Review Article

Recent Advances in Accreditation Systems in Higher Agricultural Educational Institutes (HAEI) in India: A Review

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ABSTRACT
Accreditation is a self-realization and peer review process to improve and sustain the quality and relevance in higher educational institutes (HEI) as well as in higher agricultural educational institutes (HAEI). In India, like NAAC under UGC, the accreditation is carried out in agricultural institutes in the three-tier system like degree programmes, college and university under the Indian Council of Agricultural Research (ICAR) by the National Agricultural Education Accreditation Board (NAEAB) with its secretariat. ICAR belongs to an autonomous organization of the Department of Agricultural Research and Education (DARE), Ministry of Agriculture and Farmers Welfare, Government of India. ICAR accreditation is a voluntary process and an institution and or different programmes can be accredited by more than one accreditation body. An agricultural college/university may be recognized first as schedule 2F/12B under UGC Act, along with Technology/ Engineering subjects by the National Board of Accreditation (NBA) of AICTE and Veterinary and Animal Sciences subjects by Veterinary Council of India (VCI). Being the non-statutory status, the ICAR does not provide the status "Recognition" or "Affiliation" to any organization/ institution/ university or any course/ programme/ degree offered by such institution but needs to comply with minimum requirement and academic regulations prescribed by ICAR. Accreditation is provided to an HAEI for five years and the mid-term review committee of NAEAB reviews the status of accreditation after completion of 2.5 years as post- accreditation monitoring process. Thus, the NAEAB accreditation is a recurring process and is intended to improve the marketability of students for national and international employment.

Key-words: AICTE, Accreditation, HAEI, ICAR, NAEAB, QMS

INTRODUCTION

Accreditation is the 3rd party attestation related to an academic institute conveying the exhibition of its competence to carry out the specific predefined tasks about quality of education [1]. The quality of higher agricultural educational institutes is commonly inherent and provides value for money, conforms predefined specifications, meets customers like students and community needs, does right things first, have zero defect with the provision of academic eminence.

The institutional quality is measured by the different criteria like curricular aspects includes goal orientation, academic flexibility, curricular design and development, feedback on curriculum, curriculum update, professional and career development alongwith employability. The benchmarks for the criteria under teaching-learning and evaluation are transparency in the admission process, filling up a teaching position and experimental methodology, minimum 180 days of teaching days in an academic calendar, maximum use of ICT enabled teaching-learning, preference in PhD qualified staff recruitment with maximum time use of education technology as well as library resources. However, the research, innovation and innovation criteria include the key aspects like promotion of research, publication output, consultancy, collaboration and extension activities along with revenue generation. The infrastructure and learning resource criteria include

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physical facilities, maintenance of infrastructure, good library resource. Student support and progression criteria are student profile, student support and student facilities. However, the governance, leadership and management criteria possess effective and motivational initiatives, transparency in operation, decentralization of governance, the delegation of power, and willingness for reforms. The ultimate institutional value criteria are sensitive and changing demands for market and employability, sustainable quality and excellence [2]. Conformity Assessment Body (CAB) is a body that includes Testing including medical Laboratory, Calibration Laboratory, Proficiency Testing Provider, Certified Reference Material Producer, HEIs, HAEIs, institutes etc. The liberalization of trade and industry policies of the Government of India has created quality consciousness in domestic trade and provided greater thrust for quality. With the tune of this quality management in higher institutes, institutional accreditation has been started at the beginning of this 2000 AD and is regarded as a procedure by which a Government, non-Government or autonomous authoritative body recognizes the technical competence for specific institute/tests/measurements, based on third party assessment as per the international standards [3].

Benefits of accreditation- Recognition of an educational institute has many advantages includes the educational institutions learn its strongness, weaknesses, and opportunities through an already-informed review process, identification of planning and resource allocation done internally, commensurations on the campus. At present, funding agencies commonly look for proper data for performance funding, institutions to initiate innovative as well as modern methods of pedagogy with a new sense of direction along with identity for institutions, reliable information on quality education provided [2,3]. Nowadays, employers look for reliable information on the quality education already offered to the prospective recruits, the intra and inter-institutional interactions along with the international recognition, focus given to global market, time and money efficiency, customers confidence and satisfaction, specific Quality Management System (QMS), continual improvements, better operational control, assurance of accurate and reliable results along with the continuation of quality, cost reduction and prevent loss due to defects.

Accreditation providers in India- The Quality Council of India (QCI) are pioneer autonomous organizations of the Government of India to set up organizations in partnership with the Indian industry. Since 1992, a need perceived for the establishment of an accreditation body in the country to establish an internationally acceptable mechanism for recognition of conformity assessment results [4]. With regards to laboratories, an accreditation body under the Ministry of Science & Technology (MoST) was already functioning. A committee formed which included various interested ministries and stakeholders including industries were established to make suitable recommendations. The work was coordinated by the then Department of Industrial Policy & Promotion–DIPP, presently known as Department for Promotion of Industries and Internal Trade" (DPIIT) and the submitted recommendations were accepted to the Cabinet in 1996 [5]. Key recommendations were "the need for establishing an organization jointly by the Government and the industry" and "the need for the organization to be self-sustaining and be away from the Government". Receiving the recommendations, the Cabinet Committee decided to set up the Quality Council of India (QCI) as a non-profit autonomous society registered under Societies Registration Act XXI, 1860 to establish a genuine accreditation structure in the country and spread the quality movement in India by undertaking a National Quality Campaign. As depicted in the Governance structure above, QCI coordinates its activities through five constituent Boards briefed below [6].

NABCB- The National Accreditation Board for Certification Bodies allots accreditation to educational institutes based on the assessment of the organization's competence as per the Board's (NABCB) criteria and along with the specificities with International Standards and Guidelines. NABCB is an internationally recognized body [7] and it represents the interests of the Indian present industry at international forums through active participation and memberships like MRA/ILAC.

NABET- NABET was initiated as the National Accreditation Board for Auditors and Training (NABAT), created in response to the emerging challenges in the conformity assessment arena. Its mandate is to establish and monitor the training and auditor's registration process.

Subsequently, National Accreditation Board for Auditors and Training (NABAT) started to work as a registrar for auditors and training courses operating in conformity assessment areas such as Quality Management System (QMS), Environment Management System (EMS). Presently, it is called as National Accreditation Board for Education and Training (NABET) [8].

NABL- National Accreditation Board for Testing and Calibration of Laboratories (NABL) furnishes accreditation in other terms recognition of technical competence of a Testing, Calibration (ISO 17025), Medical Laboratory (ISO 15189), Proficiency Testing Provider (PTP/ ISO 17043) and Reference Material Producer (RMP/ ISO 17034) for a specific scope of the laboratory following the international standards [9,10].

NABH- The National Accreditation Board for Hospitals & Healthcare Providers (NABH) also allots accreditation programmes for healthcare organizations. The board is concerned to cater to the much-desired needs of hospital consumers and preparing benchmarks for the progress of healthcare organizations [11].

NBQP- National Board for Quality Promotion (NBQP) works on the mission of promoting the quality of life of the citizens of India. The Board organizes events i.e., Quality Conclaves (National/Regional/Virtual) and Quality Month Competitions [12].

Teach-R Model (NCTE with QCI)- It is a new initiative of the National Council of Teacher Education (NCTE) for especially the B.Ed. institutes.

NAAC Model (UGC)- The National Assessment and Accreditation Council (NAAC) performs assessment and accreditation of Higher Educational Institutions (HEI) in India such as colleges, universities or other recognized institutions to estimate the 'Quality Status' of the institution. NAAC evaluates the applicant institutions for its conformance to the standards of quality in terms of grades on its performance related to the educational processes and outcomes, teaching-learning processes and their effectiveness, different curriculum coverage including new syllabus, faculty, research, infrastructure, organization, governance, different learning resources including E-learning, financial and student activities [13].

NBA Model (AICTE)- The National Board of Accreditation was established by the All India Council of Technical Education (AICTE) in the year 1994 to assess the competence in engineering in dominance [14].

NAEAB Model (ICAR)- It is used in the ICAR system of accreditation. The detail of the NAEAB is discussed below.

Table 1: Different accreditation body/ Statutory Body in India [15]

S.No.	Council	Web Links
1.	All India Council of Technical Education- AICTE	http://www.aicte-india.org
2.	Medical Council of India - MCI	http://www.mciindia.org/
3.	National Council for Teacher Education-NCTE	http://www.ncte-india.org/
4.	Dental Council of India-DCI	http://www.dciindia.org/
5.	Pharmacy Council of India-PCI	http://www.pci.nic.in/
6.	Indian Nursing Council-INC	http://www.indiannursingcouncil.org/
7.	Bar Council of India-BCI	http://www.barcouncilofindia.org/
8.	Central Council of Homeopathy-CCH	http://www.cchindia.com/
9.	Central Council for Indian Medicine-CCIM	http://www.ccimindia.org/
10.	Council of Architecture-COA	http://www.coa.gov.in/
11.	Distance Education Council-DEC	http://www.ugc.ac.in/deb/

12.	Rehabilitation Council of India-RCI	http://rehabcouncil.nic.in/
13.	National Council for Rural Institutes-NCRI	http://www.ncri.in/
14.	The Veterinary Council of India-VCI	http://www.vci.nic.in/
15.	National Councils of Education research & training- NCERT	http://www.ncert.nic.in/
16.	Institute of Chartered Accountants of India-ICAI	http://www.icai.org/
17.	Institute of Cost & Works Accountants of India-ICMAI	http://icmai.in/icmai/index1.php/
18.	Institute of Company Secretaries of India-ICSI	http://www.icsi.edu/
19.	Institution of Engineers	http://www.ieindia.info/

Table 2: List of Research Councils in India providing funds for overall quality enhancement

S. No.	Council	Web Links
1.	Council of scientific and Industrial Research (CSIR)	http://www.csir.res.in/
2.	Department of Atomic energy (DAE)	http://www.dae.gov.in/
3.	Defense Research and Development Organization (DRDO)	http://www.drdo.gov.in/
4.	Indian Academy of Sciences (IAS)	http://www.ias.ac.in/
5.	Indian National Academy of Engineering (INSE)	http://www.inae.org/
6.	Indian Council for Agricultural Research (ICAR)	http://www.icar.org/
7.	Indian Council of Historical Research (ICHR)	http://www.ichrindia.org/
8.	Indian Council of Medical Research (ICMR)	http://www.icmr.nic.in/
9.	Indian Council for Philosophical Research (ICPR)	http://www.icpr.in/
10.	Indian Council for Social Sciences Research (ICSR)	http://www.icssr.org/
11.	Indian Space Research Organization (ISRO)	http://www.isro.org/
12.	Indian National Science Academy (INSA)	http://www.insaindia.org/
13.	National Academy of Sciences (NAS)	http://nasi.nic.in/

Indian Council of Agricultural Research (ICAR)- The Indian Council of Agricultural Research (ICAR) is an autonomous organisation of the Department of Agricultural Research and Education (DARE), Ministry of Agriculture and Farmers Welfare, Government of India. Previously, it was known as the Imperial Council of Agricultural Research, which was established on 16 July 1929 as a registered society under the Societies Registration Act, 1860 in pursuance of a report of the Royal Commission on Agriculture. The ICAR has its headquarters in New Delhi. The Council is the apex body for co-ordinating, guiding and managing research and education in agriculture including animal sciences and fisheries in the entire country. The ICAR boasts of having 101 numbers of ICAR institutes and 71 agricultural universities spread across the country like India. The ICAR has played a pivotal role in ushering Green Revolution and subsequent developments in agriculture in India through its research and latest technology development that has enabled the country to produce grains by 5.6 times, horticultural crops by 10.5 times, fish by 16.8 times, milk by 10.4 times and eggs by 52.9 times since 1950-51 to 2017-18, thus made a visible impact on the national food and nutritional security [16,17]. Simultaneously, it has played a major role in promoting excellence in higher education in agriculture. It is engaged in cutting edge areas of science and technology development along its scientists are internationally acknowledged in its fields.

Table 3: Different ICAR Institutes in India

ICAR Deemed to be University

S. No	Name of the Institutes	Places
1.	Indian Agricultural Research Institute	New Delhi
2.	National Dairy Research Institute	Karnal
3.	Indian Veterinary Research Institute	Izatnagar
4.	Central Institute on Fisheries Education	Mumbai

Research Institutes under ICAR

S. No	Name of the Institutes	Places
1.	Central Island Agricultural Research Institute	Port Blair
2.	Central Arid Zone Research Institute	Jodhpur
3	Central Avian Research Institute	Izatnagar
4.	Central Inland Fisheries Research Institute	Barrackpur
5	Central Institute Brackish water Aquaculture	Chennai
6.	Central Institute for Research on Buffaloes	Hissar
7.	Central Institute for Research on Goats	Makhdoom
8.	Central Institute of Agricultural Engineering	Bhopal
9.	Central Institute for Arid Horticulture	Bikaner
10.	Central Institute of Cotton Research	Nagpur
11.	Central Institute of Fisheries Technology	Cochin
12.	Central Institute of Freshwater Aquaculture	Bhubaneswar
13.	Central Institute of Research on Cotton Technology	Mumbai
14.	Central Institute of Sub Tropical Horticulture	Lucknow
15.	Central Institute of Temperate Horticulture	Srinagar
16.	Central Institute on Post-harvest Engineering and Technology	Ludhiana
17.	Central Marine Fisheries Research Institute	Kochi
18.	Central Plantation Crops Research Institute	Kasargod
19.	Central Research Institute for Jute and Allied Fibres	Barrackpur
20.	Central Potato Research Institute	Shimla
21.	Central Research Institute of Dryland Agriculture	Hyderabad
22.	National Rice Research Institute	Cuttack
23.	Central Sheep and Wool Research Institute	Avikanagar
24.	Indian Institute of Soil and Water Conservation	Dehradoon
25.	Central Soil Salinity Research Institute	Karnal
26.	Central Tobacco Research Institute	Rajahmundry
27.	Central Tuber Crops Research Institute	Trivandrum
28.	ICAR-Research Complex for Eastern Region	Patna
29.	ICAR-Research Complex for NEH Region	Barapani
30.	Central Coastal Agricultural Research Institute	Goa
31.	Indian Agricultural Statistics Research Institute	New Delhi
32.	Indian Institute of Agricultural Biotechnology	Ranchi
33.	Indian Grassland and Fodder Research Institute	Jhansi
34.	Indian Institute of Horticultural Research	Bangalore
35.	Indian Institute of Natural Resins and Gums	Ranchi

36.	Indian Institute of Pulses Research	Kanpur
37.	Indian Institute of Soil Sciences	Bhopal
38.	Indian Institute of Spices Research	Calicut
39.	Indian Institute of Vegetable Research	Varanasi
40.	Indian Institute of Sugarcane Research	Lucknow
41.	National Academy of Agricultural Research & Management	Hyderabad
42.	National Institute of Biotic Stresses Management	Raipur
43.	National Institute of Abiotic Stress Management	Malegaon
44.	National Institute of Animal Nutrition and Physiology	Bangalore
45.	National Institute of Natural Fibre Engineering and Technology	Kolkata
46.	National Institute of Veterinary Epidemiology and Disease Informatics	Bangalore
47.	Sugarcane Breeding Institute	Coimbatore
48.	Vivekananda Parvatiya KrishiAnusandhanSansthan	Almora
49.	Central Institute for Research on Cattle	Meerut
50.	National Institute of High-Security Animal Diseases	Bhopal
51.	Indian Institute of Maize Research	New Delhi
52.	Central Agroforestry Research Institute	Jhansi
53.	National Institute of Agricultural Economics and Policy Research	New Delhi
54.	Indian Institute of Wheat and Barley Research	Karnal
55.	Indian Institute of Millets Research	Hyderabad
56.	Indian Institute of Farming Systems Research	Modipuram
57.	Indian Institute of Oilseeds Research	Hyderabad
58.	Indian Institute of Oil Palm Research	Pedavegi
59.	Indian Institute of Water Management	Bhubaneswar
60.	Indian Institute of Rice Research	Hyderabad
61.	Central Institute for Women in Agriculture	Bhubaneswar
62.	Central Citrus Research Institute	Nagpur
63.	Indian Institute of Seed Research	Mau
64.	Indian Agricultural Research Institute	Hazaribagh
65.	National Institute for Plant Biotechnology	New Delhi

National Research Centres (NRC) under ICAR

S. No.	Name of NRC	Places
1.	National Research Centre for Banana	Trichi
2.	National Research Centre for Grapes	Pune
3.	National Research Centre for Litchi	Muzaffarpur
4.	National Research Centre for Pomegranate	Solapur
5.	National Research Centre on Camel	Bikaner
6.	National Research Centre on Equines	Hissar
7.	National Research Centre on Meat	Hyderabad
8.	National Research Centre on Orchids	Pakyong
9.	National Research Centre on Mithun	Nagaland
10.	National Research Centre on Pig	Guwahati
11.	National Research Centre on Seed Spices	Ajmer
12.	National Research Centre on Yak	West Kemang

| 13. | National Centre for Integrated Pest Management | New Delhi |
| 14. | Mahatma Gandhi Integrated Farming Research Institute | Motihari |

National Bureau under ICAR

S. No.	Name of National Bureau	Locations
1.	National Bureau of Plant Genetics Resources	New Delhi
2.	National Bureau of Soil Survey and Land Use Planning	Nagpur
3.	National Bureau of Agricultural Insect Resources	Bangalore
4.	National Bureau of Agriculturally Important Micro-organisms	Mau
5.	National Bureau of Animal Genetic Resources	Karnal
6.	National Bureau of Fish Genetic Resources	Lucknow

Project Directorates under ICAR

S. No.	Name of Project Directorate	Place
1.	Directorate of Groundnut Research	Junagarh
2.	Directorate of Soybean Research	Indore
3.	Directorate of Rapeseed & Mustard Research	Bharatpur
4.	Directorate of Mushroom Research	Solan
5.	Directorate on Onion and Garlic Research	Pune
6.	Directorate of Cashew Research, Puttur	Puttur
7.	Directorate of Medicinal and Aromatic Plants Research	Anand
8.	Directorate of Floricultural Research	Pune
9.	Directorate of Weed Research	Jabalpur
10.	Project Directorate on Foot & Mouth Disease	Mukteshwar
11.	Directorate of Poultry Research	Hyderabad
12.	Directorate of Knowledge Management in Agriculture (DKMA)	New Delhi
13.	Directorate of Cold Water Fisheries Research	Bhimtal

As per instruction Ministry of Education, Government of India dated 13.10.2021, for maintenance of standards in higher education and research institutes, PhD degree will be mandatory for direct recruitment to assistant professors in universities *w.e.f.* 01.07.2021.

Table 4: Different degree provided from agricultural university

UG	PG	PhD
Basic Science (Sc)	M.Sc	Subject wise
Plant Sc	M.Sc	Do
Social Sc	M.Sc	Do
Physical Sc	M.Sc	Do
Statistical Sc	M. Stat.	Do
Horticultural Sc	M.Sc	Do
Forestry Sc	M.Sc	Do
Home Sc	M.Sc	Do
Biotechnology	M. Tech	Do
Plant Protection	M.Sc	Do

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Fishery Sc	M. F. Sc.	Do
Dairy Sc	M. Tech.	Do
Food Sc	M. Tech.	Do
Agricultural Engineering	M. Tech.	Do
Veterinary Sc	M.V.Sc.	Do

History of NAEAB- Following is the major developments are given below [3]-

In the year 1952, the Education Panel of ICAR proposed the development of model curricula of B.Sc. (Ag.) & B.V.Sc and framed guidelines for the establishment of new agri-vet colleges. But in the year 1965, Standing Committee on Agricultural Education informed the Development of the first Model Act for different state agricultural university (SAU), agricultural engineering (Agri Engg), Agricultural and Veterinary subjects, Home Science subjects. Simultaneously, in the year 1974, the norms and accreditation committee reported the creation of norms towards financial assistance from ICAR for agricultural universities, different faculties in general universities and Private Colleges, who are offering degrees in Agriculture, veterinary, fishery, dairy, horticulture, home sciences after adopting the UGC pay scales by SAU, NET qualifications as mandatory and Career Advancement Schemes for promotion, development of various schemes for faculty members including competence improvement and developed a process of accreditation (recognition), which is the main criteria for financial support [17].

Accreditation Board (1996)- The ICAR developed a process of accreditation in a comprehensive, rigorous and periodically improve quality and relevance of higher agricultural education in India. Though the accreditation board started its functions early, the accreditation Board was finally restructured with effect from 9th February 2017. The Accreditation Board was modified to ensure the quality in various agricultural subjects of different agricultural universities and colleges in the country like in India. There are four regional centres of the NAEAB like (1)Indian Agricultural Research Institute (IARI), New Delhi (2) Central Research Institute for Jute and Allied Fibres (CRIJAF), Barrackpore, Kolkata (3) Central Institute for Fisheries Education (CIFE), Mumbai and (4) The Indian Institute of Horticultural Research, Bangalore are adhered to the NAEAB for accreditation of Higher Agricultural Educational Institutions (HAEIs) in India.

Table 5: Different Regional Offices of NAEAB

Zones	Different states of India	Various Regional Offices
North	Haryana, Punjab, Rajasthan, Himachal Pradesh, Jammu & Kashmir, Uttar Pradesh, Uttarakhand, Chandigarh and Delhi	IARI, New Delhi
East and North East	Bihar, West Bengal (WB), Jharkhand, Assam, Manipur, Odisha, Chhattisgarh (CG), Sikkim, Mizoram, Arunachal Pradesh, Meghalaya, Nagaland, Andaman & Nicobar Islands, Tripura	CRIJ & AF, Barrackpore, near Kolkata
West	Goa, Gujarat, Daman & Diu, Madhya Pradesh (MP), Nagar Haveli, Maharashtra	CIFE, Mumbai
South	Karnataka, Telangana, Kerala, Andhra Pradesh (AP), Tamil Nadu (TN) and Pondicherry	IIHR, Bangalore

Table 6: Accreditation reforms period in India

Years	Criteria's
1996	Establishment of Accreditation Board in ICAR
2004-2010	Accreditation was granted with general criteria without specified guidelines
2010-2014	Benchmarks as IV Dean's report, BSMA report and ICAR Model Act.

2015-2017	V Dean's report, BSMA report and ICAR Model Act and linking accreditation with development grant to the state agricultural universities (SAU), new introduction of scoring/ grading points in accreditation processes and accreditation fee.
2018	V Dean's report, BSMA report and ICAR Model Act and linking accreditation with development grant to state agricultural universities (SAU), the introduction of scoring/ grading points in the accreditation process and also with the allotment of all India seats in all accredited agricultural universities.
2020	V Dean's report, BSMA report and ICAR Model Act and linking accreditation with development grant to state agricultural universities (SAU), the introduction of scoring/ grading points in the accreditation process and also with the allotment of all India seats in all accredited agricultural universities and introduction of the online portal for accreditation of universities.
2021	ICAR will act as a professional standard-setting body (PSSB) and provide required guidelines for all HAEIs both public and private institutes. Veterinary Council of India (VCI) will act to provide the professional standard for veterinary education. Deemed universities of ICAR will be transformed into Multidisciplinary Education and Research Institute (MERU). NAEAB may be recognized as accreditor for accreditation of different agricultural programmes, College and University offering agricultural education under the National Accreditation Council (NAC) under NEP, 2020.

Accreditation fees amount for NAEAB application for accreditation- The fees commonly collected from Applicant College or faculty are entirely exhausted during accreditation process at different levels including Board Secretariat, Regional Centres [16], Peer Review Teams, Post-accreditation monitoring and review and completing other requirements of the Board in efficient, time-bound ways. The fees are of three types:

1. Rs 6.0 lakh + GST for Accreditation of the different Agricultural University plus constituent colleges plus programmes.
2. Rs 3.0 lakh + GST for accreditation of Agricultural College (s).
3. Rs 2.0 lakh + GST for accreditation of Academic Programmes irrespective of the number of programmes for accreditation.

However, expenditure for conduction of Peer Review for accreditation is to be borne by applicant colleges or universities.

The eligibility criteria for NAEAB application- HAEIs may apply for the accreditation from the NAEAB; ICAR when at least one batch has passed out from college and fulfils all other criteria laid in different provisions. The eligibility criteria of HAEIs are grouped as below:

Agricultural Universities- Different State Agricultural Universities (SAUs), State Veterinary Universities, Central Agricultural Universities (CAU), State Horticultural Universities, State Fisheries Universities and ICAR Deemed-to-be-Universities (DU) etc [3,17] may apply for ICAR accreditation.

Agricultural Colleges (also termed as Schools, Faculties, Institutes)- Autonomous, constituent and affiliated agricultural colleges (offering Degree Programmes in agriculture and allied sciences subjects) in State Agricultural Universities (SAU), State Horticultural Universities, State Veterinary Universities, State Fishery Universities, Central Agricultural Universities (CAU), ICAR Deemed Universities, Private Universities, State Universities, Central Universities, UGC Deemed Universities and others [3,18].

Academic Programmes- Different Bachelor (UG), Master (PG) and PhD. Degree Programmes in agriculture and allied science subjects as per the recommendation of Deans' Committees, Veterinary Council of India (VCI) and Broad Subject Matter Area (BSMA) Committees of ICAR for various Agricultural Universities and Colleges are eligible for accreditation through NAEAB [3,19].

Latest Format for scoring of NAEAB accreditation- Different Agricultural Universities boast having constituent Colleges depicted under ICAR Model Act (2009 revised) and are established following the broad

guidelines outlined by ICAR Model Act. Besides the Colleges and various disciplines, the Agricultural University should adopt strong networks of research centres, KVKs and other extension units set up which are required for effective agricultural education [20,21]. Different colleges, research stations, KVKs and other units should have the status as constituent colleges under university with the same authoritative control. However, none unit shall be recognized as an affiliated unit [22,23]. At present, the NAEAB follows the below mentioned.

Table 7: Criteria, key aspects and pre-determined weightage for Agricultural University M accreditation [24-26]

Criteria		Key Aspects	Pre-determined Weightage (W)	Peer Review Team providing Key Aspect Grade points (KAGP) (4/3/2/1/0)	Key Aspect based Weighted Grade Point (KAWGP)
1. Governance	1a.	Vision, Mission and Goals of applicant	40	3	120
	1b.	Statutes and Regulations	40	2	80
	1c.	University Statutory Officer Selection Process as per the Statutes of the University	50	3	150
	1d.	Decentralization of Powers of institutes	30	1	30
	1e.	Supporting Units (Maintenance Cell / SC/ ST Cell/ Health Centre)	30	4	120
	1f.	Technology Support	20	1	20
	1g.	Institutional Database + Website update	20	2	40
	1h.	Inter-Departmental Linkages	20	0	0
	1i.	Monitoring Mechanism	30	1	30
	1j.	Institute Quality Assurance Cell / PME Cell	30	2	60
	1k.	Collaboration with relevant Academic Institutions and Industry	40	3	120
Sub-total		(1a+…+1k)	W_I=350		$(KAWGP)i$ = 770
2. Academic Support	2a.	Academic Council	30		
	2b.	Innovations and Best Practices	30		
	2c.	Library/CLINS	100		
	2d.	Centre for Excellence/ Advance Studies/ Centre for Advanced Faculty Training (CAFT)etc	20		
	2e.	Incubation Centre	30		
	2f.	Technology Enabled Learning Resources	10		
	2g.	Integrated Learning System (Experiential Learning)	10		
	2h.	Academic- Industry Interface	10		
	2i.	National Ranking (ICAR/MHRD)	10		
Sub-total		(2a+…+2i)	W_{II}=250		$(KAWGP)_{II}$
3. Research Support	3a.	Research Council/REEC	20		
	3b.	Directorate of Research/DREF	20		
	3c.	Technologies Developed and their Adoption	40		

	3d.	Research Publications (based on the work carried out in University)	25	
	3e.	Citation Index/ h Index	15	
	3f.	Innovations and Best Practices	20	
	3g.	IPR Cell / ITMU	20	
	3h.	Central Instrumentation Unit	20	
	3i.	Global Support	10	
	3j.	CSR Funding	10	
Sub-total		(3a+…+3j)	W_{III}=200	(KAWGP)$_{III}$
4. Extension Support	4a.	Extension Council/REEC	20	
	4b.	Directorate of Extension Education/DREF	20	
	4c.	Extension Planning and Technological Impact	50	
	4d.	Implementation of National initiatives	25	
	4e.	Innovations and Best Practices	25	
	4f.	Consultancy/Certification /Testing	10	
Sub-total		(4a+…+4f)	W_{IV}=150	(KAWGP)$_{IV}$
5. Faculty and staff Development	5a.	Recruitment and Promotional Avenues/CAS	50	
	5b.	Participation of Faculty in National and International Seminars/Workshops/Symposia	60	
	5c.	Incentives to Excellence/Faculty Recognition	40	
	5d.	Capacity Building and Training /CBP	50	
Sub-total		(5a+…+5d)	W_V=200	(KAWGP)$_V$
6. Student Development	6a.	Scholarships / Stipend	40	
	6b.	Extra and Co-curricular Activities	40	
	6c.	Health Insurance	30	
	6d.	Sports and Cultural Facilities	50	
	6e.	Student Counseling and Placement Cell	60	
	6f.	Disabled Friendly Ability	30	
Sub-total		(6a+…+6f)	Wv_i=250	(KAWGP)$_{VI}$
7. Infra-structure	7a.	Physical Facilities Including Administrative Building and Necessary Land preferably own land	100	
	7b.	IT Infrastructure	25	
	7c.	Student and Staff Amenities	25	
Sub-total		(7a+7b+7c)	W_{vii}=150	(KAWGP)$_{VII}$
8. Financial Resource Management	8a.	Budget allocation (Salary: Contingency)	40	
	8b.	Finance Committee	20	
	8c.	Internal Resource Generation	50	
	8d.	Resource Mobilization through External Funding	50	
	8e.	Financial delegation to Deans and HoDs and others	20	
	8f.	Per cent finance utilization in last five years	20	
Sub-total		(8a+…+8f)	W_{viii}=200	(KAWGP)$_{VIII}$
9. Accomplishments	9a.	Regional, National, International Awards of the University	50	
	9b.	Accreditation from ICAR/Other Agencies and Follow up on its Recommendations	50	

9c.	Inter Institutional Standing	25	
9d.	Socio-economic Impact	25	
9e.	International Collaboration	50	
9f.	Fund Raising Through CSR	25	
9g.	Alumni Support	25	
Sub-total	(9a+…+9g)	$W_{ix}=250$	$(KAWGP)_{ix}$
Total of C		$\sum (w)_{I\text{-}ix}$ $= 2000$	$\sum (CrWGP)_{I\text{-}ix} = 6500$
CGPAU of the University= $(\sum (CrWGP)_{I\text{-}ix})/ W_{I\text{-}ix}$		6500/2000= 3.25	

The Grade point average for the agricultural university (GPAAU)- The NAEAB has made nine criteria like governance, academic support, research support, extension support, faculty and staff development, student development, infrastructure, financial resource development and accomplishment. Under each criterion, there are varieties of key aspects along with pre-determined weightage. The PRT assigns 0/1/2/3/4 points against each key aspect without any decimal. By the use of the guiding indicators and based on actual observations and assessment of the institution (on-spot visit as well as the SSR validation), the Peer Review Team judiciously assign accurate grade points to each of the key aspecton5 point scale (0, 1, 2, 3 and 4). The Key Aspect-wise Weighted Grade Point (KAWGP) is calculated by multiplying the Predetermined Weightage (W) of each Key Aspect with the corresponding Key Aspect Grade Point (KAGP). The predetermined weightage is fixed that is 2000 at present [27]. The sum of KAWGP is calculated by considering all nine criteria.

Grading as well as accreditation of already applicant University- There are four types of grades like A+, A, B and C given to any accredited university. The mean of all colleges under a university is termed as G_C in the grading system. However, the G_U will be the score of the concerned university.

The final grading of the university (G_f) will be $G_f = (G_C+G_U)/2$, When the score G_f is 2.49 or lower, it is treated that the university is not accredited.

Table 8: Different Grade's corresponding to university score

University Score (G_f)	Grade
3.50 or more	A+
3.00-3.49	A
2.75-2.99	B
2.50-2.75	C
2.49 or less	Nil/Not accredited

Post-Accreditation monitoring-The HAEI have to submit a comprehensive compliance report in a published format prescribed for Peer Review Team, NAEAB for accreditation of the institution after completion of 2.5 years from the date of accreditation. The compliance report shall be reviewed by the Sectoral Committees/ Mid-term Review Committee of NAEAB, New Delhi. Commitments made by universities through undertaking by Registrar office order. Letters to the PRT chairman or in the mid of observation of peer review may be verified along with the observations made during grant of accreditation of applicant [28-30]. Observation of the Committees shall be put up to the next meeting, NAEAB for decision.

Online portal- In order to infuse transparency and efficiency in the accreditation process, the NAEAB decided to implement an online mode process for the invitation of LoI/IEA/Statement of Compliance as well as its preliminary examination. The Indian Agricultural Statistics Research Institute (IASRI), New Delhi under the National Agricultural Higher Education Project (NAHEP) developed the portal (https://accreditation.icar.gov.in/) and it's Standard Operating Procedure along with the following three Manuals which are available on the Accreditation Portal.

i. User Manual for NAEAB, Secretariat
ii. User Manual for Regional Centres, NAEAB
iii. User Manual for Registrars of applicant Universities

Table 9: Steps in the NAEAB accreditation process

Steps	Functions
First (1)	Online submission of Letter of Intent (LoI), Institutional Eligibility for Accreditation (IEA) and Statement of Compliance (SoC) to NAEAB Secretariat
	Within 15 Days
Second (2)	Applicant HAEI is communicated by NAEAB
	Within 30 Days
Third (3)	Self Study Report (SSR) to Regional Centre of the concerned HAEI and Fees to NAEAB deposited
	Within 15 Days
Fourth (4)	Peer Review Team (PRT) formed by NAEAB
	Within 30 Days
Fifth (5)	PRT visits HAEI and submits reports to NAEAB
Sixth (6)	Accreditation to HAEI by NAEAB for five years
	After 2.5 years of date of accreditation to HAEI
Seventh (7)	Comprehensive Compliance Report by HAEI to NAEAB
Eighth (8)	Accreditation continued next 2.5 years.

Table 10: Ranking of different HAEIs as for 2019 published on 05.12.2020 by ICAR

S. No.	Name of the HAEI under ICAR
1	ICAR-National Dairy Research Institute, Karnal
2	Punjab Agricultural University, Ludhiana
3	ICAR-Indian Agricultural Research Institute, New Delhi
4	ICAR-Indian Veterinary Research Institute, Izatnagar
5	G B Pant University of Agriculture & Technology, Pantnagar
6	Chaudhary Charan Singh Haryana Agricultural University, Hisar
7	Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana
8	Tamil Nadu Agricultural University, Coimbatore
9	University of Agricultural Sciences, Dharwad
10	Professor Jayashankar Telangana State Agricultural University, Hyderabad
11	Dr. Yaswant Singh Parmar University of Horticulture & Forestry, Nauni-Solan
12	Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir, Srinagar
13	Acharya N.G. Ranga Agricultural University, Guntur
14	Ch. Sarwan Kumar Krishi Vishvavidyalaya, Palampur
15	Bidhan Chandra Krishi Viswavidyalaya, Nadia, WB
16	ICAR-Central Institute of Fisheries Education, Mumbai
17	Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut
18	University of Agricultural Sciences, Bangalore
19	Kerala Agricultural University, Thrissur
20	Orissa University of Agricultural and Technology, Bhubaneswar

21	University of Agricultural Sciences, Raichur
22	Tamil Nadu Veterinary and Animal Sciences University, Chennai
23	Indira Gandhi Krishi Vishwavidyalaya, Raipur
24	Anand Agricultural University, Anand
25	Central Agricultural University, Imphal
26	Maharana Pratap University of Agriculture and Technology, Udaipur
27	Mahatma Phule Krishi Vidyapeeth, Rahuri
28	Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar
29	Maharashtra Animal and Fishery Sciences University, Nagpur
30	Junagadh Agricultural University, Junagadh
31	Jawahralal Nehru Krishi Vishwa Vidyalaya, Jabalpur
32	Swami Keshwanand Rajasthan Agricultural University, Bikaner
33	Sri Konda Laxman Telangana State Horticultural University, Hyderabad
34	Dr. Y.S.R. Horticultural Univeristy Venkataramannagudem, West Godavari
35	University of Agricultural and Horticultural Sciences, Shivamogga
36	Dr. Rajendra Prasad Central Agricultural University, Samastipur
37	Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu
38	Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola
39	Kerala Veterinary and Animal Sciences University, Wayanad
40	University of Horticultural Science, Bagalkot
41	Vasantrao Naik Marathawada Krishi Vidyapeeth, Parbhani
42	Navsari Agricultural University, Navsari
43	Chander Shekhar Azad University of Agriculture and Technology, Kanpur
44	Rajasthan University of Veterinary & Animal Sciences, Bikaner
45	Sardar Krushinagar Dantiwada Agricultural University, Sardarkrushi Nagar
46	West Bengal University of Animal and Fishery Sciences, Kolkata
47	Nanaji Deshmukh Veterinary Science University, Jabalpur
48	Bihar Agricultural University, Bhagalpur
49	Assam Agricultural University, Jorhat
50	Rajmata VijayarajeScindia Krishi Vishwa Vidyalaya, Gwalior
51	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli
52	Agriculture University, Kota
53	Sri Karan Narendra Agriculture University, Jobner
54	Tamil Nadu Dr. J. Jayalalithaa Fisheries University, Nagapattinam
55	Uttar Banga Krishi Viswavidyalaya, Coochbehar
56	U.P. Pt. Deen Dayal Upadhyaya Pashu Chikitsa Vigyan Vishwa Vidhyalaya Evem Go Anusandhan Sansthan, Mathura
57	Kerala University of Fisheries and Ocean Studies, Panangad
58	Banda University of Agriculture and Technology, Banda
59	Chhattisgarh Kamdhenu Vishvavidyalaya, Durg
60	Birsa Agricultural University, Ranchi
61	Acharya Narendra Deva University of Agriculture and Technology, Ayodhya

62	Karnataka Veterniary, Animal and Fisheries Sciences University, Bidar
63	Agriculture University, Jodhpur
64	Sri Venkateswara Veterinary University, Tirupati
65	Uttarakhand University of Horticulture & Forestry, Bharsar
66	Bihar Animal Sciences University, Patna
67	P.V. Narsimha Rao Telangana Veterinary University, Hyderabad

Accreditation of agri-education in National Educational Policy-2020 (NEP-2020)- The aim is to increase the gross enrollment ratio in higher education from 26.30% (2018) to 50% by 2035 [31-33]. All the standalone agricultural universities will be multidisciplinary to increase agricultural productivity through better-skilled graduates and technicians, innovative research, market-based extension linked to technology and practices for direct local community development. All professional students should learn artificial intelligence, 3-D monitoring, big data analysis, genome studies, biotechnology, nanotechnology, neuroscience etc. The regulatory authority will be the Higher Education Commission in India (HECI) under the Department of Education, Govt. of India [34,35]. The first vertical of HECI will be the National Higher Education Regulatory Council (NHERC) as a common, single point regulator, second vertical National Accreditation Council (NAC) for accreditation of higher education institutes, third vertical Higher Education Grants Council (HEGC) for funding and financing and fourth vertical General Education Council for evaluation of learning outcome [36] through National Higher Education Qualification Framework (NHEQF). Simultaneously, the professional councils in agriculture like the Indian Council of Agricultural Research (ICAR), Veterinary Council of India (VCI) and proposed Fishery Council of India (FCI) will act as professional standard-setting bodies (PSSBs).

CONCLUSIONS

In higher education institutes, there are models like Baldridge model, ISO-9001, Capacity maturity model, Six Sigma, Total quality management, Kaizen model, Bennett's quality model, Servqual model and balanced scorecard where no one is complete in the accreditation system. Few organizations undergo two or more accreditation systems instead of single accreditation. In higher educational institutes, NAAC is under UGC, NBA under AICTE and Teach-R model for NCTE with the collaboration of QCI are used in different institutes. But

in agricultural institutes, till today, only the NAEAB performs accreditation to evaluate its global acceptance. Few courses under the ICAR system need NBA/AICTE accreditation (Technology/Engineering), VCI recognition (Veterinary Science) and different laboratory need NABL accreditation (ISO 17025: 2017) along with overall institute quality management system (ISO 9001:2015). Future will say whether there is a need for so many accreditations or single accreditation for higher agricultural educational institutes in India as well as the world.

CONTRIBUTION OF AUTHORS
One author is only contributed in this article.

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