

Proceeding of the meeting of the ICAR's expert committee to work out the Minimum Standards of Higher Agricultural Education (MSHAE) in terms of infrastructure, laboratories/field facilities, faculty, man-power and other support so as to firm up the guidelines for establishing College of Agriculture in SAUs/ICAR Institutes/Deemed Universities, held at G. B. Pant University of Agriculture & Technology, Pantnagar on April 21-22, 2014.

Human Resource development is critical for sustaining, diversifying and realizing the potentials of agriculture in Indian context where a vast majority of the population continues to secure its livelihood through this premiere enterprise, which also sustains food and nutritional security of the nation. Agricultural human resource development is a continuous process being undertaken through partnership and efforts of the components of the Indian Council of Agricultural Research (ICAR) - Agricultural Universities, Deemed to be universities, Central Agricultural University and other Central Universities with Agriculture Faculty. The Agricultural Universities in India set up on the 'land grant' pattern of USA have contributed immensely to human resource development as well as enhancement of agricultural productivity and production in the country over the years.

The present priorities, opportunities and threats of agriculture sector have changed. Accordingly, agricultural education has now to evolve in tune with fast changing national and international scenario. Future agriculture is dominated by looming dangers of food insecurity due to stagnating/declining productivity and profitability as well as degradation and depletion of natural resources. The agriculture is also confronted with the face of changing climate. Millions of Indian farmers own uneconomic land holdings and the fragmentation is increasing day by day. Another daunting concern is the post-harvest losses to the crops. Moreover, agriculture sector has to continuously sustain majority of Indian population in the future besides providing an economically lucrative employment alternative to the vast youth population of the country.

Looking into the requirement, there is the need to revisit the present perspective of higher agricultural education to cater to the present day local and global needs. The agricultural graduates need to be thoroughly equipped with knowledge, skills, ability to emerge as an entrepreneur in agriculture and allied sector as well as to become a solution-provider in rural areas to promote the much-required transformation of Indian villages with commercial propositions to traditional agriculture. Certain aspects on which more emphasis is required in

agricultural education is linked to curricula, skill generation, employability traits and infrastructure which is essentially required in any agricultural institution, if they have to perform adequately according to global competitiveness.

All this requires setting up of minimum standards for higher education in agriculture in terms of infrastructure, manpower and other logistics so that students get required facilities to enhance their capabilities and deliver as per need.

The following committee members were present in the meeting:

1. Dr. S.A.Patil, Chairman, Karnataka Krishi Mission	Chairman
2. Dr. S.K.Sanyal, (former VC, Mohanpur, West Bengal)	Member
3. Dr. J.Kumar, Dean , College of Agriculture, Pantnagar	Member
4. Dr. H.S.Gaur, Vice-Chancellor, SVP University, Modipuram, Meerut	Member
5. Dr. P.K.Das, Dean Research, Orissa University of Agric. & Tech.	Member
6. Dr. Arvind Kumar, DDG (Edn.) ICAR, New Delhi	Member
7. Dr. K.L.Khurana, Principal Scientist, Education Division, ICAR, New Delhi	Member Secretary

The following faculty members of the university also attended the meeting as special invitees:

1. Dr. N. S. Murty, Dean, Post Graduate Studies
2. Dr. Y. V. Singh, Professor & Head, Department of Vegetable Science
3. Dr. Ramesh Chandra, Prof & Head, Department of Soil Science
4. Dr. M.L.Sharma, Prof & Head, Department of Agril. Economics
5. Dr. Shant Lal, Prof & Head, Department of Horticulture
6. Dr. A.K.Karnataka, Prof & Head, Department of Entomology
7. Dr. K.Vishunawat, Prof & Head, Department of Plant Pathology
8. Dr. B.Kumar, Professor, Agril. Communication
9. Dr. Shivendra Kashyap, Professor, Agril. Communication
10. Dr. D. Roy, Professor, Genetics & Plant Breeding

11. Dr. R. Prasad, Professor, Genetics & Plant Breeding
12. Dr. S.K.Sharma, Asstt. Prof. Food Science & Technology
13. Dr. Ajit Nain, Assoc. Prof. Agrometeorology
14. Dr. D.S.Pandey, Prof & Head, Department of Agronomy
15. Dr. K.P. Raverkar, Professor, Soil Science

Chairman of the committee, Dr. Patil, welcomed all the members and introduced the objectives of the meeting. Subsequently, Dr. Arvind Kumar DDG, Education briefed about the genesis behind constitution of the committee to address the requirements of laying down standards to be observed for the purpose of higher agriculture education in the country. Thereafter, Dr. J. Kumar introduced the Heads of various departments and various other invitees of the College of Agriculture, GBPUAT, Pantnagar to the committee. The committee worked on to prepare the final draft of the MSHAE for Under Graduate studies after thorough deliberations held over two days and the same is enclosed as Annexure –I. It was decided to hold another meeting for drawing the standards for P.G. Education.

Dr. S.K.Sanyal
Member

Dr. J.Kumar,
Member

Dr. H.S.Gaur,
Member

Dr. P.K.Das,
Member

Dr. Arvind Kumar
Member

Dr. K.L.Khurana,
Member Secretary

Dr. S.A.Patil
Chairman

Proceedings of the Second meeting of the ICAR's expert committee to work out the Minimum Standards of Higher Agricultural Education (MSHAE) in terms of infrastructure, laboratories/field facilities, faculty, man-power and other support so as to firm up the guidelines for establishing Agriculture Colleges in SAUs/ SVUs/ DUs/ CAUs.held at Education Division, ICAR on May 23, 2014

Following committee conducted the meeting:

- | | |
|---|------------------|
| 1. Dr. S. A. Patil, Chairman, Karnataka Krishi Mission | Chairman |
| 2. Dr. J. Kumar, Dean , College of Agriculture, Pantnagar | Member |
| 4. Dr. H. S. Gaur, Vice-Chancellor, SVP University, Modipuram, Meerut | Member |
| 5. Dr. P. K. Das, Dean Research, Orissa University of Agric. & Tech. | Member |
| 6. Dr. K. L. Khurana, Principal Scientist, Education Division, ICAR,
New Delhi | Member Secretary |

The meeting started with a welcome address by Dr. K L Khurana, Principal Scientist (EQR) followed by opening remarks by Dr S A Patil, Chairman of the Committee. The Committee members recalled the discussions and progress made in the meeting held on April 21 -22, 2014 at Pantnagar.

After detailed deliberations over the day the recommendations of the committee for MSHAE for UG program and PG programmes in Agriculture are placed at Annexures -1 and 2, respectively.

The meeting ended with vote of thanks to the chair.

Dr. J. Kumar
Member

Dr. H .S. Gaur
Member

Dr. P. K. Das
Member

Dr. K. L. Khurana,
Member Secretary

Dr. S. A. Patil
Chairman

Report of the Committee

The ICAR constituted the following committee vide its office order. F. No.Edu 5/4/2013-EQR dated October 1, 2013 to work out Minimum Standards of Higher Agricultural Education for Agriculture Education in terms of infrastructure, laboratories/ field facilities, faculty, manpower and other support so as to firm the guidelines for establishing Agriculture Colleges in SAUs/ SVUs/ DUs/ CAUs.

1. Dr. S. A. Patil, Chairman, Karnataka Krishi Mission	Chairman
2. Dr. S. K. Sanyal, (former VC, Mohanpur, West Bengal)	Member
3. Dr. J. Kumar, Dean , College of Agriculture, Pantnagar	Member
4. Dr. H. S. Gaur, Vice-Chancellor, SVP University, Modipuram, Meerut	Member
5. Dr. P. K. Das, Dean Research, Orissa University of Agric. & Tech.	Member
6. DDG (Edn.) ICAR, New Delhi	Member
7. ADG (EQR) Education Division, ICAR, New Delhi	Member Secretary

The committee met as per the following schedule:

1. **April 22 -22, 2014** at College of Agriculture, GBPUAT, Pantnagar: The committee worked on to prepare the final draft of the MSHAE for Under Graduate studies after thorough deliberations held over two days.
2. **May 23, 2014** at Education Division, ICAR: to finalize the recommendations for MSHAE for Post Graduate Studies in Agriculture and Compilation of the composite report for UG and PG Education as given at Annexures 1 and 2, respectively.

Dr. J. Kumar
Member

Dr. H .S. Gaur
Member

Dr. P. K. Das
Member

Dr. K. L. Khurana,
Member Secretary

Dr. S. A. Patil
Chairman

Annexure 1

Minimum Standards for Establishing a College of Agriculture in State Agricultural Universities/Central Agricultural Institutes/Deemed Universities

- I. Name of the degree** : B.Sc. (Agriculture)
Bachelor of Science in Agriculture
10+2 or intermediate
- II. (A) Minimum educational requirements for admission to B.Sc. (Agri.) degree programme** : Physics, Chemistry, Mathematics, Biology,
Physics, Chemistry, Biology
Physics, Chemistry, Mathematics
- II. (B) Minimum Admission Strength** : 60 (Sixty)

III. (A) Divisions/Departments/Sections

1. Agronomy
2. Agricultural Economics
3. Agricultural Extension & Communication
4. Entomology
5. Genetics and Plant Breeding
6. Horticulture
7. Food Science and Technology
8. Soil Science and Agricultural Chemistry
9. Agro-meteorology
10. Plant Pathology
11. Animal Sciences
12. Fisheries
13. Biochemistry
14. Crop Physiology
15. Agricultural Engineering
16. Agro-forestry
17. Seed Science and Technology
18. Environmental Sciences
19. Microbiology
20. Basic Sciences and Humanities
 - a) Basic Economics
 - b) Sociology and Psychology
 - c) English
 - d) Mathematics
 - e) Computer Sciences
 - f) Statistics

21. Non-credit course: NCC/NSS/Physical Education, etc.

Note: To reduce the number, the subjects which have only one or two courses may be merged with major Division/Department. Colleges/Universities have liberty to do this at their level.

However, for practical purposes following model has been proposed here along with minimum teaching staff required for each Division/Department taking into account the merger of related subjects.

III. (B) Model -Divisions/Departments/Sections proposed along with Cadre-wise teaching staff required.

Sl. No.	Divisions/Departments/Sections including mergers shown in bracket	Minimum	Teaching Staff required			
			Professor	Assoc. Prof.	Asstt. Prof.	Total
A. Divisions/Departments						
1.	Agronomy + (Agro-forestry)	5	1	1	4+1	7
2.	Agricultural Economics + (Basic Economics, Maths & Computer Science and Statistics)	5	0	1	2+3	6
3.	Agriculture Extension & Communication + (Sociology and Psychology, English)	3	0	1	1+2	4
4.	Entomology	2	0	1	2+0	3
5.	Genetics & Plant Breeding + (Seed Science & Technology)	3	1	1	2+1	5
6.	Horticulture + (Food Science & Technology)	4	1	1	2+1	5
7.	Soil Science and Agricultural Chemistry + (Microbiology, Agro-meteorology, Environmental Sciences)	4	0	1	2+3	6
8.	Plant Pathology	2	0	1	2+0	3
	Total	28	3	8	17+11	39

Sl. No.	Divisions/Departments/Sections including mergers shown in bracket	Minimum	Teaching Staff required			
			Professor	Assoc. Prof.	Asstt. Prof.	Total
B. Sections						
9.	Animal Sciences including Fisheries, Dairy Fisheries & Poultry units)	1	0	0	1+1	2
10.	Agriculture Engineering + (Farm Management)	1	0	0	1+1	2
11.	Biochemistry and Crop Physiology	1	0	0	1+1	2
Total		31	3	8	20+14	45

Note: Total strength after four years should have 45 teachers as faculty. However, in extreme cases, it can be 31 and few courses viz. Basic Sciences, and Humanities, Maths, and Computer Sciences, etc. can be completed by hiring the teachers.

IV. Administrative Staff requirement for Divisions/Departments/Sections

Sl. No.	Divisions/Departments/Sections	Assistant *	Lab Asstt.	Field Asstt.	Attendant/Messenger	Total
1.	Agronomy + (Agro-forestry)	1	2	3	- **	6
2.	Agricultural Economics + (Basic Economics, Maths & Computer Science and Statistics)	1	3	-	-	4
3.	Agriculture Extension & Communication + (Sociology and Psychology, English)	1	1	-	-	2
4.	Entomology	1	1	1	-	3
5.	Genetics & Plant Breeding + (Seed Science & Technology)	1	2	2		5
6.	Horticulture + (Food Science & Technology)	1	2	2		5
7.	Soil Science and Agricultural Chemistry + (Microbiology, Agro-meteorology, Environmental Sciences)	1	3	1		5
8.	Plant Pathology	1	2	1		4
9.	Animal Sciences including Fisheries, Dairy Fisheries & Poultry units)	1	1	1		3
10.	Agriculture Engineering + (Farm Management)	1	1	2		4

11.	Biochemistry and Crop Physiology	1	1	-		2
	Total	11	19	13		43

* Assistant should have computer literacy, accounts and store handling training

** Attendant/Messenger/Janitor/Security/watch and ward to be outsourced.

V. Manpower Requirement of Dean's Office

Sl. No.	Name of the Post	No. of Posts
1.	Dean	01
A. Establishment		
1.	P.A./P.S. to Dean	01
2.	Asstt. Administrative Officer	01
3.	Asstt. Academic Officer	01
4.	Assistant Accounts Officer	01
5.	Assistants (one for each AAO)	03
6.	Steno/Computer Operators	01
7.	Driver	01
8.	Farm Manager (Asstt. Prof.)	01*
9.	Store Keeper	01

* Will be with Engineering/Agronomy. Utility services like Wireman/Plumber/Janitors/Attendants/Messengers, Landscaping, and Mechanic, etc. to be outsourced.

B. Central Instrumentation Laboratory		
1.	Instrumentation Asstt. Engineer	01
2.	Instrumentation Technician/Lab Asstt.	01
C. Library Staff		
1.	Asstt. Librarian (Asstt. Prof. cadre)	01
2.	Library Asstt./Clerk	01
3.	Shelf Asstt.	01
D. Students Welfare		
1.	Physical Education (Asstt. Prof.)	01
2.	Attendant	01
E. Hostel Staff		
1.	Warden	01+01
2.	Care taker/Asstt.	01+01
F. Estate Branch		
1.	Junior Engineer	01
2.	Security Asstt.	01

VI. Land Required

- | | | |
|--------------------------------------|---|----------|
| (A) 1) Plain Regions | : | 75 acres |
| 2) Hill, islands and coastal regions | : | 40 acres |

(B) Land Utilization Pattern

		(Acres)	
		Plain	Hill/Coastal Region
1.	Main Building/Hostels/Residential Quarters (Including roads)	17	8
2.	Playground & other amenities	08	5
3.	Farm Area, including godown/ stores	50	27
Note: If land is not in one stretch, it should be atleast within a radius of 5 kms			

(C) Division/Department/Section-wise land allocations (acres)

1.	Agronomy & Farm Forestry	15	8
2.	Entomology	1	0.5
3.	Genetics & Plant Breeding + (Seed Science & Technology)	08	4.0
4.	Horticulture	15	9.0
5.	Soil Science and Associated Departments	2	0.5
6.	Plant Pathology	1	0.5
7.	Animal Sciences	5	3.0
8.	Biochemistry and Physiology	1	0.5
9.	Agricultural Engineering	2	1.0
10.	Total	50	27.0

VII. Infrastructure facilities (Floor space required)**A. Central Facilities**

Sl. No.	Details	No. of Rooms	Dimensions (in ft)
1.	Dean Office	1	20x24
2.	P.A. Room	1	10x12
3.	Committee Room with video conferencing facility	1	20x30
4.	Assistant Administrative Officer including staff	1	20x12
5.	Assistant Accounts Officer including staff	1	20x12
6.	Assistant Academic Officer including staff	1	20x12
7.	Exam Cell (300 capacity)	1	20x12
8.	Evaluation Room	1	20x36
9.	Faculty Room (Ladies)	1	10x12
10.	Faculty Room (Gents)	1	20x12
11.	Placement Cell	1	20x12

12.	Smart Lecture Halls	5	40x30 (60 capacity)
13.	Exam Hall Cum Auditorium	1	100x50
14.	Library/Book Bank	1	30x72
15.	Common Utility Room	1	20x36
16.	Central Laboratory	1	50x36
17.	Hostels including Mess, Gym/Indoor, Reading Room, Warden Room, Store etc.	1 (boys)	150
		1 (girls)	150
18.	Canteen	1	20x12 (kitchen with store)
			20x36 Seating
19.	Wash room (with toilet & urinary facilities)	10	20x12 (keeping ladies requirements)
20.	Parking space		As per requirement
21.	Farm stores, threshing yards including implements and tractor sheds	One core complex	
22.	Vehicles		
	i. Car	1	
	ii. Jeep/Car staff	2	
	iii. Bus	1	
	iv. Pickup van	1	
	v. Motor Bikes	2	
	vi. Minibus (30 capacity)	1	
	vii. Tractors	2	
23.	Drinking water and irrigation facilities		As per requirements
24.	Vehicles shed	1	10x80

B. Divisions/Departments/Sections – Requirements

Sl. No.	Details	No. of Rooms	Dimensions (in ft)
1.	Office of Head	12	24x12 with wash room facility
2.	Faculty Rooms 1+1	12	12x10 + 18x12 24x10 depending on the strength of each deptt.
3.	Clerical/technical staff	12	12x10 to 24x10 depending on the strength of each deptt.
5.	Laboratories	12	30x 60 Larger deptt. will have two
6.	Field/Lab Stores	5	1. Agronomy 2. Gen. & Pl. Breeding 3. Soil Sci. 4. Horticulture 5. Pests & Chemicals
7.	Green house/poly house/Nursery facilities (Hort. deptt.)	½ acre	

VIII. Requirements of Lab/field equipments for each Division/Department/Section)

1. Agronomy + (agroforestry)

1.	Crop Cafeteria	– ½ acre land – small implements like spade, hoe, khurpi, darati etc.
2.	Museum for identification of seeds, fertilizer, weeds, commonly used agro-chemical and medicinal and aromatic plants etc.	– Storage bottle – Herbarium posting material
3.	Field of sowing method, fertilizer application, irrigation and soil productivity and yield estimation	– Small equipment/ implement
4.	Irrigation water measurement, bulk density etc.	
	<u>Equipments</u>	Number
	i Hot air oven	02
	ii Moisture box	30
	iii Moisture meter	05
	iv Tube Auger	10
	v Bucket auger	10
	vi Weighing Balance	01
	vii Seed Germinator	02
	viii Conductivity Meter	01
	ix pH Meter	02
	x Water Bath	01
	xi Shaker	01
	xii Chlorophyl Meter	01
	xiii Drip and Sprinkler System	03
	xiv Sprayer	03
	xv Spring Balance 50 Kg	05
	xvi Spring Balance 10 Kg	05
	xvii Top Pan Balance 1 kg capacity	05
	xviii Top Pan Balance 2 kg capacity	05
	xix Meter Scale	10
	xx Tape	05
	xxi Brix meter	02

2. Agricultural Economics + (Basic Economics, Maths & Computer Science and Statistics)

In numbers

1.	Computers	15
2.	Camera	01
3.	Software	As per requirement

3. Agriculture Extension & Communication + (Sociology and Psychology, English)

1. Audio-visual Lab

In numbers

1.	LCD projector	1.
2.	Camera (SLR) with zoom, wide-angle, tele-photo lens	1
3.	Video camera with tripod, lighting accessories and editing facility	1
4.	Computers (workstation) with editing softwares	1
5.	Digital voice recorders	5
6.	Audio recording-mixing consoles	1
7.	Computation softwares for statistics	1

3. Entomology

In numbers

1.	Binocular Microscope	20
2.	Insect Box	60
3.	Insect Collection Nets	60
4.	Collection Bottles	60
5.	Insect Collection Big Boxes for Museum (1 for each order)	29
6.	Insecticides for showing students/Representative for each group	As per requirement
7.	Stereomicroscope	01
8.	Electronic Balance	01
9.	Soxhlet Extraction Apparatus	01
10.	Bee keeping equipment	01 Set
11.	Oven	01
12.	Patters Tower	01
13.	Sprayers	01 of each type
14.	Light traps	01 set
15.	Fumigation Chamber	01
16.	Sides/cover slips	as per requirement
17.	pH meter	01
18.	Computer with printer	01 set

5. Genetics & Plant Breeding + (Seed Science & Technology)

Genetics

In Numbers

1.	Microscope	10
2.	Binocular microscope	10
3.	Electronic Moisture Meter	02
4.	Electronic Balance	02
5.	Seed Germinator	02
6.	Automatic seed/grain counter	01

Biotechnology

In Numbers

10.	Hot Air Oven	01
11.	BOD Incubator	01
12.	Fluorescence microscope	01
11.	Centrifuge	01
12.	Growth Chamber	01
13.	Distillation Assembly	01

6. Horticulture + (Food Science & Technology)

1. Labs (Post Harvest)

In Numbers

1.	Hand refractometer	05
2.	Digital Refractometer	02
3.	Oven	01
4.	Refrigerator	01
5.	Electronic Weighing Balance	02
6.	Pan Balance (1 kg & 10 kg. capacity each)	02
7.	Deep Freezer	01
8.	pH Meter	01
9.	Fruit crusher	01
10.	Grinding and Mixing Machine	01
11.	Distillation Assembly	01

2. Lab (UG Lab)

In Numbers

1.	Seed Germinator	02
2.	Grafting and budding knife	60
3.	Secateur	60
4.	Saw	05

5.	Loppers	05
6.	Mist Chamber	01
7.	Poly house with drip irrigation system	02
8.	Microscope	02

4. **Food Science & Technology**

In Numbers

1.	Refrigerator	1
2.	Muffle furnace	1
3.	Weighing balance	2
4.	Water bath	2
5.	Hot air oven	2
6.	Fruit penetrometer	2
7.	Pulper	1
8.	Juice extractor	1
9.	Crown corking machine	1
10.	Spectrophotometer	1
12.	Microwave oven	1
13.	Baking oven	1
14.	Sieve shaker	1
15.	Poly pouch sealer	1
16.	Crusher	1
17.	Masala grinder	1
18.	Dehydrator	1
19.	Cold room	1
20.	Vacuum pump	1

7. **Soil Science and Agricultural Chemistry + (Microbiology, Agro-meteorology, Environmental Sciences)**

In Numbers

1.	Electronic Top pan balance (0.1 g capacity)	02
2.	Electronic Top pan balance (1 mg capacity)	02
3.	Hot air oven	02
4.	pH Meter	05
5.	EC Meter	05
6.	Flame Photometer	01
7.	Visible spectrophotometer	01
8.	Hot Plate	02
9.	Distilled water unit	02
10.	Water Bath	01
11.	Rotary Shaker	02
12.	Binocular Microscope	20
13.	BOD Incubator	02
14.	Autoclave	02

15.	Laminar Air Flow	01
16.	Microwave oven	01
17.	Digestion block	02
18.	Buoycos Hydrometer	05
19.	Infiltrometer	02
20.	Hydraulic conductivity meter	01
21.	Atterberg's limitsmeter	05
22.	Nitrogen Analyser	02

8. Agrometeorology

In Numbers

1.	Thermometer Max	05
2.	Thermometer Min	05
3.	Digital Anemometer	02
4.	Cup Anemometer	02
5.	Pan Evaporimeter	01
6.	Soil thermometer	
	05 cm.	05
	10 cm.	05
	15 cm.	05
7.	Rain gauge	01
8.	Self recording Rain gauge	01
9.	Sunshine Recorder	01
10.	Stevenson's Screen	01
11.	Thermograph	01
12.	Hygrograph	01
13.	Soil Heat Flux Plate	01
14.	GPS	10
15.	AWS (optional)	01
16.	Lysimeter (optional)	01
17.	Luxmeter	02
18.	Solar Pyranometer	01

9. Plant Pathology

In Numbers

1.	Microscope compound with photo display arrangement	03
2.	Sterobinocular	05
3.	Sample processing Board (Dry preservation of samples)	04
4.	Wet preservation Jars	50
5.	Autoclave	02

6.	Oven	01
7.	Deep Freeze	01
8.	Centrifuge (3000 rpm)	01
9.	Refrigerator	01
10.	Water bath	02
11.	Electronic balance	02
12.	Weighing machine	01
13.	Incubator	02
14.	Ocular meter	05
15.	Stage Micrometer	05
16.	Camera Lucida	05

10. Animal Sciences including Fisheries

In Numbers

1.	NIRS™ 5000/6500 Feed and Forage Analyzer	01
2.	Hand and electric centrifuge	01
3.	Analytical balance	01
4.	Hot air oven	01
5.	Micro kjeldhal N digestion & distillation apparatus	01
6.	Soxhlet unit for fat estimation	01
7.	Hot plate, Fiber Tech.	01
8.	Vacuum pump	01
9.	Willy mill grinder	01
10.	Platform balance (100 kg cap)	01
11.	Gerber centrifuge unit (for milk fat testing)	01
12.	Milk analyzer (automatic)	01
13.	Crude fiber estimation unit	01
14.	Distilled water unit	01

12. Dairy & Poultry

In Numbers

1.	Incubator cum hatcher	01
2.	Brooder machine	01
3.	Feeder	01
4.	Waterer	01
5.	Egg candling machine	01
6.	Debeaker	01
7.	Vaccinator	01
8.	Milking machine	As per requirements
9.	Milking bucket	As per requirement
10.	Milking can	As per requirements
11.	Animal and bird identification tools	As per requirement

12.	Chaff cutter	01
13.	Lactometer	01
14.	Castrator	01
15.	Shearer	01
16.	Electric dehorner	01
17.	Artificial vagina	01
18.	Common medication device	01
19.	Cattle crate	01

13. Agriculture Engineering + (Farm Management)

In Numbers

1.	Working models of MB plough, Disk plough and indigenous plough	2 sets each
2.	Working model of different harrows	Actual
3.	Seed drill	01
4.	Different types of threshing drums	As per requirement
5.	Working models of reaper and mowers	02
6.	Different types of sprayers and dusters	As per requirement
7.	Cut model of CI & SI engine	01
8.	Cut model of Tractor	01

Minimum Standards for Establishing a College of Agriculture in State Agricultural Universities/Central Agricultural Institutes/Deemed Universities for UG and PG degree programmes.

I. Name of the degree

Bachelor programmes

B.Sc. (Agriculture)

Bachelor of Science in Agriculture

Post graduate programmes

M.Sc. (Agriculture) with suffix

Agronomy, Agriculture Economics, Agriculture Extension & Communication, Entomology, Genetics and Plant Breeding, Horticulture, Food Science and Technology, Soil Science and Agriculture Chemistry, Agro-meteorology and Environmental Sciences, Plant Pathology, Agriculture Engineering, Agro-forestry, Seed Science and Technology, Agriculture Microbiology, Physiology and Biochemistry, Plant Biotechnology, Plant Virology, Plant Nematology and Sericulture

Ph.D. with suffix:

Agronomy, Agriculture Economics, Agriculture Extension & Communication, Entomology, Genetics and Plant Breeding, Horticulture(with specialization in Vegetable Science/Pomology/ Floriculture/Landscaping/ Medicinal & Aromatic Plants/ Plantation Crops), Food Science and Technology, Soil Science and Agriculture Chemistry, Agro-meteorology and Environmental Sciences, Plant Pathology, Agriculture Engineering, Agro-forestry, Seed Science and Technology, Agriculture Microbiology, Plant Physiology, Plant Biochemistry, Plant Biotechnology, Plant Virology, Plant Nematology and Sericulture

N.B.

Post graduate degree nomenclatures will be maintained by all the colleges/universities/institutes. In case some nomenclature other than the listed above is to be adopted, a prior approval of the ICAR may be obtained.

II. (A) Minimum educational requirements for admission

B.Sc. (Agri.) degree programme

10+2/Intermediate with PCMB (Physics, Chemistry, Mathematics, Biology), PCB (Physics, Chemistry, Biology PCM (Physics, Chemistry, Mathematics), 10+2 Agriculture

Post graduate programmes

M.Sc. (Agriculture)

B.Sc. (Agriculture)

- N.B.** (i) Some of the colleges/universities/institutes are granting Bachelor degrees with different nomenclature, their eligibility for admission to M.Sc. may be evaluated at colleges/universities/institutes level based on the subjects and credit loads which they have undertaken at U.G. level.
- (ii) B.Sc. in Non-agricultural subjects may be considered for admission to M.Sc (except Agronomy, Agriculture Economics, Horticulture, Agriculture Extension) subject to undertaking remedial courses in agriculture, the M.Sc. in that case will be of three years duration i.e. one year extra than the normal M.Sc.

II. (B) Minimum Admission Strength :

B.Sc. (Agri.) degree programme 60 (Sixty)

M.Sc. (Agriculture) programme

A minimum of four seats are recommended for M.Sc. (Agriculture) in each subject listed above.

Ph.D. Programmes

A minimum of two seats are recommended for Ph.D. in each subject listed above.

(A) Divisions/Departments/Sections

22. Agronomy
23. Agricultural Economics
24. Agricultural Extension & Communication
25. Entomology
26. Genetics and Plant Breeding
27. Horticulture
28. Food Science and Technology
29. Soil Science and Agricultural Chemistry
30. Agro-meteorology
31. Plant Pathology
32. Animal Sciences
33. Fisheries
34. Biochemistry
35. Crop Physiology
36. Agricultural Engineering
37. Agro-forestry
38. Seed Science and Technology
39. Environmental Sciences
40. Microbiology
41. Basic Sciences and Humanities
 - a) Basic Economics
 - b) Sociology and Psychology

- c) English
- d) Mathematics
- e) Computer Sciences
- f) Statistics

42. Non-credit course for UG program: NCC/NSS/Physical Education, etc.

Note: To reduce the number, the subjects which have only one or two courses may be merged with major Division/Department. Colleges/Universities have liberty to do this at their level. However, for practical purposes following model has been proposed here along with minimum teaching staff required for each Division/Department taking into account the merger of related subjects.

III. (B) Model -Divisions/Departments/Sections proposed along with Cadre-wise teaching staff required.

Sl. No.	Divisions/Departments/Sections including mergers shown in bracket	Minimum	Teaching Staff required			
			Professor	Assoc. Prof.	Asstt. Prof.	Total
A. Divisions/Departments						
1.	Agronomy + (Agro-forestry)	7	1	2	6	9
2.	Agricultural Economics + (Basic Economics, Maths & Computer Science and Statistics)	7	1	2	6	9
3.	Agriculture Extension & Communication + (Sociology and Psychology, English)	5	1	2	4	7
4.	Entomology	4	1	2	3	6
5.	Genetics & Plant Breeding + (Seed Science & Technology)	5	1	2	4	7
6.	Horticulture + (Food Science & Technology)	6	1	2	4	7
7.	Soil Science and Agricultural Chemistry + (Microbiology, Agro-meteorology, Environmental Sciences)	6	1	2	6	9
8.	Plant Pathology including Virology and Nematology	5	1	2	4	7
B. Sections						
9.	Animal Sciences including Fisheries, Dairy Fisheries & Poultry units)	2	1	0	2	3
10.	Agriculture Engineering + (Farm Management)	2	1	1	3	5
11.	Biochemistry and Crop Physiology	2	1	1	3	5
Total		51	12	18	45	74

IV. Administrative & Technical Staff requirement for Divisions/Departments/Sections

Sl. No.	Divisions/Departments/Sections	Assistant *	Clerk	Lab Asstt.	Field Asstt.	Attendant/Messenger	Total
1.	Agronomy + (Agro-forestry)	1	1	4	5	- **	11
2.	Agricultural Economics + (Basic Economics, Maths & Computer Science and Statistics)	1	1	4	-	-	6
3.	Agriculture Extension & Communication + (Sociology and Psychology, English)	1	1	2	-	-	4
4.	Entomology	1	1	3	2	-	7
5.	Genetics & Plant Breeding + (Seed Science & Technology)	1	1	4	5	-	11
6.	Horticulture + (Food Science & Technology)	1	1	4	5	-	11
7.	Soil Science and Agricultural Chemistry + (Microbiology, Agro-meteorology, Environmental Sciences)	1	1	4	3	-	9
8.	Plant Pathology including Virology and Nematology	1	1	4	3	-	9
9.	Animal Sciences including Fisheries, Dairy Fisheries & Poultry units)	1	0	1	1	-	3
10.	Agriculture Engineering + (Farm Management)	1	1	2	3	-	7
11.	Biochemistry and Crop Physiology	1	1	2	1	-	5
	Total	11	10	34	28	-	83

* Assistant should have computer literacy, accounts and store handling training

** Attendant/Messenger/Janitor/Security/watch and ward to be outsourced.

V. Manpower Requirement of Dean's Office

Sl. No.	Name of the Post	No. of Posts
1.	Dean	01
A. Establishment		
1.	P.A./P.S. to Dean	01
2.	Assistant/Deputy Registrar	01
3.	Asstt. Administrative Officer	01
4.	Asstt. Academic Officer	01
5.	Assistant Accounts Officer	01
6.	Assistants (one for each AAO)	03
7.	Steno/Computer Operators	01

8.	Driver	01
9.	Farm Manager (Asstt. Prof.)	01*
10.	Store Keeper	01

* Will be with Engineering/Agronomy. Utility services like Wireman/Plumber/Janitors/ Attendants/Messengers, Landscaping, and Mechanic, etc. to be outsourced.

B. Central Instrumentation Laboratory		
1.	Instrumentation Asstt. Engineer	01
2.	Instrumentation Technician/Lab Asstt.	01
C. Library Staff		
1.	Librarian	01
2.	Asstt. Librarian (Asstt. Prof. cadre)	01
3.	Information technologist	01
4.	Library Asstt./Clerk	02
5.	Shelf Asstt.	03
D. Students Welfare		
1.	Physical Education (Asstt. Prof.)	02
2.	Attendant	02
E. Hostel Staff		
1.	Warden(to be nominated from amongst faculty)	02+02
2.	Care taker/Asstt.	02+02
F. Estate Branch		
1.	Junior Engineers(Civil/Electrical)	02
2.	Security Officer	01

VI. Land Required

- | | | |
|--------------------------------------|---|---------------|
| 1) Plain Regions | : | 30 ha + 10 ha |
| 2) Hill, islands and coastal regions | : | 16 ha + 5 ha |

VII. Infrastructure facilities (Floor space required)

A. Central Facilities

Sl. No.	Details	No. of Rooms	Dimensions (in ft)
1.	Dean Office	1	20x24
2.	P.A. Room	1	10x12
3.	Visitors Room	1	10x12
3.	Committee Room with video conferencing facility	1	20x30
4.	Assistant Administrative Officer including staff	1	20x12
5.	Assistant Accounts Officer including staff	1	20x12
6.	Assistant Academic Officer including staff	1	20x12
7.	Exam Cell (300 capacity)	1	20x12
8.	Evaluation Room	1	20x36

9.	Faculty Room (Ladies)	1	10x12
10.	Faculty Room (Gents)	1	20x12
11.	Placement Cell	1	20x12
12.	Smart Lecture Halls	6	40x30 (60 capacity)
13.	Exam Hall Cum Auditorium	1	100x50
14.	Library/Book Bank	1	30x72
15.	Common Utility Room	1	20x36
16.	Central Laboratory	1	50x36
17.	Hostels including Mess, Gym/Indoor, Reading Room, Warden Room, Store etc.	2 (boys)	To accommodate 250 students
		2(girls)	To accommodate 250 students
18.	Canteen	1	20x12 (kitchen with store)
			20x36 Sitting
19.	Wash room (with toilet & urinary facilities)	10	20x12 (keeping ladies requirements)
20.	Parking space		As per requirement
21.	Farm stores, threshing yards including implements and tractor sheds	One core complex	
22.	Vehicles		
	I. Car	2	
	II. Jeep/Car staff	2	
	III. Bus	1	
	IV. Pickup van	2	
	V. Motor Bikes	2	
	VI. Minibus (30 capacity)	2	
	VII. Tractors	2	
23.	Drinking water and irrigation facilities		As per requirements
24.	Vehicles shed	1	10x80

B. Divisions/Departments/Sections – Requirements

Sl. No.	Details	No. of Rooms	Dimensions (in ft)
1.	Office of Head	12	24x12 with wash room facility
2.	Faculty Rooms 1+1	12	12x10 18x12 24x10 depending on the strength of each deptt.

3.	Clerical/technical staff	12	12x10 to 24x10 depending on the strength of each deptt.
	P.G. Classrooms	12	To seat 30 students
4.	U. G. Laboratories	12	30x 60 Larger deptt. will have two
5.	P.G. Laboratories	12	20x48 Larger deptts. may have two P.G. labs
6.	Field/Lab Stores	5	1. Agronomy 2. Gen. & Pl. Breeding 3. Soil Sci. 4. Horticulture 5. Pests & Chemicals More store rooms may be added as per requirement
7.	Green house/poly house/Nursery facilities (Hort. deptt.)	0.5 ha	
	a. Rain out shelters	1	
	b. Glass houses	4	
	c. Net houses	4	
	d. Poly houses	4	
8.	Fenced area for transgenic Field Testing	0.5 ha	

Requirements of Lab/field equipments for each Division/Department/Section)

1. Agronomy + (Agro-forestry)

1.	Crop Cafeteria	– 0.5 ha land – small implements like spade, hoe, khurpi, darati etc.
2.	Museum for identification of seeds, fertilizer, weeds, commonly used agro-chemical and medicinal and aromatic plants etc.	– Storage bottle – Herbarium posting material
3.	Field of sowing method, fertilizer application, irrigation and soil productivity and yield estimation	– Small equipment/ implement
4.	Irrigation water measurement, bulk density etc.	
	<u>Equipments</u>	<u>Nos.</u>
	i Hot air oven	03
	ii Moisture box	30
	iii Moisture meter	05
	iv Tube Auger	10
	v Bucket auger	10
	vi Weighing Balance	04

	vii Seed Germinator	02
	viii Conductivity Meter	02
	ix pH Meter	02
	x Water Bath	03
	xi Shaker	02
	xii Chlorophyll Meter	01
	xiii Drip and Sprinkler System	01
	xiv Sprayer	04
	xv Spring Balance 50 Kg	05
	xvi Spring Balance 10 Kg	05
	xvii Top Pan Balance 1 kg capacity	05
	xviii Top Pan Balance 2 kg capacity	05
	xix Meter Scale	05
	xx Tape	10
	xxi Brix meter	05
	xxii Refrigerators	02

2. Agricultural Economics + (Basic Economics, Maths & Computer Science and Statistics)

1.	Computers (no.)	20
2.	Camera (no)	02
3.	Software	As per requirement

3. Agriculture Extension & Communication + (Sociology and Psychology, English)

1. Audio-visual Lab

In numbers

1.	LCD projector	2
2.	Camera (SLR) with zoom, wide-angle, tele-photo lens	1
3.	Video camera with tripod, lighting accessories and editing facility	1
4.	Computers (workstation) with editing softwares	1
5.	Digital voice recorders	5
6.	Audio recording-mixing consoles	1
7.	Computation softwares for statistics	1

4. Entomology

1.	Binocular Microscope	20
2.	Insect Box	60

3.	Insect Collection Nets	60
4.	Collection Bottles	60
5.	Insect Collection Big Boxes for Museum (1 for each order)	29
6.	Insecticides for showing students/Representative for each group	As per requirement
7.	Stereomicroscope	02
8.	Research Microscope (trinocular with image analysis system)	02
9.	Electronic Balance	02
10.	Soxhlet Extraction Apparatus	02 unit
11.	Bee keeping equipment	01 Set
12.	Oven	02
13.	Patters Tower	01
13.	Sprayers	02 of each type
14.	Light traps	01 set
15.	Fumigation Chamber	01
16.	Sides/cover slips	as per requirement
17.	pH meter	02
18.	Chemicals Acetic /Ethyl Alcohol	As per requirement
19.	Computer with printer	1 set

5. Genetics & Plant Breeding + (Seed Science & Technology)

Genetics

1.	Microscope	20
2.	Binocular microscope	15
	Research Microscope (trinocular with image analysis system)	02
3.	Electronic Moisture Meter	02
4.	Electronic Balance	02
5.	Seed Germinator	02
6.	Automatic seed/grain counter	01
7.	Refrigerators	02
8.	Deep Freezer -20C	02

Biotechnology

10.	Hot Air Oven	02
11.	BOD Incubator	02
12.	Fluorescence microscope	01
11.	Centrifuge	02
12.	Growth Chamber	01
13.	Distillation Assembly	03
14.	PCR Machines	02
15.	Geldoc system	01

16.	Refrigerated Centrifuge	02
17.	Electrophoresis Assembly	03
18.	Deep Freezer -20C	02
19.	Refrigerators	02

6. Horticulture + (Food Science & Technology)

Labs (Post Harvest)

14.	Hand refractometer	05 Nos.
15.	Digital Refractometer	02 Nos.
16.	Oven	01 No.
17.	Refrigerator	01 No.
18.	Electronic Weighing Balance	02 No.
19.	Pan Balance (1 kg & 10 kg. capacity each)	02 No.
20.	Deep Freezer	01 No.
21.	pH Meter	01 No.
22.	Fruit crusher	01 No.
23.	Grinding and Mixing Machine	01 No.
24.	Distillation Assembly	01 No.
	Deep Freezer -20C	01 no.
	Refrigerators	02 no.

Lab (UG Lab)

1.	Seed Germinator	02 Nos.
2.	Grafting and budding knife	60 Nos.
3.	Secateurs	60 Nos.
4.	Saw	05 Nos.
5.	Loppers	05 Nos.
6.	Mist Chamber	01 No.
7.	Poly house with drip irrigation system	02 Nos.
8.	Microscope	02 Nos.

Food Science & Technology

1.	Deep Freezer -20C	02 no.
2.	Refrigerators	02 no.
3.	Weighing balance	2 nos.
4.	Water bath	2 nos.
5.	Hot air oven	2 nos.
6.	Fruit penetrometer	2 nos.
7.	Pulper	1 no.
8.	Juice extractor	1 no.
9.	Crown corking machine	1 no.
10.	Spectrophotometer	1 no.
12.	Microwave oven	1 no.

13.	Baking oven	1 no.
14.	Sieve shaker	1 no.
15.	Poly pouch sealer	1 no.
16.	Crusher	1 no.
17.	Masala grinder	1 no.
18.	Dehydrator	1 no.
19.	Cold room	1 no.
20.	Vacuum pump	1 no.

7. Soil Science and Agricultural Chemistry + (Microbiology, Agro-meteorology, Environmental Sciences)

1.	Electronic Top pan balance (0.1 g capacity)	02
2.	Electronic Top pan balance (1 mg capacity)	02
3.	Hot air oven	02
4.	pH Meter	05
5.	EC Meter	05
6.	Flame Photometer	01
7.	Visible spectrophotometer	01
8.	Hot Plate	02
9.	Distilled water unit	02
10.	Water Bath	01
11.	Rotary Shaker	02
12.	Binocular Microscope	20
13.	BOD Incubator	02
14.	Autoclave	02
15.	Laminar Air Flow	01
16.	Microwave oven	01
17.	Digestion block	02
18.	Buoycos Hydrometer	05
19.	Infiltrometer	02
20.	Hydraulic conductivity meter	01
21.	Atterberg's limits meter	05
22.	Nitrogen Analyzer	02
	Refrigerators	02 no.

8. Agrometeorology

1.	Thermometer Max	05
2.	Thermometer Min	05
3.	Digital Anemometer	02
4.	Cup Anemometer	02
5.	Pan Evaporimeter	01
6.	Soil thermometer	
	05 cm.	05
	10 cm.	05

	15 cm.	05
7.	Rain gauge	01
8.	Self recording Rain gauge	01
9.	Sunshine Recorder	01
10.	Stevenson's Screen	01
11.	Thermograph	01
12.	Hygrograph	01
13.	Soil Heat Flux Plate	01
14.	GPS & GIS	10+1
15.	AWS (optional)	01
16.	Lysimeter (optional)	01
17.	Luxmeter	02
18.	Solar Pyranometer	01
19.	Automatic Weather Station with Data Loggers	01

9. Plant Pathology

1.	Microscope compound with photodisplay arrangement	03
2.	Sterobinocular	05
3.	Sample processing Board (Dry preservation of samples)	04
4.	Wet preservation Jars	50
5.	Autoclave	02
6.	Oven	01
7.	Deep Freeze	02
8.	Centrifuge (3000 rpm)	01
9.	Refrigerator	02
10.	Water bath	02
11.	Electronic balance	02
12.	Weighing machine	01
13.	Incubator	02
14.	Occular meter	05
15.	Stage Micrometer	05
16.	Camera Lucida	05

10. Animal Sciences including Fisheries

1.	NIRS™ 5000/6500 Feed and Forage Analyzer	01
2.	Deep Freezer -20C	01
3.	Refrigerators	01
4.	Hand and electric centrifuge	01
5.	Analytical balance	01
6.	Hot air oven	01
7.	Micro kjeldhal N digestion & distillation apparatus	01
8.	Soxhlet unit for fat estimation	01

9.	Hot plate, Fiber Tech.	01
10.	Vacuum pump	01
11.	Willy mill grinder	01
12.	Platform balance (100 kg cap)	01
13.	Gerber centrifuge unit (for milk fat testing)	01
14.	Milk analyzer (automatic)	01
13.	Crude fiber estimation unit	01
14.	Distilled water unit	01

11. Dairy & Poultry

1.	Incubator cum Hatcher	01
2.	Deep Freezer -20C	02
3.	Refrigerators	02
4.	Brooder machine	01
5.	Feeder	01
6.	Waterer	01
7.	Egg candling machine	01
8.	Debeaker	01
9.	Vaccinator	01
10.	Milking machine	As per requirements
11.	Milking bucket	As per requirement
12.	Milking can	As per requirements
13.	Animal and bird identification tools	As per requirement
14.	Chaff cutter	01
15.	Lactometer	01
16.	Castrator	01
17.	Shearer	01
18.	Electric dehorner	01
19.	Artificial vagina	01
20.	Common medication device	01
21.	Cattle crate	01

25. Agriculture Engineering + (Farm Management)

1.	Working models of MB plough, Disk plough and indigenous plough	2 sets each
2.	Working model of different harrows	Actual
3.	Seed drill	01
4.	Different types of threshing drums	As per requirement
5.	Working models of reaper and mowers	02
6.	Different types of sprayers and dusters	As per requirement
7.	Cut model of CI & SI engine	01
8.	Cut model of Tractor	01
9.	Tractor with trolley	02
	Tube well	02

10.	Generator Set	02
11.	Diesel Engine	02
12.	Rotavater	02
13.	Disk harrow	02
14.	Cultivator	02
15.	Soil Turning Plough	02
16.	Ridge maker	02
17.	Leveler	01
18.	Laser Leveler	01
19.	Marker	04
20.	Grass Mower	01
21.	Normal Seed-cum- Fertilizer Drill	01
22.	Roller	01
23.	Zero-Till-Seed drill	01
24.	Single plot Thresher with motor	02
25.	Thresher with motor	01
26.	Single Plant Thresher	03

Central Instrumentation Laboratory

1.	HPLC	01
2.	Real Time PCR	01
3.	UV- Vis Spectrophotometer	01
4.	Automatic N-analyser	01
5.	Atomic Absorption Spectrophotometer	01
6.	Water Purification System	01
7.	High Speed Refrigerated Centrifuge	01

Central Library and Information System

1.	Internet Server	01
2.	Intranet Server	01
3.	Computers for Reading Hall	20
4.	Heavy Duty Photocopiers	02
5.	Computerized Issue and Catalogue Systems	02
6.	Wi-Fi facility in college/library/hostels	As per requirement
7.	CCTV monitoring system for library	01
8.	RFID and Access Control System (Optional)	01
9.	Broadband Internet Connectivity with minimum speed of 1Gbps	