Republika ng Pilipinas
(Republic of the Philippines)
KAGAWARAN NG EDUKASYON, KULTURA AT ISPORTS
(DEPARTMENT OF EDUCATION, CULTURE AND SPORTS)
University of Life Complex, Pasig, Metro Manila

May 18, 1992

DECS O R D E R
No. 52, s. 1992

REVISED MINIMUM STANDARDS FOR BACHELOR OF SCIENCE IN AGRICULTURE (BSA) PROGRAM

To: Bureau Directors
Regional Directors
Presidents, State Colleges and Universities
Heads of Private Schools, Colleges and Universities

1. Inclosed is the revised guidelines and minimum standards for the Bachelor of Science in Agriculture (BSA) program as recommended by the Technical Panel for Agricultural Education (TPAE), Bureau of Higher Education. These revisions were formulated based on results of the Workshop on the Revision of Minimum Standards for Agriculture Program held on April 22-23, 1989; Search Conference for New Directions in Agriculture Education held on May 30-31, 1990; Workshop on the Revision of BSA Minimum Standards held on October 12-13, 1990; and Regional Consultation on the Revision of BSA Minimum Standards held on May 2-4, 1991. These workshops and conferences were participated in by resource persons/experts, selected government and private employers and representatives from professional organizations and institutions offering agriculture program.

2. The said revised guidelines and minimum standards approved by this Office shall be applicable to potential regional colleges of agriculture under the National Agriculture Education System (NAES) which shall take effect beginning this school year 1992-1993.

3. It is desired that the inclosed guidelines and minimum standards be given the widest publicity possible.

(SGD.) ISIDRO D. CARIÑO
Secretary

Incl.: As stated
Reference: MEC Order: No. 4, s. 1981
Allotment: 1-3-4--(M.O. 1-87)
To be indicated in the Perpetual Index
under the following subjects:

CHANGE
Course of Study, COLLEGIATE
CURRICULUM
PROGRAM, SCHOOLS

Guiding Principles and Minimum Standards for
Bachelor of Science in Agriculture Program

I. GUIDELINES

A. Philosophical basis of the curriculum

The efforts to improve the Philippine agriculture sector has scarcely progressed in promoting a balanced-agro industrial development. Agriculture education in the country has to address this problem amidst the changing scenario toward a more diversified and intensively cultivated farms that are commercially operated and based on appropriate and sustainable farming strategies.

To be able to respond to the situation, the agriculture education system must develop highly motivated, capable, progressive-minded but socially conscious professionals, scientists and farm practitioners. There is a need for a holistic, multidisciplinary approach emphasizing forward and backward linkages to agriculture, sustainable farming systems, agribusiness and agro-industrial development. Such an approach should be utilized in place of the commodity specific approach which, heretofore, has dominated Philippine agriculture education.

The constitution provides that the educational system must offer quality education at all levels and guarantee access to this kind of education. An integrated system of education must be evolved, sustained and developed through rational, conscious and deliberate efforts following the macro plans for agriculture education. Self-realization in the art, science and vocation of agriculture should be emphasized in the various agriculture curricula. Ultimately, a real and sound development in agriculture and in other economic sectors can be achieved only through a balanced education rooted in the proper values that shall serve to encourage and foster the development of a genuine nationalistic spirit for the true Filipino.

B. Curriculum objective

The BSA program aims to train students in the scientific habit of thought and prepare them to become professionals with entry-level competencies in technical agriculture. It emphasizes the processes and techniques of identifying, diagnosing and analyzing problems and in designing, packaging and

applying technologies needed in the development and conservation of the agriculture and food system resources.

C. Programs

1. Instruction/curriculum

The curriculum should have a well-balanced general education and technical courses aimed at developing students mentally, physically, socially and morally.

The BS Agriculture curriculum requirements should be satisfied first before an institution is given an authority to operate any B.S.A. related courses such as B.S. in Agricultural Economics or B.S. in Agribusiness.

2. Research and extension

In order to strengthen its instructional program, a Regional College of Agriculture (RCA) must create a wealth of information through a viable research program. Also, it must undertake extension activities in order to translate its research findings into forms that can be applied by farmers and its other clientele.

D. Resources

1. Faculty

There should be a minimum number of qualified instructors to handle courses in the Bachelor of Science in Agriculture curriculum.

2. Support personnel

Adequate support staff must be provided to efficiently implement the agriculture program.

3. Student

The institution should adopt an admission policy which provides equal access to all students particularly from lower income groups without sacrificing academic standards.

4. Physical facilities and equipment

The existence of adequate facilities and equipment is a prerequisite to ensure the offering of a quality undergraduate program in agriculture.

E. Organization

Program and resources of the concerned institution should be organized in such a way that its three main functions, namely: instruction, research and extension, could be carried out effectively.

F. Placement of Graduates

Each institution offering the BSA curriculum should have a placement office to trace where its graduates go, and possibly, assist them in getting a job.

G. Financial Resources

Adequate financial resources supporting the program must be provided.

II. MINIMUM STANDARDS

A. Programs

1. Instruction/curriculum

a. There should be a minimum of 2 majors, namely: a) crop science, and b) animal science. The minimum credit required for graduation in a 4-year BS Agriculture curriculum is 166 units (see Annex A for details).

b. The maximum faculty-student ratio is 1:20 but if the subject is with laboratory, the ratio should be 1:12 using the full-time equivalent (FTE) for teaching as basis.

c. Budget should be allocated in such a way that out of the allotment for instruction, at most 70 percent is allocated for salaries and other personal services and at least 30 percent is allocated for maintenance and operating expenses.

2. Research and Extension

Research and extension funds and facilities must be provided. The equivalent of at least 20 percent of the institution's total current operating expenditures or of the agriculture program budget should be allocated for research and extension. Of this amount, a maximum of 75

percent should be allocated for salaries and other personal services and a minimum of 25 percent for maintenance and operating expenses.

B. Resources

1. Faculty

a. Exclusive of the general education faculty, there should be a minimum full- time faculty of 25 for the BS Agriculture program whose fields of specialization are properly distributed in the following primary disciplines: crop science, crop protection, soil science, animal science, agricultural engineering, agricultural economics, agricultural chemistry, and statistics and Postharvest Technology.

b. At least 50 percent of the full-time agriculture faculty should be MS degree holders in their respective fields of specialization. There should be at least one MS degree holder in each of the primary discipline in agriculture (animal science, crop science, crop protection and soil science).

2. Land

There should be a minimum area of 50 hectares specifically used by the agriculture program for instruction, production, research and extension (farm demonstration).

3. Physical Facilities and Equipment

a. Building requirements

1. School buildings should comply with appropriate zoning and building regulations.

2. The laboratory floor space should be 2.3 sq. m. per student.

3. The classroom floor space should be 1.5 sq. m. per student.

4. Circulation should be approximately 30 percent of the sum of the areas of all teaching accommodation (including storage), library, communal administrative and catering accommodation.

b. Minimum laboratory equipment and facilities for research and instruction

1. Crop Sciences
2. Animal Sciences
3. Physical Sciences
4. Chemical Sciences
5. Biological Sciences
6. Postharvest Technology
7. Farm Machinery Shop

c. Library

1. The library seating capacity should be 10 percent of the combined total of students and academic staff.

2. There should be a minimum of 2 book titles (less than 10 years old) per subject for the general education (GE) and fundamental agriculture (FA) courses, and at least 3 book titles (less than 10 years old) for each of the advanced agriculture subjects. There should be one book for every 25 students.

3. A minimum of 2 technical journals (current) for each of the fundamental agriculture and major agriculture subjects should be available.

d. Support services

1. Health services

There should be functional medical and dental clinics for students, staff and their dependents.

2. Student, personnel and placement service

There should be adequate student accommodation, recreational facilities, counselling and graduate placement service.

C. Organization

The organization must have a built-in system for planning, implementation and evaluation of the instruction, research and extension programs.

B.S. AGRICULTURE CURRICULUM
(Sample Curriculum)

	Courses	Units	
I.	General Education		78
	Natural Sciences	38	
	Social Sciences	15	
	Humanities	25	
II.	Fundamental Agriculture		46
	Animal Science	6	
	Crop Sciences	6	
	Crop Protection	6	
	Soil Science	3	
	Agricultural Engineering	7	
	Agricultural Economics	3	
	Agricultural Extension and Communications	3	
	Genetics	3	
	Elementary Plant Physiology	3	
	Microbiology I	3	
	Soil Fertility and Management	3	
III.	Major Area		34
	Thesis*	6	
	Seminar	1	
	Electives	6	
	Major Area	21	
IV.	Physical Education Courses		8
	P E. I	2	
	P.E. II	2	
	P.E. III	2	
	P.E. IV	2	
	TOTAL		166

* Can be substituted with 6 units of courses related to the major field and 3 units of special problem or a total of 9 units.

BACHELOR OF SCIENCE IN AGRICULTURE
Major: Crop Science/Animal Science

Courses			Units	
I. General Education				78
A. Natural Sciences				38
1. Biology			6	
a. Botany I		3		
b. Zoology I		3		
2. Chemistry			8	
a. Chemistry I		5		
b. Chemistry II		3		
3. Mathematics			6	
a. College Algebra		3		
b. Plane Trigonometry		3		
4. Physics			6	
a. General Physics I		3		
b. General Physics II		3		
5. Statistics			6	
a. Statistics I		3		
b. Statistics II		3		
6. Computer Science I			3	
7. Principles of Ecology			3	
B. Social Sciences				15
1. Introduction to Behavioral Sciences			3	
2. Philippine History			3	
3. Philippine Government and Politics			3	
4. Social and Political Thought			3	
5. General Economics			3	
C. Humanities				25
1. Humanities			4	
a. Introduction to the Humanities		3		
b. Ethics I		1		
2. Languages			18	
a. English		12		
1. Communication Skills I	3			
2. Communication Skills II	3			
3. Introduction to Literature	3			
4. Scientific Writing	3			
b. Filipino		6		
1. Filipino I	3			
2. Filipino II	3			
3. Life and Works of Rizal and other Heroes		3		

	Courses		Units	
II.	Fundamental Agriculture			46
	A. Animal Science		6	
	1a. Introduction to Animal Science	3		
	1b. Introduction to Livestock and Poultry Production	3		
	B. Crop Science		6	
	1. Crop Science I Fundamentals of Agronomy	3		
	2. Crop Science II Fundamentals of Horticulture	3		
	C. Crop Protection		6	
	I. Entomology I	3		
	II. Plant Pathology I	3		
	D. Soil Science		3	
	1. Principles of Soil Science	3		
	E. Agricultural Engineering		7	
	1. Fundamentals of Ag. Eng'g. I	4		
	2. Fundamentals of Ag. Eng'g. II	3		
	F. Agricultural Economics		3	
	1. Fundamentals of Farm Management	3		
	G. Agricultural Extension and Communications		3	
	1. Extension Teaching and Communications	3		
	H. Genetics		3	
	I. Plant Physiology		3	
	J. Microbiology I		3	
	K. Soil Fertility and Management		3	
III.	Major Area			34
	A. Thesis		6	
	B. Seminar		1	
	C. Electives		6	
	D. Major Area		21	
IV.	Physical Education Courses			8
	A. P.E I (should include health and nutrition)		2	
	B. P.E. II		2	
	C. P.E. III		2	
	D. P.E. IV		2	
		Total		166

Description of General Education Courses

Natural Sciences

Botany I - Introduction to Plant Science. 3 units, 5 hours/week (2 class, 3 lab.). Structures, functions, adaptation and phylogenetic relationships of plants.

Zoology I - General Zoology. 3 units, 3 hours/week (2 class, 3 lab.). The morphology, physiology, general life, history and phylogenetic relationships of the different phyla.

Chemistry I - General Chemistry. 5 units, 9 hours/week (3 class, 6 lab.). Fundamental principles of Chemistry and preparations, properties and classifications of typical compounds.

Chemistry II - Basic Organic Chemistry. 3 units, 5 hours/week (2 class, 3 lab.). Elementary organic structural theory and functional group chemistry; introduction to carbohydrates, fats, proteins and nucleic acid. (Prerequisite: Chemistry I).

Mathematics I - College Algebra. 3 units, 3 hours/week (class). Linear equations, quadratics, complex numbers; binomial theorem, progressions; theory of equations; number systems.

Mathematics II - Plane Trigonometry. 3 units, 3 hours/week (class). Trigonometric function, solutions of right and oblique triangles; logarithms and applications; radian and inverse trigonometric functions. (Prerequisite: Mathematics I).

General Physics I - Mechanics and Heat. 3 units, 5 hours/week (2 class, 3 lab.). Inertia, motion, forces and energy properties and laws of solids and liquids, temperature measurements and effects on properties of materials and heat flow. Primarily for students not in the natural and engineering sciences.

General Physics II - Electricity and Magnetism. 3 units, 5 hours/week (2 class, 3 lab.). Sources, effects, measurements and uses of electricity magnetism, fundamentals of wave motion applied to the study of sound and light.

Statistics I - Elementary Statistics. 3 units, 5 hours/week (2 class, 3 lab.). Basic statistical concepts, frequency tables and distributions; sampling; averages; tests of significance; introduction to regression and correlation; introduction to analysis of variance and experimental design. (Prerequisite: Mathematics I).

Statistics II - Experimental Design. 3 units, 5 hours/week (2 class, 3 lab.). Regression and correlation; analysis of variance and experimental design, non-parametric statistics and application of softwares. (Prerequisite: Computer Science I).

Computer Science I - Introduction to Computer Science. 3 units, 5 hours/week (2 class, 3 lab.). EDP fundamentals, word processing, spread sheets and data base reinforced by hands-on sessions. (Prerequisite: Mathematics I).

Principles of Ecology - Plants and animals in relation to environment, plants and animal associations. 3 units, 3 hours/week lecture. (Prerequisite: Botany I or Zoology I).

Social Sciences

Social Science I - Introduction to the Behavioral Sciences. 3 units, 3 hours/week (class). Basic principles, theories, concepts and processes of human behavior. The social, cultural and psychological bases of contemporary Philippine conditions with emphasis on population, social change and rural development.

Social Science II - Philippine History. 3 units. The appreciation and understanding of the beginnings and development of significant social and cultural events and personalities that formed the Filipino since pre-Spanish to contemporary times.

Social Science III - Philippine Government and Politics. 3 units, 3 hours/week (class). The principles of government especially as they apply to the Philippines; the historical and social development of political institutions with special emphasis on the new constitution and taxation and land reform.

Social Science IV - Social and Political Thought. 3 units, 3 hours/week (class). Ideas of selected Asian and Western thinkers as reflected in contemporary issues and problems.

Social Science V - General Economics. 3 units, 3 hours/week (class). Survey of classical and contemporary economic principles and thought.

Humanities

Humanities I - Introduction to the Humanities. 3 units, 3 hours/week (class). The fields of music and the visual arts. Study of principles underlying them.

Ethics I - Professional and Social Ethics. 1 unit, 1 hour/week (class). The Philosophical bases of professional and social ethical behavior.

Languages

English

English I - Communication Skills. 3 units, 3 hours/week (class). The development of proficiency in the whole exercise of language, with particular emphasis on reading and writing skills and using materials in both the scientific and humanities disciplines.

English II - Communication Skills. 3 units, 3 hours/week (class). The development of more advanced written skills and oral (speech) communication.

English III - Introduction to Literature. 3 units, 3 hours/week (class). The study of literacy types' fiction, poetry, drama, essay and biography. Skills in communication continue to be developed through discussions, reports and papers. Reading to include English selections by Filipino and other Asian writers.

English IV - Scientific Writing. 3 units, 3 hours/week (class). Principles underlying the preparation and writing of scientific papers.

Life and Works of Jose Rizal and other heroes. 3 units, 3 hours/week (class). The life and works of Jose Rizal and other heroes.

Filipino

Filipino I - Sining ng Pakikipagtalastasan. 3 units; 3 hours/week (class). Mga paraan sa pakikipagtalastasan o pagpapahayag. Paglalarawan, pagsasalaysay, paglalahad at pangangatuwiran.

Filipino II - Poklorikong Filipino. 3 units, 3 hours/week (class). Panimula sa Poklorikong Filipino.

Description of Fundamental Agricultural Courses

Animal Science I. Introduction to Animal Science. 3 units, 5 hours a week (2 class, 3 lab.). Principles of breeding, physiology and nutrition in relation to production, processing and marketing of animal products.

Animal Science II. Introduction to Livestock and Poultry Production. 3 units, 5 hours/week (2 class, 3 lab.) The management of farm animals for the efficient production of meat, milk, eggs, and other animal products.

Crop Science I. Fundamentals of Agronomic Production. 3 units. Principles and practices of producing agronomic crops.

Crop Science II. Fundamentals of Horticulture. 3 units. Principles and practices of producing horticultural crops.

Crop Protection I. Economic Entomology. 3 units, 5 hours/week (2 class, 3 lab.). The structure, function, classification and biology of useful and destructive insects. (Prerequisite: Zoology I).

Crop Protection II. Principles of Plant Pathology. 3 units, (2 class, 3 lab.). History, nature and causes of plant diseases; development, analysis, forecasting, assessment and control of disease in plant populations. (Prerequisite: Botany I).

Agricultural Engineering I. Fundamentals of Agricultural Engineering. 4 units, 5 hours/week (3 class, 3 lab.). Hydrology, irrigation and drainage; soil and water conservation engineering; weather elements, climate classification, crop and livestock environment. (Prerequisite: Physics I).

Agricultural Engineering II. Fundamentals of Agricultural Engineering. 3 units, 5 hours/week (2 class, 3 lab.). Structures and machinery for crop animal production and processing.

Agricultural Economics I. Fundamentals of Farm Management. 3 units, 5 hours/week (2 class, 3 lab.). Principles underlying farm management and their application on agricultural business, offices and programs.

Agricultural Extension and Communication I. Extension Teaching and Communication. 3 units, 3 hours/week (class). Principles and methods of extension teaching and communication as applied to human resource development in agriculture.

Genetics. 3 units, 5 hours/week (2 class, 3 lab.). Mechanisms of heredity and variation; molecular genetics, cytogenetics, quantitative genetics and evolutionary genetics. (Prerequisite: Botany I and Zoology I).

Elementary Plant Physiology. 3 units, 5 hours a week (2 class, 3 lab.). Photosynthesis, respiration, nutrition, water relations, transport of materials and growth of plants. (Prerequisite: Botany I and Chem. 1).

Microbiology I. General Microbiology. 3 units, 5 hours a week (2 class, 3 lab.). Biology of major groups of microorganisms with emphasis on bacteria and an introduction to applied microbiology (Prerequisite: None).

Soil Science I. Principles of Soil Science. 3 units. 5 hours/week (2 class, 3 lab.). Nature, properties conservation and management of soils.

Description of Major Subjects in Crop Science

Cereals and Food Legumes. 3 units, 5 hours/week (2 class, 3 lab.). Production management of grain crops with emphasis on rice. corn wheat, sorghum, soybean and mungbean.

Sugarcane and Industrial Crops. 3 units, 5 hours/week (2 class, 3 lab.). Production management of selected industrial field crops with emphasis on sugarcane, cotton, ramie, jute, kenaf, sunflower, sesame and tobacco.

Pasture and Fodder Crops. 3 units, 5 hours/week (2 class, 3 lab.). Basic principles and practices in the production and utilization of pasture and fodder crops including natural gross lands.

Postharvest Handling and Processing. 3 units, 5 hours/week (2 class, 3 lab.).

Seed Science. 3 units, 5 hours/week (2 class, 3 lab.). Basic concepts and methodologies in the science and technology of seed production, processing, storage, distribution, testing and quality control.

Farming Systems. 3 units, 5 hours/week (2 class, 3 lab.). Principles and determinants of farming systems; procedures for designing and evaluating location-specific farming systems options.

Weeds and their Control. 3 units, 5 hours/week (2 class, 3 lab.).

Weed identification, methods of weed control, introduction to herbicides and factors influencing their use. Prerequisite: Elementary Physiology.

Biology of Weeds. 3 units, 5 hours/ week (2 class, 3 lab.). Establishment, reproduction and dispersal of weeds, relationship with other plants and changes in weed population.

Methods of Plant Breeding. 3 units, 5 hours/week (2 class, 3 lab.). Methods and techniques in the improvement of crop plants.

Description of Major Subjects in Animal Science

Swine Production. 3 units, 5 hours/week (2 class, 3 lab.). Breeding, feeding and management of swine.

Beef Production. 3 units, 5 hours/week (2 class, 3 lab.). Breeding, feeding and management of beef cattle and carabao on the range and in smallhold.

Poultry Production. 3 units, 5 hours/week (2 class, 3 lab.). Principles of breeding, feeding and management of poultry with emphasis on commercial operations.

Poultry Management. 2 units, 5 hours/week (lab.). Practices of incubation, breeding, feeding, selection and management of poultry.

Meat Processing. 3 units, 5 hours/week (2 class, 3 lab.). Meat selection, identification of standard cuts, and preservation methods.

Slaughter and Meat Evaluation. 3 units, 5 hours/week (2 class, 3 lab.). Ante and postmortem inspection; handling and slaughtering; carcass evaluation and meat hygiene.

Reproduction in Farm Animals. 3 units, 5 hours/week (2 class, 3 lab.). Anatomy and physiology of reproduction and techniques for improving reproductive efficiency in farm animals.

Methods in Animal Breeding. 3 units, 5 hours/week (2 class, 3 lab.). Measurement and inheritance of economically important traits of farm animals; systems of breeding and selection; inbreeding and hybridization in farm animals.

Fundamentals of Animal Climatology. 3 units, 5 hours/week (2 class, 3 lab.). The mechanics of thermo-regulations and animal adaptation, thermal stress, the problems associated with the improvement of livestock production in tropical climate.

Dairy Production. 3 units, 5 hours/week (2 class, 3 lab.). Breeding, feeding and management of dairy animals.

BACHELOR OF SCIENCE IN AGRICULTURE
(General Curriculum)

FIRST YEAR

First Semester

Subjects	Units
Botany I	3
Chemistry I, General Chemistry	5
English I, Communication Skills	3
Mathematics I, College Algebra	3
Social Science I, Introduction to Behavioral Sciences	3
Filipino I, Communication Skills	3
P. E. I	2
Military Science 1a	(1.5)
Social Orientation I	(2)
	22

Second Semester

Zoology I	3
English II, Communication Skills	3
Mathematics II, Plane Trigonometry	3
General Physics I	3
Social Science II, Philippine Government and Politics	3
Filipino II, Communication Skills	3
P. E. II	2
Military Science 1b	(1.5)
Social Orientation 11	(2)
	20

SECOND YEAR

First Semester

Subjects	Units
Animal Science I, Introduction to Animal Science	3
Crop Science I, Fundamentals of Agronomy	3
English III, Introduction to Literature	3
General Physics II - Electricity and Magnetism	3
Chemistry II, Basic Organic Chemistry	3
Entomology I	3
P. E. III	2
Military Science 2a	(1.5)
	20

Second Semester

Animal Science II, Introduction to Livestock and Poultry Production	3
Crop Science II, Fundamentals of Horticulture	3
Social Science III, Philippine Government and Politics	3
Statistics I, Elementary Statistics	3
Computer Science I, Introduction to Computer Science	3
Plant Pathology I	3
P. E. IV	2
Military Science 2b	(1.5)
	20

THIRD YEAR

First Semester

Subjects	Units
Ag. Economics I, Fundamentals of Farm Management	3
Social Science IV, Social and Political Thought	3
Ag. Extension and Communication I, Extension Teaching and Communication	3
Statistics II, Experimental Design	3
Soil Science I, Principles of Soil Science	3
Genetics	3
Ethics I, Professional and Social Ethics	1
Principles of Ecology	3
	22

Second Semester

English IV, Scientific Writing	3
Humanities I, Introduction to the Humanities	3
Elementary Plant Physiology	3
Microbiology I, General Microbiology	3
Life and Works of Jose Rizal and other Heroes	3
Soil Fertility and Management	3
Major I	3
	21

Summer

Thesis	3

FOURTH YEAR

First Semester

Subjects	Units
Fundamentals of Agricultural Engineering I	4
Major 2	3
Major 3	3
Major 4	3
Major 5	3
Thesis	3
Undergraduate Seminar 1a	1
	20

Second Semester

Fundamentals of Agricultural Engineering II	3
Social Science V, General Economics	3
Major 6	3
Major 7	3
Elective 1	3
Elective 2	3
	18

SUMMARY

		Number of Units
FIRST YEAR		42
First Semester	22	
Second Semester	20	
SECOND YEAR		40
First Semester	20	
Second Semester	20	
THIRD YEAR		43
First Semester	22	
Second Semester	21	
SUMMER		3
FOURTH YEAR		38
First Semester	20	
Second Semester	18	
Total		166

BGF/fgr
03-31-92

BASIC LABORATORY FIELD EQUIPMENT AND FACILITIES
Bachelor of Science in Agriculture

I. CROP SCIENCE

		Specifications	Quantity
A.	Field or Garden Equipment		
1.	Native Plow	wood and/or steel	2
2.	Native Harrow	comb type or spike-toothed harrow	2
3.	Hand Tractor	6-10 Hp, with plow and harrow attachment	2
4.	Pick-up truck	single cab	1
5.	Panicle thresher	motor-driven, 0.75 Hp	1
6.	Seed blower	motor-driven, 0.5 Hp or locally manufactured	2
7.	Sprayer	Knapsack type, 16 liters capacity	4
8.	Shovel, spade, hoe and rake		30 each
9.	Wheel barrow		5
10.	Pruning saw and shear		15
11.	Budding knife		15
12.	Steel tape	150-m long, metric scale	2
13.	Spring balance	25 and 50 kg. cap.	1 each
14.	Weighing scale	20-30 kg. cap., top loading	2
15.	Water sprinkler	8-10 li. cap., plastic or galvanized	10
16.	Draft animal	carabao and/or cattle	2
17.	Rice thresher	portable, 500 kg./hr. cap. with cleaner, throw-in type, axial-flow type, with 7 Hp engine	1
18.	Corn sheller	hand operated	10
19.	Corn sheller	0.5-1.0 t/hr. cap., 5-7 Hp engine	1
20.	rotary weeder	double rotor type, single row, cono or spike type, steel frames	5
21.	Grain dryer	batch type, flat bed 1-2 tons/batch cap., with rice hull furnace, axial fan driven by 5 Hp engine	1
22.	Cotton gin	local type, wooden roller	1
23.	Decorticator	for bast fiber	1

		Specifications	Quantity
B.	Laboratory Equipments/ Facilities		
1.	Microscope	compound, Bausch and Lomb	15
2.	Drying oven	ordinary, convection 1 cu.m. cap., 0-170°C temp. range	1
3.	Seed cleaner	two-stage air screen cleaner, 200-500 kg. cap. portable type	1
4.	light meter	digital or analog display, with SI units	1
5.	pH meter	digital or analog display	1
6.	Seed moisture tester	electronic grain moisture meter, capacitance or resistance type, measures up to 30% moisture (for corn and rice)	1
7.	Refrigerator	at least 7 cu.ft. capacity	1
8.	Analytical balance	accuracy = 0.001 g maximum 100g cap.	2
9.	Triple beam balance	accuracy =0.1g, max. 3 kg. capacity	4
10.	Distilling apparatus	0.5 liter/hr. cap.	1
11.	Autoclave or pressure cooker	8"-10" chamber size, with pressure gauge	1
12.	Stereoscope	with max. 3x magnification	5
13.	Soil auger	can measure up to 24 inches depth	3
14.	Soil analysis kit	with leather container	2
15.	Glasswares (flasks, beakers, petri dishes, etc.)	Pyrex or Kimax	10 each kind and size
16.	Vernier caliper	metric scale	2
17.	Soil sieve 20, 40, 80 mesh	US Model	1 each
18.	Iron stand	with metal or wood base	5
19.	Iron ring		10
20.	Hot plate	with temp. controller, 220V	2
21.	Bunsen burner		5
22.	Dessicator with dessicant	Dry-seal glass vacuum type	2 each
23.	gas tank/cylinder	with methane gas, large	2
24.	wash bottle	250-500 ml. cap.	4
25.	Dissecting microscope	up to 1000 x magnifying power, acid-resistant mechanical stage	2
26.	Spatula, small and medium	stainless blade, wooden handle	5 each
27.	Alcohol lamp		10
28.	Cyanide bottles	customized	10

		Specifications	Quantity
29.	Insect nets	customized	10
30.	Scissors	small, pointed	10
31.	Saccharimeter		2
32.	Safety devices (fire extinguisher, emergency shower)	at least 4.5 kg cap. tank, with pull safety lock	2 per lab.
C.	Collection/Specimens/ Charts/Visual Aids		
1.	Pests	preserved or flipcharts	2 sets
2.	Diseases	flipcharts	2 sets
3.	Weeds	herbarium or flipchart	2 sets
4.	Seeds	actual or pictures	2 sets
5.	Crops	actual, herbarium	2 sets
6.	soil profile monolith		1 for each major soil series
7.	Slide projector	6-position voltage selector, High/low lamp intensity control remote control, forword/ reverse	2
8.	Overhead projector	multi-voltage, portable, with built-in pen tray transparency location pins and guide points	2
D.	Field and Physical Facilities		
1.	Greenhouse		1
2.	Mist house (chamber)		1
3.	Tool and equipment room		1
4.	Working shed		1
5.	Experimental farm (good and arable land preferably with irrigation facilities)		25 ha.
6.	Established orchard for instructional purposes		3 ha.
7.	Fruit crop lab.		300 sq.m.
E.	Laboratories		
1.	Crop Protection Lab.		1
2.	Soil Science Lab.		1
3.	Crop Science Lab.		1

II. Animal Science

A. Basic Tools and Equipment

A.1 Farm

		Quantity
1.	Shovel	10
2.	Wheel barrow	5
3.	Forage chopper (manual or motor-driven)	1
4.	Set of veterinary instrument	2 sets
	- Capsule forceps	
	- Bolling gun,	
	- Dose Syringe	
5.	Sprayer (knapsack)	1
6.	Weighing scale for different species of farm animals	1 heavy duty platform, scale
	- cattle or other large animals	1000 kg. capacity
	- swine	1 Fairbank Morse platform 500 kg. capacity
7.	Branding iron, set	2 (numbers, 0-9)
8.	Castration set (cattle & carabaos)	
	- emasculator	1 unit
	- emasculatome	1 unit
	- surgical knife or scalpel with blade	1 dozen
	- surgical thread	1 spool
	- surgical needle	1 dozen
9.	Castration set (small animals)	
	forcep, straight	2 pieces
	forcep, curved	2 pieces
	forcep, artery	2 pieces
	scalpel with blade	2 pieces
10.	Dairy (hand-milking)	
	- milk scale	1 unit, 30 kg. x 100 gm. division
	- strip cup	1 unit
11.	Beef/carabao, horse	
	- saddle	
	- bridle/bits	1 unit
	- halter	1 unit
	- rope-wire stretcher	1 unit
	- fence plier and staple puller	2 units
	- post hole digger	1 unit
12.	Swine backfat probe	2 units

A.2 Meat Processing

1.	Meat curing pump	2 units
2.	Meat thermometer	2 units
3.	Salinity tester	2 units
4.	Range (cooking oven)	1 unit

		Quantity
5.	Refrigerator/freezer	1 unit
6.	Weighing scale for meat - carcass - small cuts	1 unit
7.	Utility scale - a triple beam balance with 2,100 gm. cap.	1 unit
8.	Plastic pail (3 gallon cap.)	6 pieces
9.	Plastic basin 1.5 ft. outside ream diameter	3 pieces
10.	Tools for slaughtering animals 1 set is composed of the following: 1 sharpening steel 2 pcs. carborandum 1 pc. cleaver 2 pcs. sticking or bleeding knives 2 pcs. skinning knives 1 pc. butcher or ordinary knives 1 pc. manual meat saw 1.5 tons capacity hoist (optional)	1 set

A.3 Reproduction

1.	Hemocytometer	2 units
2.	Refrigerator - freezer	1 unit
3.	Microscope	2 units

A.4 Nutrition

1.	Feed grinder, small or medium	1 unit
2.	Weighing scale for feeds - 500 kg. cap. Fairbank Morse platform scale - single beam, 50 kg. cap.	2 units
3.	Distilling apparatus set	1 set
4.	Assorted laboratory glassware set	10 sets
5.	Fat extraction apparatus	1 unit (with 6 heaters)
6.	Furnace	2 units
7.	Laboratory grinder or microgrinder	1 unit
8.	Centrifuge	2 units
9.	Bomb calorimeter	1 unit
10.	Fume hood	1 unit

		Quantity
11.	Bunsen burner	10 units
12.	Gas pipe	3 units
13.	Autoclave	1 unit
14.	Crucible tongs	6 units
15.	Kjeldahl apparatus	1 unit (with 12 heaters)
16.	Analytical balance	3 units
17.	Dessicator	5 units
18.	pH meter	1 unit
19.	Lab. thermometer	5 units
20.	Oven	2 units
21.	Calorimeter	2 units

A.5 Classroom equipment

1.	Tape measures (10 meters steel and one unit plastic covered	3 units
2.	Slide projector and screen	1 set
3.	Overhead projector	1 set
4.	Barometer (m)	1 unit
5.	Hydrometer %	1 unit
6.	Thermometer °C	1 unit
7.	Stethoscope	5 units
8.	Rain gauge	1 unit
9.	Stop watches	

B. Minimum number of animals for instructional purposes only

1.	Swine	
	- sow (at least 3 pure breeds)	10
	- gilt (of various breeds)	10
	- boar (any pure breed)	2
	- pigs (growing, fattening)	30
2.	Cattle	
	- cows (beef, dairy)	10
	- bull, breeding	2
	- young animals	20
3.	Carabao (1 bull, 2 females)	3
4.	Horse (1 stallion, 2 mares)	3
5.	Goat	
	- does	10
	- buck	2
	- young animals	30

	Quantity
C. Poultry	
C.1 Farm	
1. Electric Debeaker (for beak trimming)	1 unit
2. Incubators	1 unit
- forced-draft type with at least 5,000 egg cap., combined setter & hatcher	
- still-air table-type electric incubators with at least 200 eggs capacity	2 units
- still-air table-type kerosene incubator, at least 100 eggs capacity	2 units
3. Brooding unit (model type not dependent on electricity is preferred)	
4. Growing pens, elevated slat type, cap. 50 head each	4 units
5. Laying facilities, individual or multiple bird cages, at least 100 head capacity	
6. Breeding flock housing facilities- combination of elevated slat-floor and litter type, capacity of 20 hens and five roosters	1 unit
7. Egg grader (manual type)	1 unit
8. Candler (fertility tester)	1 unit
9. Different model/type of feeder and waterer (drinking equipment)	
Feeder	
- tube feeder, medium/large size	10 units
- trough feeder	10 units
Waterer	
- fount-type, sizes (1/4 gal., 1/2 gal., 1 gal.)	10 units/size
- pan type	5 units
- continuous flow-type	3 units
- automatic waterer	1 unit
10. Poultry	
a. Chickens	
- layers (commercial egg-type strains)	100
- pullet (commercial egg-type strains)*	120
- broiler, straight-run	200 head/batch; all-in-all-out scheme or 100 head/batch or 2-age group scheme

		Quantity
	- breeding flocks (egg-type or meat type)	
	rooster	at least 5 head
	laying hen	20 head
	b. Other poultry species ducks (muscovy, mallard) turkey, quails, geese, pigeon, guinea fowls	
11.	Weighing scale, 50 kg. cap. spring balance, sensitive to 100 gm (0.1 kg)	1 unit

C.2 Classroom

1.	Caponizing set with spreader, hook, scoop, scalpel	4 sets
2.	Egg shell micro caliper (for measuring egg shell thickness)	1 unit
3.	Yolk color fan (for determining yolk color intensity)	1 unit
4.	Albumen height meter (for determining egg quality through Haugh Unit value)	1 unit
5.	Weighing scale, 10 kg. cap., sensitive to 1 gm	1 unit

*At any one time, there should be a batch of growing egg-type pullets between 4 weeks to 16 weeks of age.

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III. BASIC AGRICULTURAL ENGINEERING EQUIPMENT
(For BSA program in institutions without a separate BSAEn curriculum)

A. Agromet Station

		Quantity
1.	Max-min thermometer	1 set
2.	Instrument Shelter	1 unit
3.	Hygrothermograph	1 unit
4.	Psychrometer	1 unit
5.	Non-recording rain gauge	1 unit
6.	Above ground evaporation pan	1 unit
7.	1 m. totalizing anemometer	1 unit
8.	Pyranograph/pyranometer and stand	1 unit
8.	Sunshine recorder and stand	1 unit
10.	Soil thermograph	1 unit
11.	Barometer/barograph	1 unit

B. Irrigation and Drainage

1.	Soil moisture meter	1 unit
2.	Weir set	
3.	Parshall Flume	1 unit
4.	Current meter	1 unit
5.	Centrifugal pump set with engine	1 unit
6.	Oven	1 unit

C. Machinery for Crop Production and Processing

	Specification	Quantity
Engine	two-stroke-spark-ignition engine, single-cylinder, 3-5 hp, magneto ignition, air-cooled	1 unit
Engine	four-stroke-spark-ignition engine, single-cylinder, 3-5 hp, magneto ignition, air-cooled	1 unit
Engine	four-stroke-compression-ignition engine, single-cylinder, 3-5 hp. water-cooled	1 unit
Electric Motor	single-phase, capacitor-start-induction-run, 240 volts, 60 cycles, 1725 rpm, 1 hp	1 unit
Electric Motor	three-phase, 240 volts, 60 cycles, 1725 rpm, 1 hp (optional)	1 unit

	Specification	Quantity
Floating Type Tiller	1-meter width, 10 hp gasoline engine (7.5 hp diesel engine), transport wheels (3) (optional)	1 unit
Power Tiller	power tiller with single bottom moldboard plow and comb harrow, pneumatic and cage wheels, 10 hp gasoline engine (7.5 hp diesel engine)	1 unit
Rice Transplanter	6 rows, manually operated, using modified dapog seedlings	2 unit
Rice Drum Seeder	8 rows, manually operated, using pre-germinated seeds, 50-75-125 kg/ha seeding rates	2 units
Corn Planter	single row, animal-drawn-plow-attached units, 30,000-50,000 seeds/ha. planting rates	2 units
Lowland Weeder	lowland rotary weeder, single-row, double rotor, cono or spike type, steel working parts and frames and wooden handle with height adjustment	2 units
Knapsack Sprayer	lever-operated knapsack sprayer, 14-16 liters capacity, stainless steel or plastic tank, piston or diaphragm-type pump, pressure chamber, pressure gauge (accessory)	2 units
Rice Reaper	1 meter width, two-element scissor-type cutting blades, conveyor, 3 hp gasoline engine	1 unit
Rice Thresher	portable rice thresher, 500 kg/hour capacity, with cleaner (combined threshing and winnowing), throw-in or axial-flow type, 7 hp gasoline engine	1 unit

	Specification	Quantity
Corn Sheller	1-2 tons/hour shelling capacity, with cleaner, crushing or non-crushing type, 10 hp gasoline engine	1 unit
Grain Dryer	batch type flat bed grain dryer, 1-2 tons per batch capacity, rice hull furnace, axial fan driven by 5 hp gasoline engine or 3 Hp motor	1 unit
Rice Mill	one-pass rice mill with rubber roll huller, hull aspirator, and abrasive or friction whitener, 6-10 cavans per hour milling capacity, 16 hp gasoline engine (12 hp diesel engine or 10 hp three-phase electric motor)	1 unit
Platform Balance	500 kg capacity with 1 kg graduations, weights, lock lever	1 unit
Weighing Balance	3 kg capacity with 1 gm. graduations, weights, zero-adjustment knob	2 units
Grain cleaner	1 ton/hr. capacity	1 unit
Manually operated forage chopper	half ton capacity	1 unit
Moisture meter	electronic grain moisture meter, capacitance or resistance type, measures up to 30 percent moisture, can be used for rice and corn and other grains	2 units
Oven	air oven type	1 unit
Psychrometer	wet and dry bulbs, 0-50°C, 1 deg graduations	2 units
Thermometers	oval type, 0-150°C	4 units
Magnifying glass	6" diameter	2 units

	Specification	Quantity
Bulk density tester		1 unit
Trier	18" long, sack sampler	1 unit

Support Services

1.	AC/DC power supply	1 unit
2.	Air compresser electrice motor	1 unit
3.	Battery charger 6-12 volts (group)	1 unit
4.	Bench vise machinists	3 units
5.	Blow torch	2 units
6.	Drill, elecric 1/2	1 unit
7.	Drill, sets, high speed twists	
	- 15 pcs. set 1/16" to 1/2 x 32nd	1 unit
	- 13 pcs. set 1716" to 1/2 x 64th	1 unit
8.	Grease injector	2 units
9.	Grinder bench mounted	1 unit
	- sickle cone wheels	2 units
	- grinding wheels	2 units
10.	Soldering iron	6 units
11.	Spring inside caliper	6 units
12.	Spring outside caliper	6 units
13.	Tractor tire gauge	2 units
14.	Welding set, oxyacetylene	1 unit
	- Welder's helmet	1 unit
15.	Gauntry "A" frame	1 unit
16.	Surveying equipment	1 set
17.	Differential hoist polley	1 unit
18.	Cost steel anvil	1 unit
19.	Hammers, assorted types	1 set
20.	Small tractor (with attachments)	1 set
21.	Micro Computer with Printer and hard disk	5 units

1 air-conditioned room

Power Tools

Drill Press 17"	Flor type Chuck capacity 0 to 1/2" Motor 3/4 Hp. 1725 speed, 115/230 volts	1 unit
Drill Portable	Heavy duty 1/2" chuck capacity 450 rpm	1 unit
Tool grinder 8"	3/4 Hp 3450 rpm, 230 volts	

	Specification	Quantity
Welding Tools and Equipment		
Arc welder	AC 180 Ampere Current range 30-180 Ampere Duty cycle setting 20% 25 volts Input voltage 200/230 volts with complete accessories. Head shield with lenses, electrode holder, output cables and instruction book	1 unit
Wood Working and Carpentry Tools		
Auger bit	1/4" to 1" by the eight of an inch	1 set
Drill bit	1/16" to 1/2" diameter	1 set
Hand drill	3/8" capacity	1 piece
Ratchet brace	10" sweep	1 piece
Back saw (hand)	10 teeth/inch, 14" long	1 piece
Cross cut saw (hand)	8 teeth/inch, 26" long	2 pieces
Saw set	For hand saw	1 piece
Chisels	2 1/2 inch 1 inch	1 piece 1 piece
Hatchet	3" blade (locally made)	1 piece
Plane	2" cutter, 14" 8" long	2 pieces
C-clamp	7 inches	1 piece
Bar clamp	6 feet	1 piece
Screw driver Flat	8 inches	2 pieces
Screw driver, Philips	8 inches	2 pieces
Claw hammer	16 oz. 14 oz.	1 piece 1 piece
Try square	6 inches blade 8 inches blade	1 piece 1 piece
Steel square	18" x 24"	1 piece

	Specification	Quantity
Marking gauge	To be made in the school shop	2 pieces
Plumb bob		2 pieces
Wood working vise	Rapid acting 4" x 7" jaw 9" jaw opening	2 units
Wood turning	one each of the following: skew chisel 1" skew chisel 1/2" gouge 3/4" gouge 1/2" gouge 1/4" round nose 1/2" spear point 1/2" parting 1/2"	1 set
Whetting stone	Carborzudum 8" long	1 piece
Ripping bar	5\8" dia x 3' goose neck	1 piece
Pliers	1 side cutting, 1 mechanical 8 inches long	1 piece
Pliers	Long nose	1 piece
<u>Metal Working and Forge Work</u>		
Steel Rale	Stainless-steel English and metric graduations 12" long	3 pieces
Hammer (One each of the following:		
Ball peen hammer	16 oz.	
Ball peen hammer	24 oz.	
Riveting hammer	12 oz.	
Peening hammer	12 oz.	
Blacksmith hammer	32 oz.	
Sledge hammer	8 lbs.	
Anvil tools	150 lbs.	1 piece
Hacksaw	With 12 extra blades	2 pieces
Cold chisels	To be made in the school shop	2 pieces
Heavy duty electric drill	1/2" chuck capacity	1 piece
Drill bit	1/16 to 1/2"	1 set

	Specification	Quantity
Tinners snip	3" cutter blade	2 pieces
Files	Bastard, flat 10"	2 pieces
Files	2nd cut, half round 10"	2 pieces
Files mill	10"	2 pieces
Files round	3/8" diameter, 1/2" diameter	2 pieces 2 pieces
Files triangle	8"	1 piece
Machinist vise	Swivel base, 4" jaw, 8" opening, 3 5/8" depth of throat	1 unit
Box wrench	10 to 30 mm	1 set
Socket wrench	10 to 30 mm	1 set
Adjustable wrench	8" long	1 piece
Pipe wrenches	14", 18" long	2 pieces
Pipe stock and die	1/4" to 2"	1 set
Concrete Work		
Shovel short handle		2 pieces
Cement trowel	6 inches	2 pieces

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