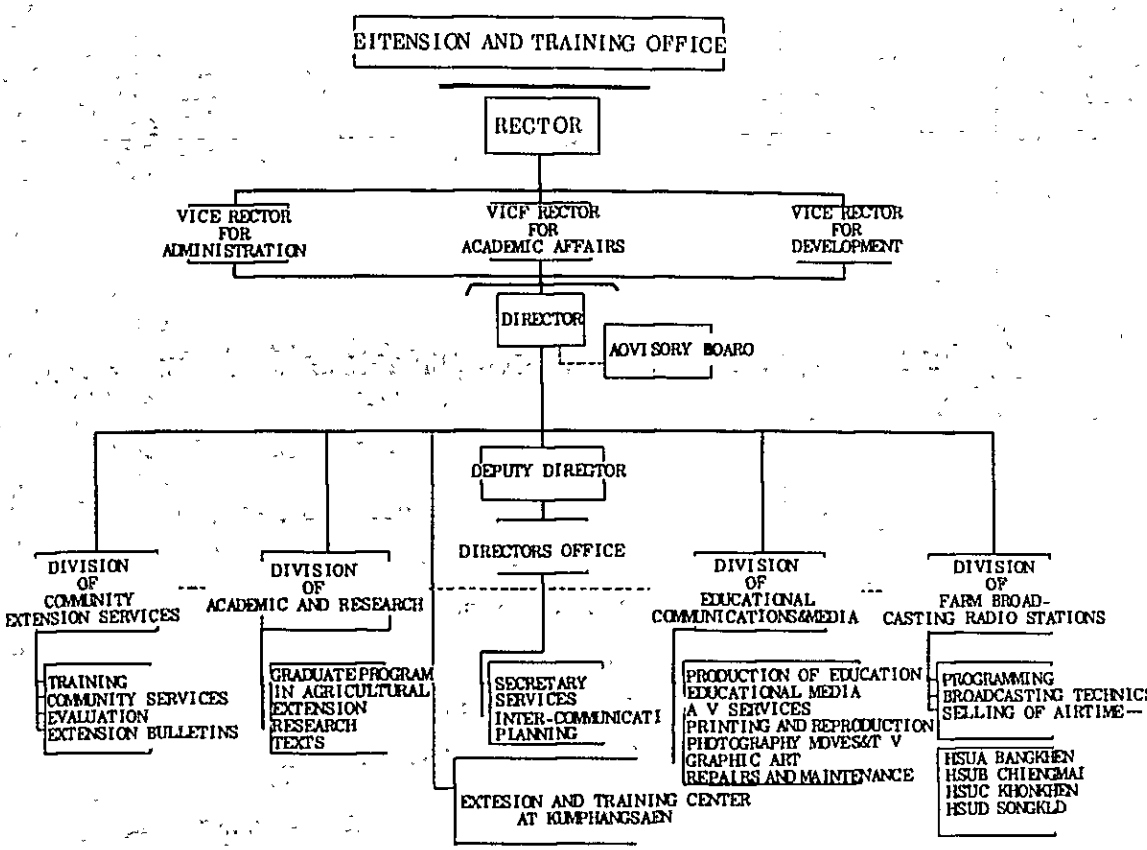
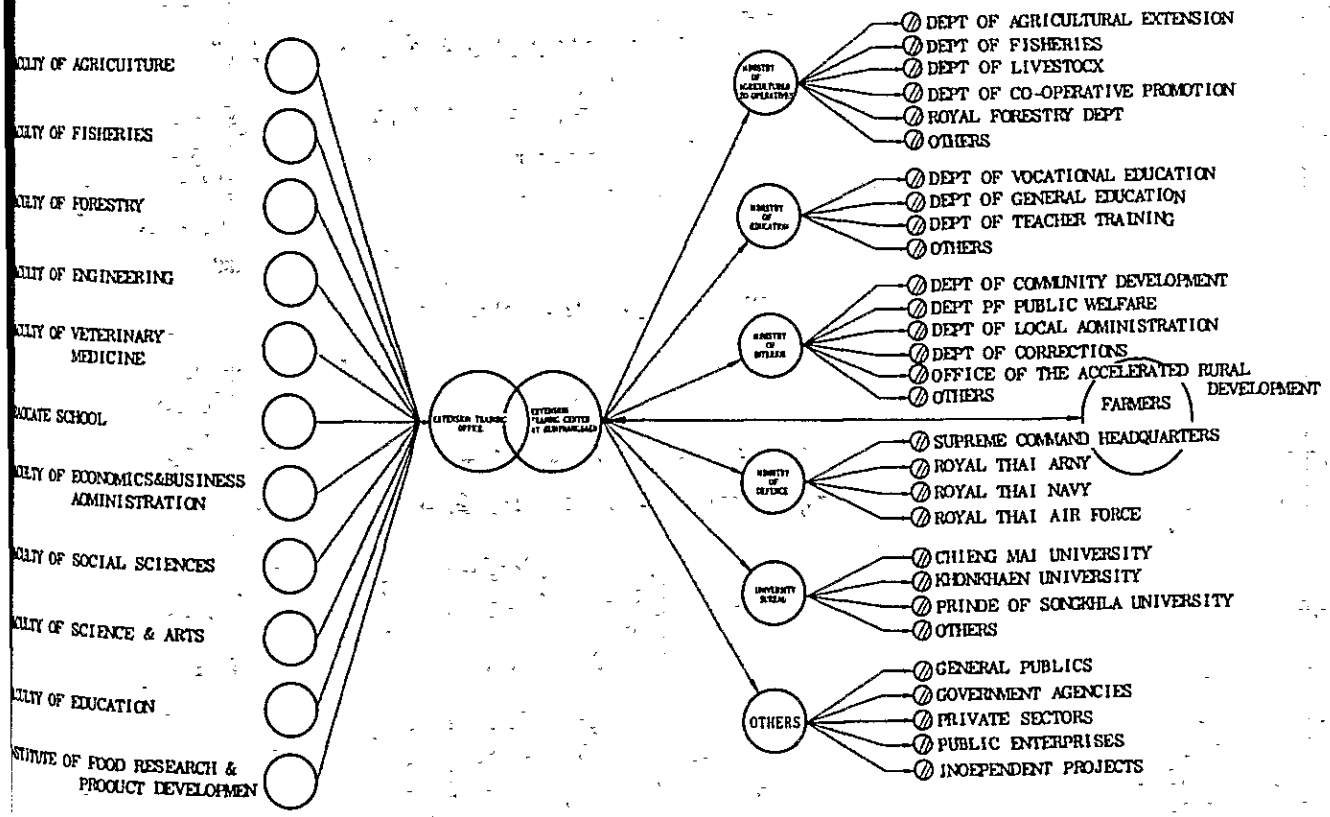
8 普及研修センター機構図





9　普及研修センターに関する資料

NATIONAL AGRICULTURAL EXTENSION AND TRAINING SERVICE CENTER

KAMPHAENGSAEN CAMPUS
KASETSART UNIVERSITY

Contents

National Agricultural Extension and Training Service Center
Kamphaengsaen Campus Kasetsart University

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1. Background information and justification

Effective dissemination and transmission of technical information from the laboratory and experiment station to its end-users, notably farmers and those engaged in agricultural - product enterprise, and efficient monitoring of pertinent feedback are essential to success in agricultural development. Although there has been a government agency, namely, the Department of Agricultural Extension of the Ministry of Agriculture and Cooperatives, that has been assigned the primary task of disseminating and transmitting technical information in agriculture to the farmers as weel as general public, it is not possible under the present setting for such agency to efficiently and adequately tackle the assigned task alone.

Many good reasons can be cited for this. For instance, the agricultural extension officers that constitute the working force of the Department of Agricultural Extension, though adequate in number, are, for reason of the nature of their work, not specialists but general practitioners as far as the various disciplines of agricultural science are concerned, so that, it is beyond their capacity to handle highly technical problems often encountered by the farmers efficiently, and it is not economically feasible for the Department to maintain a team of well-trained and constantly well-informed specialists for such purpose. Another reason is that the agricultural extension workers themselves are normally stationed in remote places up country and, thus, do not

have immediate access to professional periodicals and technical publications that are necessary in keeping themselves up to date and constantly informed of important findings and advancement in the various aspects of agricultural science. Hence, there is a need for them to undergo regular in-service training at appropriate time intervals. Such training cannot be handled effectively by the Department of Agricultural Extension due to lack of adequate space, necessary facilities and suitable resource persons of its own. Moreover, for psychological reason, transmission of technical information to the farmers and other ordinary citizens who are interested in agriculture is usually more effective when the transmitting agents are staff members of reputable institution of higher learning in which they have faith. For these and many other reasons, the Department of Agricultural Extension has been in constant contact and close cooperation with Kasetsart University in both planning and implementation of its various extension and training programs.

Recognizing its vital role in and indispensable contribution to effective national programs in agricultural extension and short-term training, Kasetsart University has consistently included extension and training in agriculture as integral component of its primary functions. Thus, extension and training services are considered by the University to be as important as instruction and research activities. To signify the great importance that it has attached to agricultural extension and short-term training services, the University has established the so-called "Extension and Training Office" with the rank of a Faculty and a present staff of 38 members to take charge of the extension and short-term training component of its primary functions. Since its establishment, this office has been engaged in year-round activities, in close cooperation with the Department of Agricultural Extension of the Ministry of Agriculture and Cooperatives, of regular farm visit, press release, radio and

television program, publication production and circulation, demonstration plot, and short-term training. To cope with the rapidly rising demand, the number of vocational courses offered by this office to the public during the summer has increased from 5 in 1953 to 40 in 1977 with the corresponding total enrollments of 404 and 1,219, respectively. From 1975 to the middle of 1977, the number of government employees that were sent for in-service, subject-matter training at the University has risen at an enormous rate from 60 to 2,747. From November, 1976 to April, 1977, the Extension and Training Office conducted a total of 23 two - day to two - week sessions on a variety of subject matter, such as mushroom culture, swine production, agricultural skill development, etc. for the farmers and rural housewives in 14 provinces representing all of the four geographical regions of the country. The Extension and Training Office has also been handling one-week, annual orientation program for new staff members of the University, and sponsoring, though not regularly, special short-term training on such matters as development of instructional materials, principles and procedures of administration, and project management for certain groups of staff members of the University.

Although the activities of the Extension and Training Office have been numerous and highly beneficial to the end-users, there is still an enormous gap between the practices that they actually follow and the technical advancement attained by the researchers of the University. This has been due primarily to a serious constraint of critical shortage of effective facilities for extension and training services. Unless such gap is urgently eliminated or at least reduced significantly, the purpose of the on-going national development programs will certainly be severely defeated. The Extension and Training Service Center being requested is aimed at removing the pertinent constraint, and,

hence, deserves strong endorsement for immediate establishment.

1.1 Objectives

The objectives of the proposed Extension and Training Service Center are fourfold, namely,

1.1.1 To render efficient services in disseminating and transmitting technical information in agriculture and related biological sciences to the end-users, and establish and efficient feedback system for successful implementation and effective planning of agricultural development programs of the country.

1.1.2 To serve as the primary source of supply of audiovisual media and materials that are needed in effective extension and training services.

1.1.3 To conduct short-term trainings in the various aspects of agricultural production, marketing and cooperatives as well as agro-industry technology for the general public, farmers and personnel of government agencies and private enterprises.

1.1.4 To conduct research and evaluation on techniques and procedures in extension and training service and make recommendation (s) for and/or execute necessary improvement of the techniques and procedures being followed.

1.2 Site and organization

The Extension and Training Service Center being requested will be located at the newly opened Kamphaengsaen campus of the University and is intended to serve primarily the farmers and general public in Nakornpathom and nearby provinces, particularly those in the Maeklong river basin. The establishment of this center will, therefore, make concurrent performance and desirable synchronization of the three basic functions of instruction, research and extension in agriculture of the University at the new campus possible.

The Center will be under the jurisdiction of the existing Extension and Training Office both administratively and operationally. It will consist of 5 major divisions, namely, Administrative Division, Technical and Research Division, Extension and Training Division, Communication Media Division, and Broadcasting Stations Division.

1.3 Anticipated work load

From 1977 to 1980, the estimated work loads in extension and training, and audio-visual media production are as follows :

1.3.1 Extension and training services

Type	Estimated Number of Participants			
	1977	1978	1979	1980
1. Continuing education services				
1.1 Summer session (April 1-30)	1,219	1,365	1,520	1,596
1.2 Intersemestral session (November 1 - 30)	-	500	800	900
2. Extension and short training services				
2.1 Spawn production and mushroom culture	2,000	1,800	1,500	1,200
2.2 Swine production, corn and sorghum cultivation, sugar cane cultivation, etc.	3,500	3,920	4,390	4,917
3. Special training services for University staff				
3.1 Development of instruction materials	20	50	50	50
3.2 General orientation for new staff	80	50	50	50
3.3 Project management	25	25	25	25
3.4 Principles and procedures in administration	-	20	20	20
3.5 Others	-	50	50	50
Total	6,844	7,780	8,405	8,808

1.3.2 Audio-visual media production

Type	Estimated Number of Sets			
	1977	1978	1979	1980
1. Video tape (5-25 minutes)	-	-	12	24
2. Film (16 mm, 10-15 minutes)				
2.1 Introduction to Kasetsart University	-	-	1	-
2.2 Knowledge in Agriculture	2	5	10	12
3. Document production				
3.1 Instructional materials (10-15 pages)	30	30	100	150
3.2 Book binding	-	-	3,100	5,000
4. Slides (30 pieces)	5	10	20	25

1.4 Buildings and infrastructure

With the Extension and Training Service Center under request having been conceived of only recently, it will not be possible for the on-going development project at Kamphaengsaen to accommodate the anticipated activities of the Center in any of the emerging buildings. The Center will, therefore, be in need of buildings and other types of infrastructure for it to function smoothly and efficiently.

Figure I shows a schematic diagram of the area to be occupied by the Center. It is seen that the area is rectangular in shape, and approximately 70 rai (28 acres) in extent (200 x 558 meters). The overall area can be conveniently divided into 3 parts, namely, business zone, dining and recreation zone, and residential zone. In the business zone are located 5 interconnected buildings,

namely, administration building, audio-visual media building, printing shop, classroom building and auditorium. The floor plans for some of these buildings are presented in figures II to V. In the dining and recreation zone are found tennis courts, football field and cafeteria. Four units of distinct house, three units of dormitory and two units of hotels are located in the residential zone.

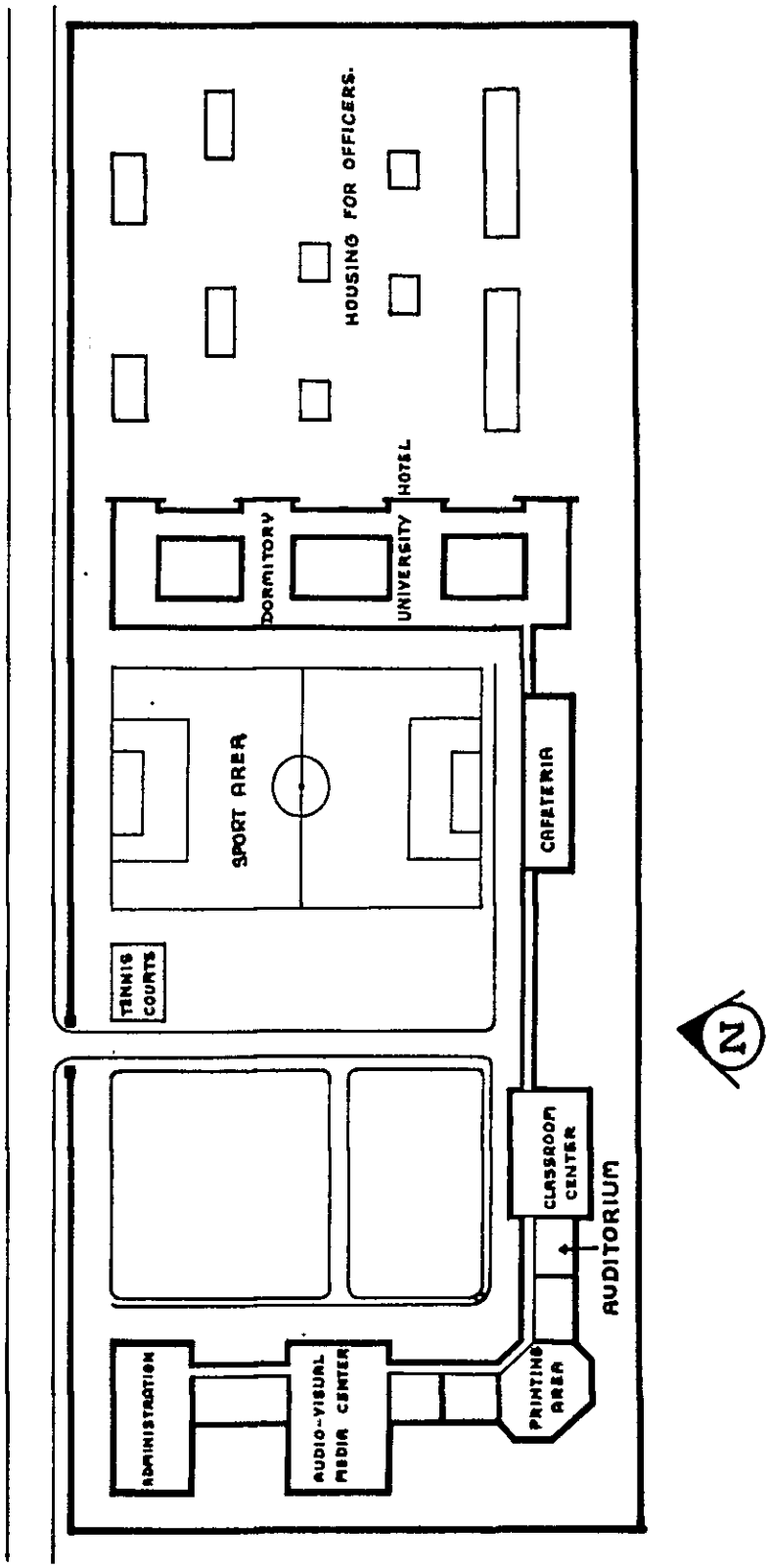


Figure I National Agricultural Extension and Training Service Center

Figure II Administration Building.

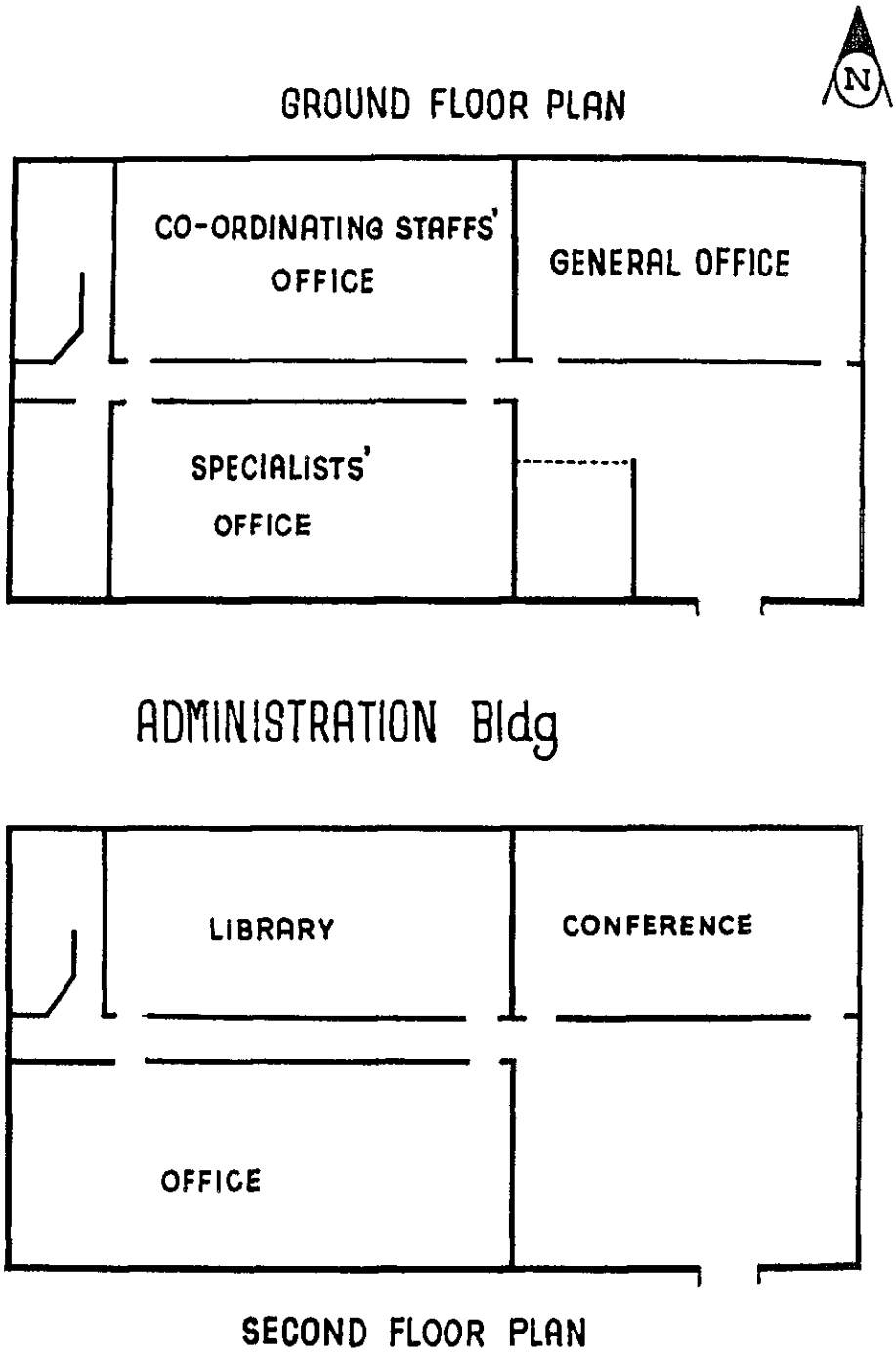


Figure III Audio-Visual Media Center

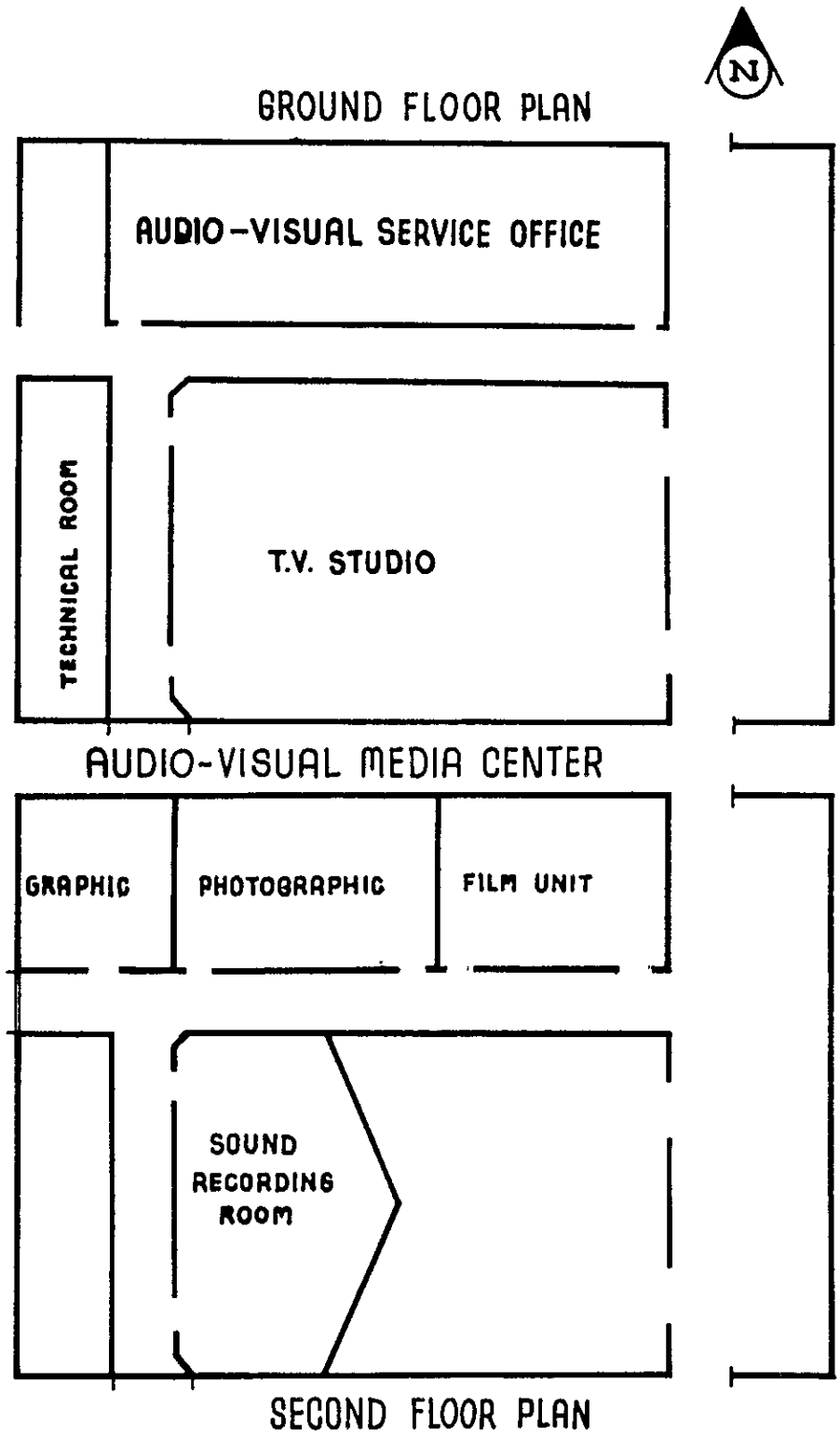


Figure IV Printing shop Building.

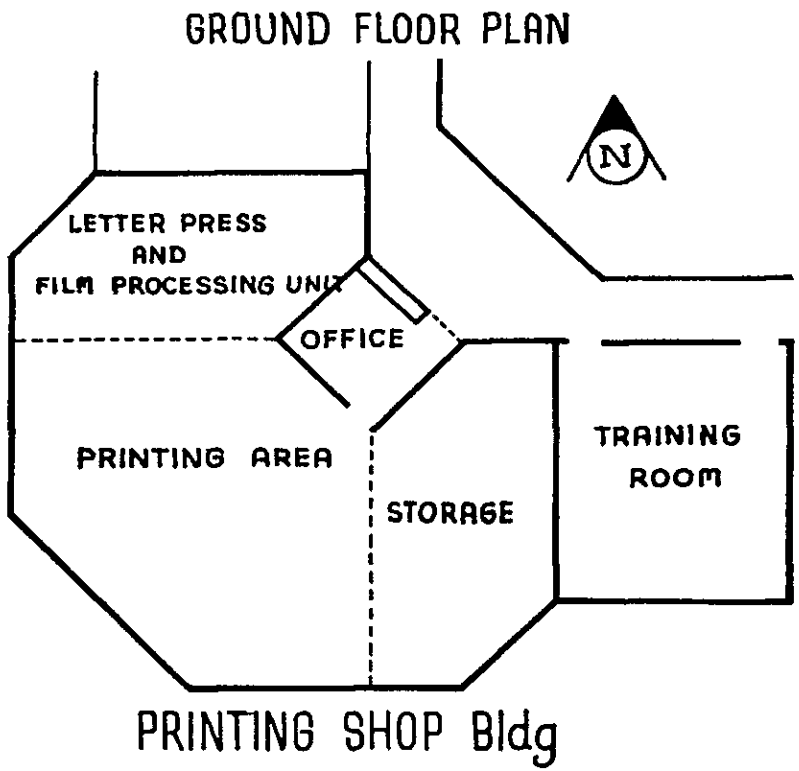
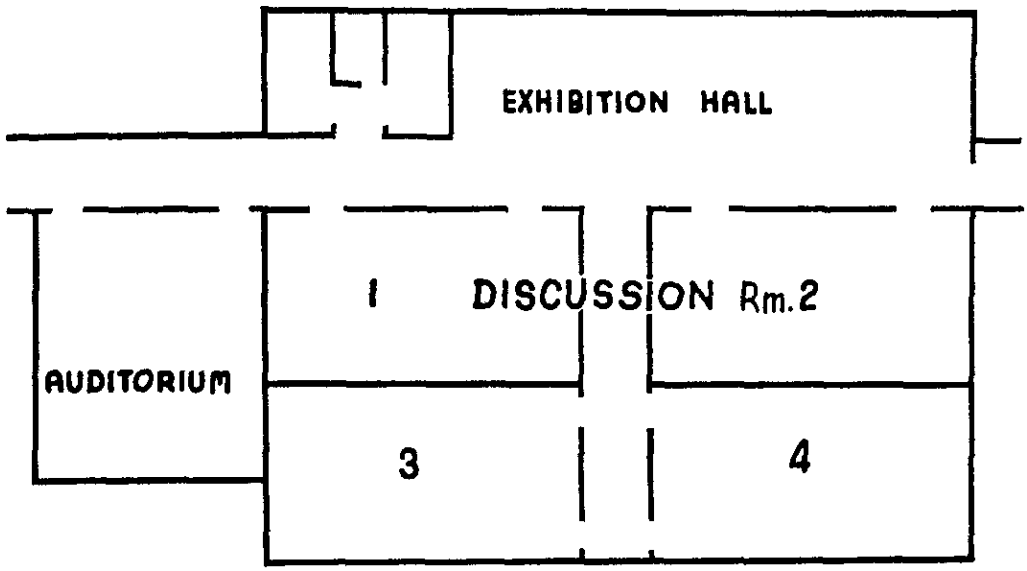
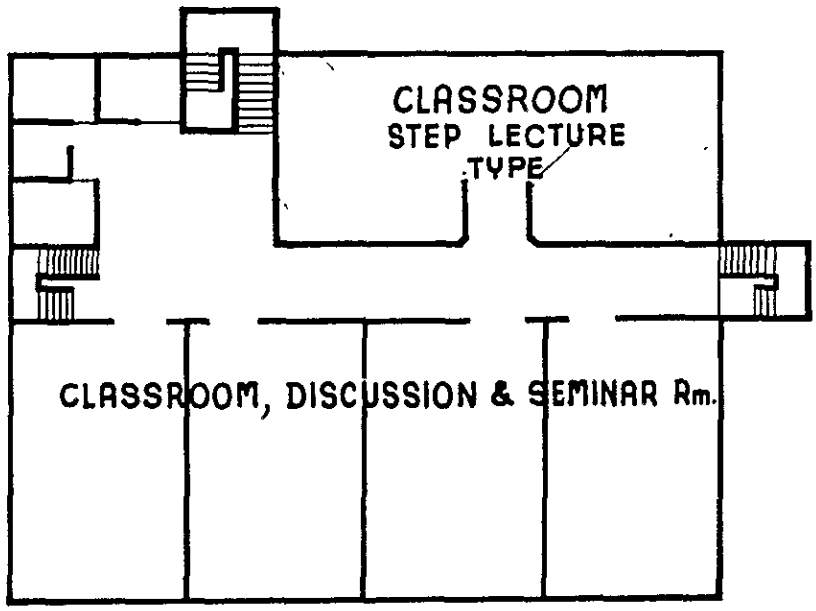


Figure V. Classroom Center Building



GROUND FLOOR PLAN



SECOND FLOOR PLAN

CLASSROOM CENTER

2. Total estimated cost for construction and Equipment

The total floor space requirement and estimated cost of construction, funiture and Air-condition for each building and other type of infrastruction are a follow :

a. Construction	48,112,770	Baht.
b. Equipment	19,354,000	Baht
Total	67,466,770	Baht

2.1 Breakdown of estimated cost for construction

Item	Area/capacity	Unit cost (Baht)	Total cost (Baht)
1. Administrative building	566.5 m^2	4,500	2,549,250
2. Audio-visual media building	1,411.4 m^2	4,500	6,351,300
3. Printing shop	374 m^2	4,500	1,683,000
4. Classroom building	2,069 m^2	4,500	9,310,500
5. Cafeteria	300 m^2	4,500	1,350,000
6. University Hotel and Dormitory	3,146 m^2	4,500	14,157,000
7. Housing	300 m^2	4,500	1,350,000
8. Circulation	816.69 m^2	4,500	3,675,105
9. Fixture			4,042,615
10. Air-conditioning facilities	140 tons	25,000	3,500,000
11. Telephone	48 units	3,000	144,000
	Total		48,112,770

2.2 Breakdown of floor area requirement

a. Administration building

Item	Area required (m^2)
1. Entrance hall, waiting area and exhibition space	40
2. Information counter, radio link and telephone junction	15
3. Director's office	18
4. W.C.	6
5. Secretary's office	9
6. Waiting area	9
7. Deputy-director's office	18
8. Office space for specialists	48
9. Office space for co-ordinating staff (15 persons @ 5 m^2)	75
10. Office space for training staff	60
11. Office space for trainees (8 persons, @ 3.5 m^2)	28
12. Conference room (30-person capacity, @ 1.8 m^2)	54
13. V.I.P. room and pantry	18
14. General office (15 persons, @ 3.5 m^2)	52.5
15. Storage	20
16. Library	48
17. W.C.	48
Total	566.5

b. Audio-visual media building

Item	Area required (m^2)
1. Section-head's office	16
2. Entrance hall, and waiting area	20
3. Information counter	15
4. General office	20
5. Television production unit	
5.1 T.V. studio (4 m height)	300
5.2 Waiting and dressing room	40
5.3 Control room	40
5.4 Video-tape recorder storage	40
5.5 Material storage	40
5.6 Technical operation room	20
5.7 Electric junction	12
5.8 W.C. & janitor	32
6. U.H.F. broadcasting unit	40
7. Audio production Unit	
7.1 Sound track record room	30
7.2 Tape record room	25
7.3 Library for tape, recorder, etc.	25
8. Graphic production unit	
8.1 Drawing room	200
8.2 Storage	9

Item	Area required (m^2)
9. Photographic production and photo-lab unit	
9.1 Picture-taking room	15
9.2 Dark room (booth)	32.4
9.3 Drying and washing space	15
9.4 Film production room	60
10. Public service facility unit	
10.1 Waiting area	60
10.2 Film, tape, and video-tape library	40
10.3 Circulation-service room	40
10.4 Exhibition space	150
10.5 Pre-view room (booth)	45
10.6 W.C. & janitor	30
Total	1,411.4

C. Printing shop

Item	Area required (m^2)
1. Printing area	200
2. Storage 1	25
3. Storage 2	50
4. Letter press room	30
5. Proof-reading room	20
6. Dark room for film offset	
6.1 Film offset laboratory	15
6.2 Dark room	9
7. Office	25
Total	374

d. Classroom building

Item	Area required (m^2)
1. Audio-visual aid unit	60
2. Classroom (60 persons) (movable partition, natural ventilation; space to be enclosed for air conditioning when necessary	540
3. Discussion room (6 units, @ 20 m^2)	120
4. Training room (2 units, @ 72 m^2)	144
5. Coffee-break space	80
6. Printing officer room	20
7. Sound-control room	9
8. Office space for staff	72
9. Classroom and auditorium	1,024
Total	2,069

e. Cafeteria

Item	Area required (m^2)
1. Dining room	240
2. Cooking space	25
3. Cold room	15
4. W.C.	20
Total	300

f. University Hotel and dormitory	3,146
g. Housing	300
h. Circulation	816.69
Grand total	8,983.59

2.3 Eqeuipment

Item	Estimated Cost (Baht)
1. Administrative section	781,830
2. Classroom unit	305,410
3. Auditorium	150,850
4. Printing Shop	7,000,000
5. Television programe unit	4,890,000
6. Motion Picture production unit	4,000,000
7. Photography unit	397,900
8. Mobile unit	517,200
9. A.V.Service unit	283,850
10. Audio media Production unit	427,790
11. Graphic production unit	110,000
12. Electric maintenance shop	106,000
13. Cafeteria and hotel dining room	382,250
Total	19,353,540

2.4 Breakdown of estimated cost for equipment

1. Administrative section

Item	quantity
1. Micro-bus	2
2. Pick-up car	2
3. Passenger car	1
4. Water pump	2
5. Electric typewriter (Thai)	2
6. Electric typewriter (English)	1
7. Rotary lown mower	2

Total estimated cost 782,290 Baht

2. Television program unit

Item	quantity
1. Color T.V. camera (studio type)	3
2. Color T.V. camera (outdoor type)	1
3. Studio switching and control system	1
4. Color video/audio distributor	1
5. PAL color encoder	1
6. PAL color decoder	1
7. Audio unit for T.V. studio	1
8. B/W picture monitor	4
9. Color T.V. monitor and reciever	15
10. Precision color monitor	2
11. Vector scope	1
12. Caption adder	1
13. Telecine with color camera	1
14. Waveform monitor	1
15. Sine square pulse. bar multiburst and and stairstep genertor	1

Item	quantity
16. Double-beam oscilloscope	1
17. Transmitter	1
18. Color VTR with monitoring facilities	2
19. Color video-cassette recorder/player	6
20. Color video projector	2

Total estimated cost 4,890,000 Baht

3. Motion-picture production unit

Itme	quantity
1. 16- mm. reflex sound camera	2
2. Continuous printer for 16-mm. films	1
3. Film processor (for 16-mm. color negative film)	1
4. Film processor (for 16-mm. color positive film)	1
5. 16-mm. optical sound recording machine	1
6. Mixing console	1
7. 16-mm., table-type, magnetic recorder/ reproducer	1
8. Magetic triple-type reproducer	1
9. Horizontal-type film editor	1
10. 16-mm. film veiwing machine	1
11. Splicer for magnetic film	1
12. 4-way friction winder with wooden base	1
13. 4-way synchronizer with film shoulder for 16-mm. film	1
14. Animation stand with camera for 16-mm. film	1

Item	Quantity
15. Super 8-mm. sound camera with zoom lens	2
16. Super 8-mm. sound projector for optical and magnetic sound reporduction	2
Total estimated cost	4,000,000 Baht

4. Photography unit

1. Enlarger and easel	10
2. Dark-room safety light	10
3. Twin lens reflex camera	10
4. Camera with 35-mm. range finder	10
5. Electronic flash	10
6. Contact proof prints	5
7. Print dryer	2
8. Print washer	2
9. Film dryer cabinet	2
10. Electronic slide duplicator	1
11. Copying set	1
12. B/W instant slide making set	1
13. 35-mm. SLR camera	3
14. Interchangeable lenses :	
(a) Wide-angle 35-mm., F/2 lens	1
(b) Telephoto 105-mm., F/2.5 lens	1
(c) Telephoto 135-mm., F/2.8 lens	1
(d) Telephoto 200-mm., F/4 lens	1
(e) 43-86 mm., F/3.5 zoom lens	1
(f) 80-200 mm., F/4.5 zoom lens	1

Item	Quantity
(g) 55-mm., F/3.5 macrolens	1
(h) 70-210 automatic zoom lens	1
(i) 50-300 mm., zoom lens	1
15. Electronic flash (Pro-type)	1
16. Motor drive for 35-mm. SLR camera	1
17. 2¼ x 2¼" single-lens reflex camera	1
18. Half-frame camera (SLR type)	1
19. Enlarger for 35-mm.	1
20. Easel for paper sizes up to 11 x 14"	1
21. Dark-room timer	1
22. Spot light	2
23. Spot light (6" sweep-focus fresnel)	1
24. Photo lamp	2
25. Flood light	2
26. Set light	2
Total estimated cost	397,900 Baht

5. Mobile unit

Item	Quantity
1. Jumbo micro bus	2
2. Slide projector for 35-mm. slide	2
3. Movies projector for 16-mm. film	2
4. Movies projector for 35-mm. film	2
5. Overhead projector	2
6. Generator (5 kV)	2
7. Close circuit T.V. assembly :	
(a) T.V. color camera plumbicon	2
(b) Camera control unit	2
(c) B/W monitor	2
(d) T.V. color monitor and 24" receiver	4
(e) Video cassette tape recorder	2

Item	Quantity
8. Amplifier (200 watts)	2
9. Mixer (phono, tape, 3-channel-mic)	2
10. Microphone (low impedance)	2
11. Microphone (high impedance)	2
12. Horn speaker	2
13. Cassette tape recorder	2
14. Screen (6 x 8 m.)	2

Total estimated cost 517,200 Baht

6. A.V. Service unit

Item	Quantity
1. Wireless amplifier with built-in speaker in column, wireless microphone, 15-watt power output	4
2. Two-channel wireless amplifier with built-in speaker, two wireless microphones, and 7-watt power output	2
3. Megaphone (flashlight-battery operated)	4
4. Public address system, i.e., mixing amplifier, 3 microphones, 2 horn speakers, record player, cassette tape deck, and 200 watt power output (r.m.s.)	2
5. 16-mm. motion-picture projector with halogen lamp, induction motor and magnetic and optical sound reproduction	2
6. Super 8-mm. motion-picture projector with halogen lamp and magnetic and optical sound reproduction	2
7. 2" x 2" Slide projector with xenon lamp	4

Item	Quantity
8. Overhead projector with halogen lamp and thermal switch	4
9. Projection screen, size 70 x 70", portable, with stand	5
10. Service vehicle (Van type and 1,600-c.c. engine)	1
Total estimated cost	283,850 Baht

7. Audio media production unit

Item	Quantity
1. Mixing amplifier with control console and 30-watt power output (r.m.s.)/ channel	2
2. Turntable (studio type)	2
3. Reel-to-reel tape deck (auto-reverse, 6 heads, 3 motors solenoid control)	2
4. Cassette tape deck (servo-motor with dolby noise reproduction)	2
5. Microphone (uni-direction, low impedance)	4
6. Headphone (all frequency)	2
7. Mo-nitoring loudspeaker (all frequency range, 20-watt output)	4
8. Tape duplication unit	1
9. Cassette-to-cassette duplicator	1
10. Mixing amplifier with 10-watt output (r.m.s.)/channel	5
11. Open-reel tape deck (3 heads, 3 motors, solenoid control)	5

Item	Quantity
12. Cassette tape deck (front-loading, dolby noise reduction)	5
13. Monitoring loudspeaker (all frequency range, 10-watt output)	10
14. Headphone	5
15. Tape spicer for $\frac{1}{4}$" tape	7
16. Filmstrip projector with compact built-in rear screen,synchronized sound and cassette tape	5

Total estimated cost 427,790 Baht

8. Graphic production unit

Item	Quantity
1. Automatic silk screen machine	1
2. Drafting table with drafting instrucments	1
3. Electric-saw table	1
4. Pantograph	1
5. Electric driller	1
6. Electric puncher	1

Total estimated cost 110,000 Baht

9. Printing shop

Item	Quantity
1. Offset press (for 21.5 x 31" paper size)	1
2. Offset press (for 21.5 x 15.5" paper size)	1
3. Letter press (for 12.5 x 31" paper size)	1

Item	Quantity
4. Letter press (for 21.5 x 15.5" paper size)	1
5. Automatic pattern (small)	2
6. Process camera and accessories (for 32 x 32" film size)	1
7. Vacuum contact printer (29 x 37" effective size)	1
8. Proof-reading equipment	1
9. Automatic folder	1
10. Book-cover	1
11. Stitching machine (for thickness of at least 2")	1
12. Hot stamping machine	1
13. Paper guillotine	1
14. Drilling and perforating machine	1
15. Block making machine	1
16. Monotype and keyboard	1

Total estimated cost 7,000,000 Baht

10. Classroom unit

Item	Quantity
1. Amplifier	6
2. Cassette tape recorder	6
3. Microphone	18
4. Loudspeaker	12
5. 16-mm. motion-picture projector	3
6. Super 8-mm. motion-picture	2
7. Slide projector	6
8. Overhead projector	6

Item	Quantity
9. Front projection screen	6
10. Rear projection screen	12
11. Opaque projector	2
12. Micro-slide projector	2

Total estimated cost 305,410 Baht

11. Auditorium (300-seat capacity)

Item	Quantity
1. Sound-control system	1 set
2. 16-mm. motion-picture projector	1
3. Slide projector	1
4. Overhead projector	1
5. Rear screen (acrylic, matte surface, 70 x 70" size)	2
6. Front screen	1

Total estimated cost 150,850 Baht

12. Cafeteria and hotel dining room

Item	Quantity
1. Iron gas burner (double type, diameter 18", including gas tank)	2
2. Iron gas burner (double type, diameter 12" including gas tank)	1
3. Gas oven, 33" x 22 x 12"	1
4. Electric freezer, 30 cu.ft	2
5. Electric refrigerator, 20 cu.ft.	4

Item	Quantity
6. Electric blender	2
7. Electric mixer	1
8. Electric coffee pot, 125-cup capacity	6
9. Gas water-heater	5
10. Electric calculating and registering machine	2
11. Electric floor polisher	1
12. Gas oven, 24 x 18" x 18" with 4 ranges	1
Total	382,500 Baht

13. Electronic maintenance shop

Item	Quantity
1. Oscilloscope	2
2. A.F. signal generator	2
3. Multi-meter	4
4. Snap-on volt, ohm, and amp meters	2
5. D.C. voltage regulator	1
6. A.F. Signal tracer	2
7. Soldering gun	4
8. Mini-drill (high speed)	2
9. A.C. voltage regulator	2

Total estimated cost 106,000 Baht

3. Utilization plan for Extension and Training Center.

3.1 Training Activities

Activity	Participant	Frequency
1. Training on Extension Methodology	1. Agricultural Extension Dept. 2. Community Development Dept. 3. International Training	All year round
2. Training on Various Agricultural Subject	1. Agricultural Extension Dept. 2. Community Development Dept. 3. Urban Renewal Office 4. Army Officer 5. Leader farmer 6. International Training	All year round
3. Training on Communication Media Production	1. Agricultural Extension Dept. 2. Community Development Dept. 3. Ministry of Ecucation. 4. K.U. Staff 5. International Training	All year round

Activity	Participant	Frequency
4. Pre-Service and In.Service Training	1. K.U. Staff	All year round
5. Seminar,conference and workshop on various subject matter.	1. K.U. Staff 2. National Level 3. International Level	All year round

3.2 Communication Media Production Activity

a. Audio-visual Production Unit

Activity	Purpose	Frequency
1. Produce audio-visual materials and programe	1. For training at the center 2. For K.U.staff 3. For distributions	All year round
2. Audio-visual media operation service	1. For training 2. For K.U.staff 3. For cinculortion	All year round
3. Maintenance	1. Maintain all media equipments	All year round
4. Film,video-tape, audio-visual material library	1. For training staff 2. For trainees 3. For K.U.staff	All year round

b. T.V. Unit

Activity	Purpose	Frequency
1. Through the use of video-tape for Training at Center	1. For training at center	All year round
2. Through the use of video-tape for mobile Unit	1. For community extension	Varied
3. Produce video-tape for teaching and learning in both campuses	1. For K.U.staff	All year round
4. Produce video-tape distributed to publice	1. For ottrer T.V. station	All year round

c. Printing Unit

Activity	Purpose	Frequency
1. Produce printed materials	For training course at center	All year round
2. Produce K.U. text books	For both campus	All year round
3. Produce K.U.Journal	For both campus	All year round
4. Produce report books, year books, hand books and documents.	For both campus	All year round
5. Produce posters, leaflets form,cards and etc.	For both campus	All year round

3.3 Community Extension Activity

Activity	Participant	Frequency
1. Mobile Unit for Selected area and on-request	1. Farmers 2. Farmer groups	All year round
2. Radio-Broadcasting and T.V.Programe	1. General public 2. Farmers	All year round
3. Publication service	1. General public 2. Farmers	All year round
4. Exhibition on Agriculture	1. General public 2. Farmers	All year round

3.4 Consultancy for Agricultural Problem

Activity	Participant	Frequency
1. Consultancy for Agricultural problem by; 1. letters 2. office Call 3. publications	1. General public 2. Farmers	All year round
2. Self-study programe by media	1. General public 2. Farmers	All year round
3. Campus Tour	1. General public 2. Farmers 3. Foreigner	All year round

3.5 Extension Research

Activity	Frequency
1. Research on Extension Communication	All year round
2. Research on Extension Methodology	
3. Research on Field Extenstion	

4. Participants.

Estimated Number of Participants in various Training Courses and seminars from various Departments per year.

4.1 Officer

Organization	Number
1. Agricultural Extension Dept.	1100
2. Community Development Dept.	990
3. Social Welfare Dept.	50
4. Bangkok Metropolitan.	64
5. Office of Army Officer Development	
- Commissioned Officer	220
- Private Soldier	500
6. K.U. Staff	100
7. Foreigner Officer.	100
8. ~~Urban Renewal Office.~~ Accelerated Rural Development	100
Total	3224

4.2 Farmer.

Organization	Number
1. Farmer group around Kamphaengsaen campus.	550
2. Farmer leader from Community Development Dept.	235
3. Farmer leader from Bangkok Metropolitan	500
4. Farmer leader from ~~Urban Renewal Office~~ Accelerated Rural Development	1520
5. Farmer leader from Agricultural Extension Dept.	1200
6. Local leader from Social Welfair Dept.	120
Total	4125

5. Experts and Followships.

1. Japaneso Experts.

1. Organization and managment	6 m/m (Jan.81)	
2. T.V. Engineering	6 m/m (July 81)	
3. Extension Work	3 m/m	(Jan.82 - June 82)
4. Training Work		
5. T.V. Programing		
6. Film Production		
7. Printing Production		

2. Followships.

2.1 Study Tour

2.1.1 Extension and Training Work	3 m/m	June 81
2.1.2 Audio-visual aid	3 m/m	

2.2 Training Scholarships.

2.2.1 Extension Work	10 m/m	
2.2.2 Training Work	8 m/m	
2.2.3 T.V. Engineering Work	18 m/m	June 81
2.2.4 T.V. Program Production		
2.2.5 Film Production		
2.2.6 Printing Work	12 m/m	

6. Personnel.

A. Tentative list of key Person

Unit/name of key person	Field of Specialization
1. Central Administrative Office	
Mr.Porn Suwan-vajokkasikij (MS.)	Agr.Extension
Mr. Poom Khumgliang (BS.)	Agr.Extension
Mr. Tatchai Sangsingkeo (M.Phil.)	Agr.Extension
2. Communication Media Unit	
Mr. Suchoti Daosukho (MA.)	Communication
Mr. Narong Sompong (MA.)	Communication
3. Training Unit	
Mr. Wattana Swanyatiputi (MS.)	Agr.Extension
Miss.Chatcharee Manoonpatarachai (MS.)	Agr.Extension
Miss. Jintana Sripraiwan (MA.)	Community Development
4. Extension Unit	
Mr. Suraphol Chandrapatya (MPA.)	Agr.Extension
Mr. Sumeth Pinyosanit (BS.)	Agr.Extension

B. Full Time staff

1. Central Adminitrative Office

	Total
1. Divector	1
2. Secretary	2
3. Financial Officer	2
4. Material Officer	2
5. Technician	3
6. Worker	15
Total	25

2. Communication Media Unit

	Total
1. Printing Unit	
1. Cert. in Printing	3
2. Cert. in Mechanic	2
3. Technician	5
Total	10
2. A.V.Production Service Unit	
1. M.A. in A.V.	1
2. M.A. in Comm. Media	1
3. Cert. in Photo.	2

	Total
4. Cert. in Arts.	2
5. Cert. in Electronic	2
Total	8

3. T.V.Production Unit

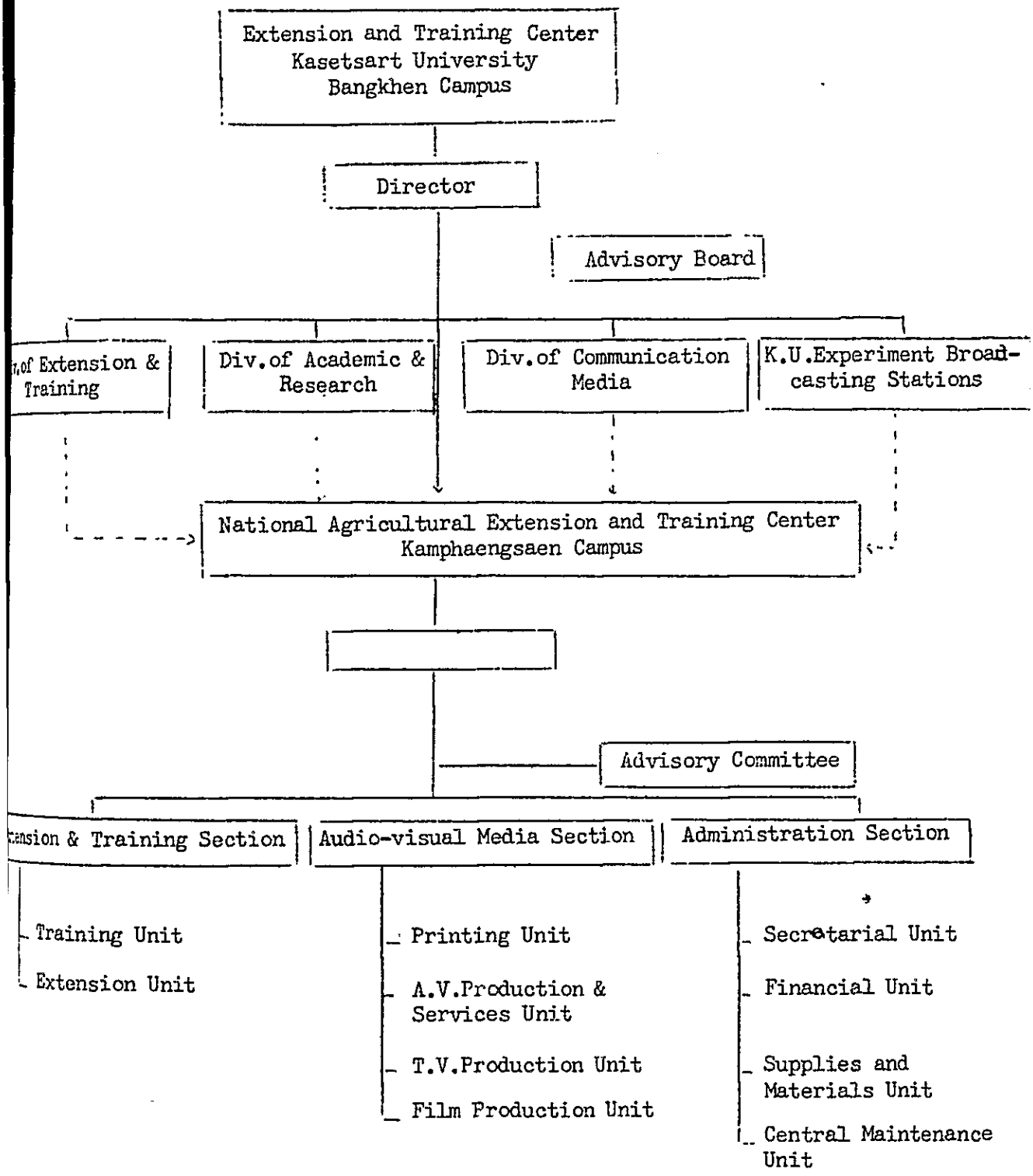
	Total
1. Ph.D. in A.V.	1
2. B.A. in Mass.Comm.	1
3. B.A. in Programming	1
4. B.A. in Engineering	2
5. Cert. in Electronic	3
Total	8

4. Training Unit

1. M.S. in Agri.	3
2. M.S. in Training	3
3. B.S. in Extension	2
Total	8

5. Extonsion Unit	Total
1. M.P.A.	2
2. M.A. in C.D.	3
3. B.S. in Agri.	3
4. Cort. in Agri.	2
Total	10
Grand Total	69

Appendix I


Extension and Training Center
Kasetsart University
Bangkhen Campus
Director
Advisory Board
Div.of Extension & Training
Div.of Academic & Research
Div.of Communication Media
K.U.Experiment Broadcasting Stations
National Agricultural Extension and Training Center
Kamphaengsaen Campus
Advisory Committee
Extension & Training Section
Audio-visual Media Section
Administration Section
Training Unit
Extension Unit
Printing Unit
A.V.Production & Services Unit
T.V.Production Unit
Film Production Unit
Secretarial Unit
Financial Unit
Supplies and Materials Unit
Central Maintenance Unit

Appendix II

Extension and Training Center staff and specialization

Kasetsart University

NAME, LAST NAME	DEGREE, FIELD OF STUDY AND UNIVERSITY	FIELD OF SPECIALIZATION
1. MR. PHORN RESANONTHA	B.S.(Ag.Ext.Ed.) Kasetsart Univ. M.S.(Ag.Ed.) Utah State Univ.	Ag. Extension
2. MR. POOM KHUMGLIANG	B.S.(Ag.Ext.) Kasetsart Univ.	Ag. Extension Photography
3. MISS WILAWAN ATTAWIPAKPATSAN	B.S. (Agriculture) Kasetsart Univ. Cert. of Housecraft Ed. (UK) M.S.(Nutrition) Univ. of Hawaii	Ag. Extension and Appleid & Community nutrition
4. MR. VICHITR AWAKUL	B.S.(Ag.Ext.) Kasetsart Univ. M.A.(Ag.Ed.) Univ. of Minnesota	Agricultural and Extension Educ.
5. MR. CHAKRIT JULAKASEWEE	B.Sc.(Agronomy) Cert. in Public Relations	Pulbic Relations Agr. Extension
6. MR. BOONTHAM CHITANAN	B.S.(Entomelogy) Kasetsart Univ. M.S.(Ag. Extension) Univ. of Wisconsin Ph.D.(Ag. Education) Cornell Univ.	Ag. Ext. Research Ag. Ed.
7. MR. DIREK RERKRAI	B.S.(Ag.Extension Ed.) Kasetsart Univ. M.A.(Community Dev.) Kasetsart Univ.	Rural Extension and Rural Development

NAME, LAST NAME	DEGREE, FIELD OF STUDY AND UNIVERSITY	FIELD OF SPECIALIZATION
	Ph.D.(Extension Ed.) U. of the Philippines Post doctoral training in Institutional Research, Michigan State Univ.	
MR. SAWANG TALENGKAPHUN	M.S.(Agri.) Kasetsart Univ. B.S.(Agri.) Kasetsart Univ. Cert. in Radio Program Production. Public Relation School	Ag. Extension Farm Broadcast Program
MISS PULSRI KANOKVICHITRA	B.S.(English, History) Srinakarintraviroj Univ. M.A.(Elementary Education) M.A.(Administration in Elementary School) Northeast Missouri State Univ., U.S.A. Ph.D.(Educational Administration and Supervision) University of Illinois, U.S.A.	Administration Method of teaching
MR. TATCHAI SANGSINGKEO	B.S.(Ag.Extension) Kasetsart Univ. M.Phil.(Ag. Extension) Reading Univ.	Ext. Psychology Ag. Ext. Research

NAME, LAST NAME	DEGREE, FIELD OF STUDY AND UNIVERSITY	FIELD OF SPECIALIZATION
11. MRS. BOONJIED RATANACHAI	B.S.(Agriculture) Kasetsart Univ. Cert. in Agricultural Extension Service (Japan) Cert. in Rural Youth Work (Federal Republic of Germany)	Agricultural Extension Home Economics Extension
12. MR. SUCHOTI DAOSUKHO	B.S. Chulalongkorn Univ. M.A. (Instructional Media) California State Univ. Long Beach	Educational Media
13. MR. SURAPHOL CHANDRAPATYA	B.S.(Entomology) Kasetsart Univ. M.P.A.(Master of Public Administration) National Institute of Development Administration Cert. in Social Research (National Research Council) Cert. in Project Management (K.U. & NIDA)	1. Agr. Extension 2. Project Management 3. Social Research 4. Personnel Management 5. General Administration 6. Training
14. MR. SUPOTE SRONSUCHATI	B.Sc.(Economic & Cooperation) Kasetsart University	Agr. Extension

NAME, LAST NAME	DEGREE, FIELD OF STUDY AND UNIVERSITY	FIELD OF SPECIALIZATION
5. MRS. PONGPAN CHITANAN	B.S.(Agriculture) Kasetsart Univ. M.S.(Ele.Ed.) State Univ. of New York.	Ext. Psyohology
6. MR. WATTANA SWANYATIPUTI	B.Sc.(Entomology) Kasetsart Univ. M.Sc.(Horticulture) Kasetsart Univ.	Agr. Extension
7. MISS JINTANA SRIPRAIWAN	B.S.(Agri. Extension) Kasetsart Univ. M.A.(Community Development) Kasetsart Univ. R.D.P.(Diploma of Regional Development Planning), Settlement Study Centre, Israel	Agri. and Extension Education. (Social Research, Rural Sociology, Project Organizer in Training course)
8. MISS CHATCHAREE MANOONPATARACHAI	B.S.(Agri.) Kasetsart Univ. M.S.(Agri.) Kasetsart Univ.	Agr. Extension
9. MISS NATH BHANTHUMNAVIN	B.A.(Social Welfare) Thammasert University M.A.(Community Development) Kasetsart University Cert. in Social Research (National Research Council)	1. Community Development 2. Rural Sociology 3. Social Research

NAME, LAST NAME	DEGREE, FIELD OF STUDY AND UNIVERSITY	FIELD OF SPECIALIZATION
20. MR. TRAKANSAK MANEEPAK	B.S.(Ag. Entomology) Kasetsart Univ. M.S.(Ag. Ext. Ed.) Kasetsart Univ.	Ag. Extension
21. MR. NARONG SOMPONG	B.S.(History) Srinakharinvirot Univ. M.S.(Educational Technology) Srinakhorinvirot Univ.	A-V Communication
22. MR. SUMETH PINYOSNIT	B.Sc.(Agr. Extension) Kasetsart Univ.	Agr. Extension

Appendix III

List of Documents and Its Expenses Published in Kasetsart University

1. Office of the Rector 323,400 ฿

1.1 Cards

1.2 Year Book

1.3 Leaflets

1.4 Expenses Receipt

1.5 Financial Papers

1.6 Receipts

1.7 Fee Card

1.8 Student I.D. Card

1.9 Personnel Record

1.10 Academic Conference Reports

1.11 List of Students

1.12 Computer Card

1.13 Degree Card Cover

1.14 Degree Card

1.15 Various Receipts

1.16 Forms

2. Publication Committee 500,000 ฿

2.1 Laboratory Handbook on General Chemistry

2.2 Laboratory Handbook on Analytical Chemistry

2.3 Laboratory Handbook on Biology

2.4 Laboratory Handbook on Soil Science

2.5 Laboratory Handbook on Genetics

2.6 Laboratory Handbook on Plant Pathology

2.7 Laboratory Handbook on Plant Science

2.8 Poultry Production

2.9 Introduction to Psychology

2.10 Translation Practice

2.11 Improvement of Genetics

2.12 Fishery Products and Preservation

2.13 Rural Sociology

2.14 Principle on Marine Farming

2.15 Agricultural

2.16 Quails

2.17 History and World Culture

2.18 Report on Biological Conference

2.19 Report on Plant Conference

2.20 Introduction to Political Science

2.21 Report on Animal Conference

2.22 Principle on Biology

2.23 General on Animal Science

3. <u>World Bank Loan Project</u> 50,000 ฿

3.1 Monthly News

3.2 Documents for Construction Design

3.3 Forms

4. Extension and Training Office 150,000 ฿

4.1 Students Handbook

4.2 Principle on Agricultural Extension

4.3 Agricultural News

4.4 Inter-University News

4.5 Facts and Figures of Kasetsart University

4.6 Extension Documents

4.7 Certificate Cards

4.8 Certificate Covers

4.9 Forms

5. Institute of Food Research and Product Development 70,000 ฿

5.1 Journal on Food

5.2 Year Book

5.3 Reports

5.4 Forms

6. The University Library 40,000 ฿

6.1 Librarial Card

6.2 Forms

7. The University Clinic 30,000 ฿

7.1 O.P.D. Card

7.2 Medical Order

7.3 Medical Package

7.4 Patient Card

7.5 Medical Recommended Forms

8. Faculty of Agriculture 10,000 ฿

8.1 Cover for Instructional Documents

8.2 Forms

9. Faculty of Fishery 25,000 ฿

9.1 Kasetsart University Fishery Research Bulletin

9.2 Notes from Faculty of Fisheries Kasetsart University

9.3 Forms

10. Faculty of Forestry 20,000 ฿

10.1 Cover for Instructional Documents

10.2 Forms

11. Faculty of Science and Arts 30,000 ฿

11.1 Year Book

11.2 Forms

12. Faculty of Education 150,000 ฿

12.1 Education Data

12.2 Education News

12.3 Handbook for Advisor

12.4 Handbook for Instructor

12.5 Handbook for Trainee

12.6 List of Instructors

12.7 List of Matrerials

12.8 List of Personnel

12.9 List of Students

13. Faculty of Economic and Business Administration 150,000 ฿

13.1 Covers for Instructional Documents

13.2 Forms

14. Faculty of Veterinary Medicine 10,000 ฿

14.1 Cover for Instructional Documents

14.2 Forms

15. Faculty of Social Science 10,000 ฿

15.1 Cover for Instructional Documents

15.2 Forms

16. The Graduate School 15,000

16.1 Handbook for Graduate Students

16.2 Forms

17. K.U. Demonstration School 22,250 ฿

17.1 Practice

17.2 Demonstration School News

17.3 Laws and Orders

17.4 News Bulletins

17.5 Student I.D. Card

17.6 Student Record Card

17.7 Educational Results Card

17.8 Educational Reports Card

17.9 Educational Record Book

17.10 Forms

18. Others 417,000 ฿

18.1 Journal on Horticulture

18.2 Journal of Orchid Society

18.3 Orchid Monthly News

18.4 Swine Magazine

18.5 Graduate Book

18.6 New Students Welcome Book

18.7 Thesis Cover

Grand Total Per Year 1,737,650

EDUCATIONAL PROGRAMS OF KASETSART UNIVERSITY FOR THE DEVELOPMENT OF SMALL FARMERS

BY Dr SUTHARM AREEKUL
KASETSART UNIVERSITY

Education Programs

of

Kasetsart University

for

The Development of Small Farmers

First Edition, Published 1976
One Thousand printings

Second Edition, Published 1977
One Thousand printings

Published by Extension and Training Office
Kasetsart University
Bangkok, Thailand.

Educational Programs of Kasetsart University For the Development of Small Farmers

by

Sutharm Areekul

Kasetsart University, Bangkok 9, Thailand

Introduction

Institutions of higher learning in Thailand have been established for different purposes and for performing varied functions. Some institutions are assigned to concentrate their work to a single field, or a small number of tasks, while other are involved in a wider range of assignment. Kasetsart University, as the name in Thai implies, has carried out its function of building up high level manpower in agriculture and played a major role on agricultural development for the nation since its establishment. It has been, and will remain, the major source of teachers and guidance in the development of new agricultural colleges and schools throughout the Kingdom. Today, more than 10,000 graduates in agriculture have been employed in key positions in various organizations, both government and private.

Kasetsart University, however, has long recognized the need to educate small farmers, with small land-holdings, who presently constitute the major part of our agricultural system in Thailand. Their lack of education is admitted to be one of the main factors which prevent them from increasing successfully their agricultural productivity. In general, Thai farmers are highly intelligent and quite efficient in their utilization of scarce resources. By educating them, even with some limitation, farmers will adopt new technical knowledge and practices which will assist them in making agriculture more productive and profitable on their farms, and ultimately raising the nation's economy. In performing this function, Kasetsart University has formulated both formal and non-formal education programs among which several have had either direct or indirect impact on the development of small farmers. Some of these programs will be discussed here in this paper.

Development of Educational Programs in Agriculture at Kasetsart University

The development of educational programs in agriculture at Kasetsart University can best be understood by examining the past history of the university. The predecessor to the Faculty of Agriculture was established back in 1904, as a school of Sericulture, responsible to the Ministry of Agriculture, which at the time put emphasis on this work for occupational improvement. The school was succeeded by the School of Agriculture, and the School of the Ministry of Agriculture, chronologically. In 1928, the

College of Agriculture, with the status of a junior college, was set up in place of the former "school", still administered by the Ministry of Agriculture. It offered three-year training programs in agricultural sciences for high school graduates. After being amalgamated into Kasetsart University as the Faculty of Agriculture in 1943, its curriculum was expanded to five-years programs leading to the degree of Bachelor of Science in Agriculture. In the early 1964, the National Education Council redirected new guidelines, in higher education in all universities, to adopt a uniform four-year requirement for all currricula leading to the Bachelor's degree, except certain professional curricula such as Veterinary Medicine which still require six years. The first of the four-year graduates from Kasetsart were granted their degree in 1968. Graduate courses leading to Master Degrees in agriculture have been offered since 1956, and the first group successfully completed their requirement and were conferred their degrees in 1958.

The impetus for the formation of the university thus originated from the Ministry of Agriculture. Its teaching program was tailored to train personnel for the Departments of Agriculture, Forestry, Fisheries, Cooperatives, Livestock, and Irrigation. Over the intervening years more faculties have been added and the program of education has shifted from that of a series of narrow professional schools to a modern university concept. Nevertheless, the idea of "service to agriculture" is still retained in the development of both teaching and research programs.

Degree Programs in Agriculture and Their Impact on Small Farmers:

During its early years, Kasetsart University started with certain three-year curricula leading to a diploma. During this period, the emphasis of the courses was aimed more on practical work, which of course focused tremendously on small farms. The university was mobilized to teach students the ability to upgrade the efficiency of local agriculture. It was concerned mostly with the agricultural practices which were suitable for operation with simple equipment on small farms. Most students, upon their graduation, during that period, worked, mostly, close to the farms. As the number of trained staff and demand for high level manpower increased, five-year curricula leading to the Bachelor's degree were approved. Courses offered for degrees in agriculture, during that period, were orientated toward greater scientific approach. In addition, parts of the curricula of colleges and universities in the Philippines, the United States, Australia and Europe were selected and integrated wherever the university felt they could provide students with wider a scope and appropriate background. It was able, however, to fulfill the requirement of many government organizations that needed agricultural scientists in their work. But at the same time, it tended to create a shortage of trained manpower that could work effectively on small farms or become good farmers. After the curriculum was changed to a four year

program, more students resulting from more enrollment, have been graduated which then tended to overflood the scientific manpower demand of goverment organizations. In recognition of the problem, which the country will face in the near future, Kasetsart University, during the Fourth Educational Development Plan to be effective begining from 1977–1982, has its plan of changing curriculum content in agriculture including teaching and learning styles so that it can produce graduates with much more practical knowledge and skills. It is expected that the program will have a great impact on the building up of well trained manpower to serve small farms for the country, in the near future.

Development of Educational Program in Agriculture for Small Farmers

Education programs in agriculture for small farmers at Kasetsart University were initiated, when the late rector of the univerity, Dr. Luang Suwan Vajokasikij, launched an extensive adaptive research program in poultry production on the university campus in 1947, and concluded his findings in 1950. His success, and lessons from it, were broadcast almost daily by radio, and published in many newspapers and journals. A campaign for profitable poultry production was made through a mass farmer education program, which was then developed along the lines of a large demonstration plot which was installed within the university campus. These activities resulted in rapid development of egg and broiler production in the country. The nation moved rapidly from being a net importer of poultry products to self sufficiency, and an exporter, to a certain extent. The Rector's success brought to the university a new task,–the task of providing technical services to meet the needs of less educated farmers, and interested public. The university started to perform this task on a broader scale in 1953, and the work has been carried on by a group of staff members, recruited mostly from the Faculty of Agriculture. Subsequently, the Office of Extension and Training was officially established in 1970. This Office has similar status to that of a faculty, and its main functions are to pass on new technical knowledge to farmers and the public, to serve as the public relation and communication unit of the university, and to coordinate extension training programs of various subject matter fields, as our service to the community.

Many non–degree programs, and non–formal education, in agriculture and its related fields, have been developed since 1953. These programs are aimed at developing simple vocational and training courses in which any interested individual can attend without regular requirements of a higher educational background. A certificate is granted to each individual upon his completion of each course. Some of these programs will be described and discussed in this paper.

Summer Vocational Courses in Agriculture and Its Related Fields

Summer vocational courses in agriculture, and many related fields were begun in 1953. At the beginning, they had as their purpose to educate

strictly farmers with simple agricultural techniques so that, upon their return home, they could make a good progress in their Farm careers. The courses have been offered during the summer period, when the season is dry, and farmers can leave their farms. Only five courses, poultry production; dairy farming; apiculture; vegetable production; and food preservation were tried the first year, with 404 farmers attending. Later on, however, admission had to be expanded to include the general public because of interest and demand, and to expand the nature of courses including professions other than agriculture (see Appendix 1).

The courses given were intensified and were scheduled to conclude within four to five weeks begining the first week of April, annually. Participants are required to attend at least a minimum of 30 total contact hours before they can complete, satisfactorily, each course, and become eligible for the course certificate. We permit each individual to take not more than any two courses each summer. Many of them, however, return regularly to enrol in quite a number of courses, some up to 14, within a number of years.

From its beginning in 1953 to the present time, a total of 9,848 have passed, and recieved their certificates through this program. It is considered to be one of the most successful program for educating farmers and the general public. Many small farms, particularly vegetable, flower, poultry, and swine farms, have been developed successfully by those who have completed one or more courses from this program. It should be noted here, from the date in Appendix 2, that the number of courses and participants increased markedly during the period from 1972–1976. The increase resulted from the enlarging of the program by the university to serve the demands of farmers who came in groups to attend classes, which had been designed to meet their requirements and purposes.

Program of Training Courses in Specific Areas of Agriculture

Kasetsart University has developed many training programs in specific areas in agriculture for small farmers and the public. These have been done through the cooperation with governmental units, societies, farmer groups, and private organizations. Some of the program are regular in that they are offered every year, while many others are non–regular, depending on the requests and needs of cooperative units. One program, which is a good example of having a great impact to the nation's economy, is described below.

The Orchid Culture Training Program

The Orchid Culture Training Program was developed through cooperation between Kasetsart University and the Orchid Society of Thailand. It depicts an excellent cooperation between a private society and the university. The program was initiated in 1963, by the present Rector of Kasetsart

University, Professor Rapee Sagarik, who at that time worked actively in the Horticulture Department, and at the same time, was appointed the President of the Bangkhen Orchid Society. It was aimed to promote orchid growing in Thailand, for pleasure, and for profit. The training program has covered a wide area of orchid cultivation, ranging from general topics of growing, to new sophisticated techniques of tissue culture (see Appendix 3). It takes at least 70 hours to complete the course. Staff members teaching in this program are recruited from many departments, including Horticulture, Soils, Entomology and Plant Pathology. Lectures are given off campus where the participants can reach the class easily, and are held after office hours from 5.00–7.00 p.m. Laboratory work is given on holiday, which may be either Saturday or Sunday. Field trips to orchid farms to study various problems in each farm are often organized during the course. Since the beginning of the program in 1963 to the present date, there have been 2625 participants, and 2403 have recieved their certificates.

The program has had a great impact on orchid cultivation and production in Thailand. Many orchid farms, ranging in size from one–sixth of a hectare to ten hectares or larger, were established, by individuals after they completed the course. Consequently, the production of cut–flower orchids has increased, and put Thailand to the forefront of the world market, in orchid production. One of the most important features, in this training program, is the establishment of a cooperative and communication unit in each class. Upon the completion of the course, a chairman and his executive committee are elected and they serve as an administrative and cooperative committee for each class. They disseminate information and establish communication among classmates. This activity has resulted in the creation of the Orchid Society of Thailand, and was followed by the development of its sattlelites, which comprised more than thirty local orchid societies and clubs at the present time.

The enrollment in this program has increased, year by year, from a beginning of 37 in 1963, to more than five hundred participants in 1973. In order to serve the enormous demand of growers, Kasetsart University in cooperation with the Ministry of Education launched a similar program at the ministry in 1972. The contact hours required in this course are 38, and since its opening, 656 persons have completed this course.

Extension of Training Programs to Rural Areas:

In its attempt to educate farmers in the rural and remote areas, Kasetsart University has developed a number of training programs in crop and animal production for farmers wherever it has sufficient facility and feasibility for increasing their production and raising their living standard in each area. In order to avoid a lengthy discussion, only three of the programs which exemplify some different approaches, and nature, will be discussed here.

Mushroom Cultivation and Production Training Program:

This program was tried in 1975 through cooperation between Kasetsart University, the Department of Agricultural Extension of the Ministry of Agriculture, and the Office of the Provincial Administrative Board of the Ministry of Interior. Four representative locations, in the northern, northeastern, southern and central parts of the country, were selected as centers of this training program. It is a campaign to promote mushroom production in the Kingdom. It has its aim to encourage farmers and public in the areas to utilize agricultural wastes available commonly for mushroom production. It is hoped to help farmers earn extra income, raising their standard of living, and ultimately helping the nation to increase its economy through the export of mushrooms.

Announcement of the course was made through radio, and T.V., and attendants were drawn on voluntary basis. It is a ten–day training course (see Appendix 4) which, according to the results concluded from evaluation sheets, showed a high degree of success (see Appendix 5). Five hundred and fifty six persons were trained, and farmers constituted a high percentage in each class. More than 50% of the attendants showed their interest in developing mushroom production as a profession. It is interesting to note, here, that on our latest visit, we found that some farmers who received training from the course have produced even better looking stock culture, and spawn than the staff themselves. Some even get better production. They have combined their newly gained technical knowledge with their existing experience to make quite rapid progress in their work.

It should be mentioned here also that undergraduate students have participated extensively in the mushroom training program. The Mushroom Club was organized and established in 1973, by a group of 20 to 30 students. Under the advice and guidance of staff members of the Faculties of Science, Agriculture, and the Office of Extension and Training, they began to offer practical training to farmers, and the public from areas around Bangkok since 1974. Up to the present, a total number of 1946 individuals have been trained by the Mushroom Club. Because of this excellent activity, the Club won the award of "Distinguished Extension Service to Community for the Year" in 1975.

Corn and Sorghum Training Program

The National Corn and Sorghum Research Center, establised in 1966, through cooperation between Kasetsart Univerity, the Ministry of Agriculture and the Rockefeller Foundation, has long been used as the center of corn and sorghum research and training of scientists both within, and outside the country. It is used in training extension service personnel of the Ministry of Agriculture and other government agencies. Starting this year, it opens its door for training to farmers directly. Recognizing the many problems that farmers have faced in growing corn and sorghum,

particularly the increasing problem of downy mildew disease in corn in many areas of the country, Kasetsart University has taken a further step in utilizing the Center. That is to directly educate farmers and familarize these people with new techniques of growing corn and sorghum, the disease and insect pest problems, and the means and ways to control them.

Farmers who are potential leaders of the farmer groups in each district were selected from various provinces of each part of the country. They comprised 40–50 people attending the ten–day course at a time. This year a total number of 134 persons has completed the course. The training program has been so designed that it is orientated toward solving of common problems which farmers must face in the region, and these vary from region to region. Since each group comes from the same region, it also permits the farmers to get know each other and some cooperative organizations among these farmers have been developed, after the course completion.

Swine Production Training Program

One of the main purposes in establishing the National Swine Research and Training Center in 1972 at Kamphaengsaen, Nakorn Pathom Province, is to educate farmers throughout the country in swine production. The Center has been operated by Kasetsart University in cooperation with the Department of Livestock Development, Ministry of Agriculture and Cooperatives. Rockefeller Foundation has given some assistance to this program enabling the University and the Department to accelerate the center development so that in 1975 it was able to start the training programs for farmers. It began with the training of a teen–age group, selected from farm families in the surrounding areas near the center who had some experience in raising swine. It is a 160–hour training course which is divided into 60 hours for attending lectures and 100 hours for practical training. The first group comprised forty–five young men and women who, upon the completion of the program, have further helped the Center by establishing demonstration plots on their own farms. In this way they help greatly in extending new techniques and knowledge among their neighbors.

Direct training for farmers was begun last April when 30 of these young people attended the course. They were selected from Nakorn Pathom province, and neighbouring areas. The program was extended to farmers, from other parts of the country, when the second course was held later on in June. It is expected that up to 300 farmers will come under this training program, each year, during the next five–year period.

Radio and T.V. Programs:

Kasetsart University, at present, operates four radio broadcasting stations, located in four different parts of the country. This broadcasting system pretty well covers the Kingdom. Since the establishment of the first

station, agricultural eduction directed towards farmers in rural areas has occupied 15% of the total hours of operation. It is planned to increases this allotment to 20% in the near future (not including education in other fields). It should be mentioned here that the majority of farmers in Thailand can now afford to own, one or two regular, radios, or transistor sets. The K.U. radio stations are quite well accepted by our farmers and have become the focal point for farmers to make a contact with, whenever they have problems. A section of questions and answers to various problems in agriculture has been added and broadcasted daily by every station.

Kasetsart University has also cooperated with a T.V. station to organize an agricultural education program for farmers and public since 1970. The regular program is one hour per week, but in many cases, special arrangement have been made, whenever a new discovery of science and technology in agriculture has been announced by the University.

Agricultural Fair and Conference:

Kasetsart Universty, in coopertion with the Ministry of Agriculture and Cooperatives has organized the "Kaset Fair" (Agricultural Fair) as a mean of education for farmers and the public since 1948. It is held on the University Campus once a year, now in the first week of February. Earlier, the Fair took five to seven days, but later on seven days has become standard. With the cooperation of the Ministry of Agriculture and Cooperatives and other government organizations, farmers gain much more knowledge and experience by visiting and participating in the fair. Some of the activities included are, exhibition of new plant and animal materials, agricultural equipment and machinery, and newly developed techniques of agriculture and its related sciences. The Agricultural Science Conference has been incorporated into the Fair in 1956. It welcomes not only scientists, as participants in this meeting, but also farmers as well. In every conference held during the Fair, there are always discussions on the immediate problems of agriculture. It usually attracts a large group of farmers leading to a lively and valuable discussion between farmers and scientists.

National Education Development Plan and the Future Role of Kasetsart University for the Development of Small Farmers.

The Fourth National Education Development Plan which will become effective between 1977 to 1981 has placed its emphasis, among the ten-point major policy, that the role of non-formal education to benefit the community should be enlarged by all institutions of higher learning. It is also recognized that small farms will continue to constitute one of the most important components of the agricultural system of the country. The majority of farm land holdings lies between 2–5 hectares (see Appendix 6) as of 1974. With increasing population, it can be only expected that the size of farm land-holdings will become less in the future. It is unavoidable, then, that farmers

need more and more to improve their agricultural productivity in order to survive, and to increase their standard of living. They cannot do this without learning and adapting new techniques to operate their farms. National economic development still depends heavily on farm productivity, and hence on how well small farmers have been educated. Realizing the importance of this task, Kasetsart University has taken a further step in strengthening non-formal education programs for small farmers through the establishment of a new institution, namely the Institute of Agricultural Research and Development. Under this new organization, all student training stations will be improved and developed to incorporate the task of educating and training small farmers. It is an outreach program of the University to improve the standard of living of small farmers in rural and remote areas where our stations are located. Each station will have adaptive research programs, with crops and animals, orientated toward those that can be produced and provide greater sources of income to the region. The stations will have all essential facilities to meet the needs of appropriate training programs for farmers, within the regions, in various fields. Besides, the University will hopefully play a major role in educating farmers in specific areas under the National Land Reform and Forestry Villages Programs, which have recently been launched by the Government. This will be a great task, and provides a greater for the University in the near future.

APPENDIX 1

Vocational Courses Offered by Kasetsart University to Farmers and Public from 1953 to 1976.

Courses	Year Initiated	Total Year Offered	Total Participants Completed
Plant Propagation	1957	16	700
Orchid Culture & Production	1957	17	1318
Olericulture	1976	12	210
Rose Gardening	1973	2	40
Soil for Home Gardening	1976	1	17
Vegetable Gardening	1953	7	163
Cocount Palm Cultivation	1954	5	44
Principles of Agronomy	1958	1	8
Fertilizer and Its Application	1961	13	289
Apiculture	1953	3	161
Animal Preservation & Stuffing	1964	5	51
Insect Pests and Their Control	1961	6	117
Principles of Plant Pest Control	1975	1	21
Sericulture	1974	1	13

Courses	Year Initiated	Total Year Offered	Total Participants Compteted
Dairy Production	1953	5	87
Swine Production	1958	8	144
Poultry Production	1953	22	1297
Poultry Breeding	1958	1	18
Meat Products	1958	8	241
Artificial Insemination	1958	3	34
Beef Production	1957	2	40
Diseases of Poultry & Swine	1971	1	45
Principle of Fish Culture	1958	9	361
Mushroom Culture & Production	1972	5	524
Food Technology	1976	1	26
Home Canning	1953	11	398
Home Bakery	1958	4	134
Home Cooking	1958	4	199
Snack Cooking	1960	8	567
Handicrafts	1957	10	244
Flat Pattern & Clothing Const.	1957	12	269
Flower Arrangements	1963	12	282
Home Dyeing & Hand Printing	1973	4	75
Artificial Flower Making	1973	1	20
Waste Materials for Craftworks	1966	4	67
Preservation of Agr. Products	1972	5	178
Writing Agricultural Information	1957	1	12
Extension Works	1957	1	10
Public Speaking	1973	3	84
Thai Astrology	1975	2	78
Photography	1999	5	92
Rural Development	1973	1	12
Industrial Media Production	1960	2	17
Cooperative Management	1960	2	16
Principles of Statistics	1959	2	16
Farm Management	1970	1	33
Principles of Accounting	1959	2	19
Economic Insurance	1959	5	156
Typing	1959	6	163
Business Communication	1974	1	36
Labour Relations	1975	1	30
Introduction to Law	1975	2	31
Principles of Irrigation	1958	5	85
Reinforced Concrete	1966	1	24

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Courses	Year Initiated	Total Year Offered	Total Participants Completed
Home Electricity	1958	2	41
Home Water Systems	1963	2	56
Welding	1958	2	27
Design of Timber Structures	1965	2	49
Auto Mechanics	1974	3	61
Drawing and Building Construction	1974	2	42
Radio Repair and Maintenance	1975	2	50
Engine Maintenance	1976	1	40
T.V. Installation & Maintenance	1976	1	33
Modern Dance	1975	1	34
Basic Dance	1976	1	36
Child Psychology	1976	1	12
English Conversation	1976	1	44
French Conversation	1976	1	7
Total 68 courses	24 years	–	9848

APPENDIX 2

Number of vocational courses offered, and participants attended from 1953 to 1976

Years	Number of Courses Offered	Number of Participants Completed
1953	5	404
1954	4	92
1955	5	165
1956	4	207
1957	11	403
1958	16	353
1959	16	509
1960	13	354
1961	15	299

Years	Number of Courses Offered	Number of Participants Completed
1962	12	246
1963	10	293
1964	12	226
1965	12	200
1966	13	329
1967	9	249
1968	9	232
1969	11	278
1970	9	399
1971	9	386
1972	12	581
1973	15	856
1974	17	929
1975	22	873
1976	30	985

APPENDIX 3

Outline of Training Course

Orchid Cultivation & Production

Title	Contact Hours
History & Importance	2
Classification	2
Origin	2
Nomenclature	2
Orchid Genera	2
Anatomy	2
Pollination	2
Seed Germination	2
Seedling Transferation	2
Vegetative Propagation	2
Tissue Culture	2
Factors Affecting Growth	2
Water Quality and Watering Method	2

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Title	Contact Hours
Nutrition	2
Animal Pests	2
Diseases	2
Nursery Construction	2
Caring of Orchids at Different Stages	2
Caring of Orchids at Different Seasons	2
Growing of Paphiopedelum	2
Growing of Dendrobium	2
Growing of Cattleya, Cymbidium, and Oncidium	2
Growing of Vanda	2
Growing of Rhynchostylis, Aerides, and Ascocentrum	2
Growing of Phalaenopsis	2
Growing of Arachnis and Renanthera	2
Growing of Orchids of the Minor Group	2
Orchid Exhibition and Contest	2
Laboratory Exercise	20
Study Tours to Orchid Farms	

APPENDIX 4

Outline of Training Course
Mushroom Cultivation & Production

1.	History & Biology	2 hours
2.	Preparation of Agar Media for Stock Culture	3 hours
3.	Tissues Isolation	3 hours
4.	Composed Media & Methods of Preparation	3 hours
5.	Methods of Producing Straw Mushroom Spawn	3 hours
6.	Growing of Straw Mushroom	3 hours
7.	Methods of Producing Oyster Mushroom Spawn	3 hours
8.	Growing of Oyster Mushroom	3 hours
9.	Methods of Producing Tricholoma Mushroom Spawn and It's Cultivation	3 hours
10.	Methods of Producing Auricularia Mushroom Spawn and Its' Cultivation	3 hours
11.	Methods of Producting Spawns of Coprinus and Champignon and Their Cultivation	3 hours
12.	Methods of Making Wine and Vinegar	3 hours
13.	Poisonous Mushrooms	3 hours
14.	Study Tours to Mushoom Farms	—

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APPENDIX 5

Professions of Participants in the Mushroom Culture Training Courses, 1975.

Professions	North %	North East %	South %	Central %
Farmers	25.95	27.33	21.61	78.80
Merchants	14.50	17.86	11.56	2.77
Students	19.08	9.52	7.03	0.92
Governments Employee	32.06	33.33	46.73	16.59
Labour	2.29	5.95	4.02	0.92
Others	6.11	5.95	9.05	0.00

Evaluation on the Usefulness of Courses Given by Particicipants

Degree of Usefulness	North	North East	South	Central
Excellent	17.19	20.99	11.06	10.00
Good	39.06	39.27	40.20	37.23
Fair	42.19	38.27	44.22	45.33
Poor	0.00	1.23	0.50	3.19
Very Poor	0.00	0.00	0.50	0.00
Not Response	1.56	0.00	3.52	4.26

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APPENDIX 6

Farm Land Holdings in Thailand, 1974.

Size of Farm Land Holdings (in hectares)	Number of Farm %	Farm Size %	Aver. Area Per Farm (in hectares)
>0.30	1.60	0.05	0.14
0.30–0.94	6.33	0.83	0.65
0.95–2.39	22.48	7.49	1.65
2.40–4.79	30.16	20.97	3.45
4.80–7.19	18.01	21.02	5.78
7.20–9.59	9.88	16.40	8.20
9.60–22.39	10.77	27.87	12.89
>22.40	0.82	5.37	32.82

พิมพ์ที่ : โรงพิมพ์การศาสนา นายวนิด เงินไพโรจน์ ผู้พิมพ์และผู้โฆษณา โทร. ๒๔๑๒๓๕๑

10　農機具センターに関する資料

AGRICULTURAL MACHINERY AND EQUIPMENT CENTER

KASETSART UNIVERSITY DEVELOPMENT STRENGTHENING:

RESEARCH AND EXTENSION SERVICE FACILITIES IN AGRICULTURE

REVISED

JULY 1978

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AGRICULTURAL MACHINERY AND EQUIPMENT CENTER

1. Background information and justification

Kasetsart University is the first University in Thailand that offers college-level education, conducts research and renders extension and short-term training services in agriculture. Since its establishment , it has been playing an important role in providing well-trained manpower in agriculture and promoting agricultural development in the country. Although its activities have been greatly expanded to include other fields of study, agriculture remains an important field of emphasis and thus, an integral part of its overall operation.

More than 80 percent of the population of Thailand are engaged in agriculture for subsistence. So far, most of the farmers have not been able to achieve a satisfactory level of production due primarily to two limiting factors, namely, lack of adequate technical knowledge and insufficiency of capital. The government is well aware of the problem and, as a consequence, has assigned top priority to assisting the farmers in these two aspects of agricultural production in its major policies in national development. There is, thus, an urgent need for all concerned to step up effort to the highest level possible in acquiring the necessary skills, technical know-how, and capital in agricultural production. Having been the primary source of generation of such skills and technical know-how of the country, Kasetsart University is naturally obligated to take the leading role in exerting its utmost effort on research, extension and short-term training in agriculture.

At present, Kasetsart University has five experimental farms for research of its staff and training of students as well as farmers. These stations are distributed over the major parts of the country. Because farm mechanization is one of the important elements of the cultural practices that are essential to high agricultural production, agricultural machinery and equipment constitute an integral part of the overall set-up of each experimental farm of the University. In order for laboratory and greenhouse research findings in agriculture and other biological sciences and well-founded outcomes of pertinent theoretical reasoning to be of usefulness in actual application, they must stand trials under actual conditions in the field. Sence, field experiments constitute an integral part of agricultural and biological research works so that heavy farm machinery and equipment are necessary for meaningful outcome of research endeavour in crop and livestock production. In addition, handling, processing, storage and preservation of agricultural products also require the service of heavy equipment and machinery. Aside from the existence of critical shortage of such necessary services in research and instruction at Kasetsart University, there is also an urgent national need for training and research in such aspects as production, operation, performance and care of agricultural equipment and machinery to cope with the increased utilization of and rising demand for labor-saving devices in farm operation and agricultural-product manipulation. It is evident, therefore, that establishment of the proposed. Agricultural Machinery and Equipment Center not only is relevant to the pressing

need of Kasetsart University and that of the nation but also will greatly strengthen fruitful and more thorough utilization of the present manpower resource in the Departments of Agricultural Engineering and Farm Mechanics of the University.

2. Objectives:

The Agricultural Machinery and Equipment Center being requested is intended to serve the following specific objectives:

2.1 To conduct research on manufacture, operation, performance and care of important agricultural machinery and equipment in accordance with the national needs.

2.2 To conduct testing and evaluation of imported and locally manufactured agricultural machinery and equipment, and offer pertinent advice and/or recommendation.

2.3 To provide training services on agricultural machinery and equipment for students and farmers.

2.4 To provide adequate heavy machinery and equipment and well-trained pertinent technicians needed in field experiments, and render proper maintenance and repair services for such machinery and equipment.

3. Sites and organization

The Agricultural Machinery and Equipment Center being requested will be located at the Kamphaengsaen campus.

Administratively, the proposed Center will be a part of the Research and Development Institute of the University. Operationally, however, it will be under the responsibility of the academic departments concerned, notably the Departments of Agricultural Engineering and Farm Mechanics. This center will function in co-operation with the National Agricultural Extenstion and Training Service Center.

4. Physical facilities

1. The building. With no construction having been planned for the proposed Agricultural Machinery and Equipment Center in the on-going development of the Kamphaengsaen campus of the University, there is a need for a building to accomodate the expected activities of the four major sections of the center, namely, administrative section, workshop and research section, maintenance and fabrication section, and training and extension section. The total floor space requirement of the building is approximately 4,100 square meters, the construction cost is estimated at 18,770,000 baht. The breakdown of construction cost and floor area requirement are presented in table 1 and 2 respectively.

Table 1. Breakdown of estimated cost for construction

Order	Item	Area/capacity	Unit cost (Baht)	Total cost (Baht)
1.	Administrative building	1,360 m^2	4,500	6,120,000
2.	Workshop and research laboratory	3,540 m^2	3,000	10,620,000
3.	Farm equipment building	200 m^2	1,800	360,000
4.	Fixture			900,000
5.	Air-conditioning facilities	29 tons	25,000	725,000
6.	Telephone	15 units	3,000	45,000
	Total			18,770,000

Table 2. Breakdown of floor area requirement

Building/ Order	Item	Area required (m^2)
I.	Administrative building	
1.	Director's office	24
2.	Deputy-director's office	24
3.	Office space for supervisors	60
4.	Documentary storage	16
5.	General office & information	64
6.	Waiting area & entrance hall	64
7.	W.C.	64
8.	Lecture room	384
9.	Testing & research unit	
9.1	Office for staff	20
9.2	Office for researcher (2 persons)	40

Breakdown of floor area requirement (continue)

Building/ Order	Item	Area required (m^2)
	10. Training & demonstration unit	
	10.1 Office for staff (8 persons)	190
	11. Living room	48
	12. Conference	48
	13. Circulation	314
	Total	1,360
II.	Workshop and research laboratory	
	1. Testing and research laboratory	1,335
	2. Fine-equipment storage	180
	3. Major-equipment storage	196
	4. Space for machine tool	564
	5. Clean-up area	20
	6. Space for carpenter tool	140
	7. Maintenance area	840
	8. Offices for staff (3 persons)	140
	9. Shower room and locker	60
	10. Platform for washing	40
	11. Space for testing pump	25
	Total	3,540
III.	Farm equipment building	200 m^2
	Grand total	4,100 m^2

4.2 The equipment. The proposed center needed a lot of equipments for effecient function. The equipments required for this center are listed below.

Group/order	Item	Quantity required	Remark
I.	Farm operation equipment		
1.	Farm tractor (80 hp.)	2	
2.	Farm tractor (65 hp.)	2	
3.	Farm tractor (small, 4-wheel, 30 hp.)	2	
4.	Farm tractor (small, 4-wheel, 13 hp.)	4	
5.	Walking tractor (10 hp.)	4	
6.	Disc plow (3 bottoms, one-way, reversible)	1	
7.	Disc plow (5 bottoms, one-way, reversible)	1	
8.	Mouldboard plow (3 bottoms)	1	
9.	Disc harrow (8 disks, one gauge)	1	
10.	Disc harrow (14 disks, offset, double-action)	1	
11.	Subsoiler (2 tines)	1	
12.	Subsoiler (7 tines)	1	
13.	Cane planter	1	
14.	Grain drill	1	
15.	Seed broadcaster	1	
16.	Rotavator (20")	1	
17.	Tool-bar cultivator (6 tines)	1	
18.	Fertilizer applicator	1	
19.	Spring-tooth weeder	1	
20.	Tine tiller (13 tines)	1	

Group/order	Item	Quantity required	Remark
21.	Sprayer (mounting type)	1	
22.	Cane harvester	1	
23.	Trailer	2	
24.	Spring rake	1	
25.	Fertilizer and lime spreader	1	
26.	Stubble shaver	1	
27.	Ratooning rotor	1	
28.	Rotary cutter-mower	1	
29.	Rice thresher	1	
30.	Movable rice mill	1	
31.	Deep plough with cutting knife-width adjuster	1	
32.	Two-row cultivator	1	
33.	Reversible fork plough	1	
34.	Ridger	1	
35.	Disc blades (for use with rotavator)	1	
36.	Fixed two-bottom plough	1	
37.	Rotary mid-mounting mower	1	
38.	Ridding rotor	1	
39.	Cage wheel	1	
40.	Centrifugal pump (1900 rpm, 35 hp.)	1	
41.	Hand-pump sprayer	1	
42.	Nozzle for sprinkler irrigation (1/2 hectare capacity)	1	
43.	Gated pipe (250 m, 42 sections)	1	
44.	Repair tools	1 set	

Group/order	Item	Quantity required	Remark
45.	Land leveller or plane	1	
46.	Irrigation-furrow device	1	
47.	Hand tools for farm work	1 set	
48.	Grass seeder	1	
49.	SSB-transceiver set	1	
50.	Audio-visual aid	1	
51.	Microbus (15-seater)	2	
52.	Pick-up truck	2	
II.	Testing equipment		All open
1.	An apparatus for testing seed-metering devices and regularity of seed spacing		
2.	A device for testing characteristic of nozzles for field sprayers		
3.	Dynamometer (hydraulic-pull type)		
4.	Torque dynamometer (electronic type, including torque transducer, signal conditioner and output display)		
5.	Equipment for measuring fuel consumption of engines		
6.	Instruments for measuring travel velocity of tractors and wheel slip		
7.	A power source for reciprocal motion (simulation of hand-tool operation)		
8.	Electric motor with variable speed drive		

Group/order	Item	Quantity required	Remark
9.	Hydraulic power source		
10.	A complete set-up for hydraulic measurments of cylinders, pumps, motors, etc.		
11.	Tester for electric motors (voltage, current, cos φ)		
12.	Instruments for measuring time, distance, R.P.M.		
13.	Scales (500 kg. capacity) for laboratory and field use.		
14.	A device for measuring floating velocity (air velocity required to float particles)		
15.	Laboratory equipment for threshing and cleaning of threshing and cleaning of grains		
16.	Instruments for measuring air velocity		
17.	Ro-tap sieve shaker with a set of sieves		
18.	Oven		
19.	Thermocouples and instruments for measuring temperature of material being dried		
20.	Instruments for meteorological measurments conditions (temperature, humidity, wind velocity and direction, air pressure, etc.)		
21.	Hardness tester (Rockwell and Brinell)		
22.	A set of containers for testing fertilizer distributors		

Group/order	Item	Quantity required	Remark
23.	A small portable elevator		
24.	Equipment for soil testing: penetrometer, vane shear, etc.		
25.	A set of workshop tools		
III.	Maintenance and fabrication equipment		
A.	Machine-shop equipment:		
1.	Lathes (swing-over bed 30", 25", and 10")	2 sets	
2.	Milling machine (with $55\frac{1}{8}$" x 11" work table)	1	
3.	Shaping machine with 16" x 12" work table	1	
4.	Shearing machine (2.5-mm thickness, 2000-mm length)	1	
5.	Bending machine (4-mm thickness, 2000-mm length)	1	
6.	Rolling machine (2000-mm length)	1	
7.	Radial drilling machine	1	
8.	Drilling machine ($1\frac{1}{2}$", pedestal type)	1 set	
9.	Drilling machine (5/8", bench type)	1 set	
10.	Machine saw	1	
11.	Grinding machine (bench type)	2 sets	
12.	Grinding machine (pedestal type)	2 sets	
13.	Plate press	1	
14.	Air compressor	1	
15.	Pipe roller	1	

Group/order	Item	Quantity required	Remark
B.	Welding equipment and accessories:		
1.	Electric welder, 350 A	4 sets	
2.	Oxy-acetylene welder-cutter	2 sets	
3.	Spot welder (handy type)	1	
4.	D.C. electric welder (engine-driven)	2 sets	
5.	Argon-gas welder	1	
6.	Double-bit cleaner	12	
7.	Welding glove	12	
8.	Fiberglass helmet (deluxe)	12	
9.	Standard goggle	12	
C.	Wood-working machine:		
1.	Planer	1	
2.	Circular saw	1	
3.	Power drill	1	
4.	Wood lathe	1	
D.	Hand tools:		
1.	Tap and die set (inch/mm)	2	
2.	Electric drill ($\frac{1}{4}$", $\frac{3}{8}$", $\frac{1}{2}$", and $\frac{3}{4}$")	1	
3.	Grinding handle	1	
4.	Reversible impact wrenches	1 set	
5.	Reversible impact screw drivers	1 set	
6.	Drill	1 set	
7.	Hammer	1 set	
8.	Rivet gun	4 sets	