THE IMPRESSION

TREATISE OF ISAE GROWTH AND IMPACT





INDIAN SOCIETY OF AGRICULTURAL ENGINEERS

...Connecting Engineers in Agriculture

THE IMPRESSION

Treatise of ISAE Growth and Impact



INDIAN SOCIETY OF AGRICULTURAL ENGINEERS G-4, A-Block, National Agricultural Science Centre Complex, Dev Prakash Shastri Marg, New Delhi - 110 012, INDIA Printed in: October 2023

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Cover page: Depicts growth of ISAE like a banyan tree, and its aerial roots indicate 36 chapters spread throughout India and memberships in all continents.

Back cover: Glimpses of Coimbatore Convention 2022

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नरेन्द्र सिंह तोमर NARENDRA SINGH TOMAR

D.O. No. 974 JAM



कृषि एवं किसान कल्याण मंत्री भारत सरकार कृषि भवन, नई दिल्ली MINISTER OF AGRICULTURE & FARMERS WELFARE GOVERNMENT OF INDIA KRISHI BHAWAN, NEW DELHI



<u>संदेश</u>

मुझे यह जानकर अत्यंत हर्ष हो रहा है कि भारतीय कृषि अभियांत्रिकी सोसाईटी (आई.एस.ए.ई.) अपने 63 वर्षों के इतिहास को समेटते हूए एक पुस्तक, "द इंप्रेशन: ट्रीटाइज़ ऑफ आई.एस.ए.ई. ग्रोथ एंड इम्पैक्ट" का प्रकाशन कर रहा है। आई.एस.ए.ई. की औपचारिक रूप से 15 अक्टूबर 1960 को आई.आई.टी. खड़गपुर में स्थापना की गई थी, तत्पश्चात् 1969 में एक प्रोफेशनल सोसायटी के रूप में पंजीकृत किया गया। विभिन्न कठिनाईयों और बाधाओं को पार करते हुए आज यह सोसाईटी भारतीय कृषि में अभियांत्रिकी एवं प्रौदयोगिकी को बढ़ावा देते हुए सफलतम सोसाईटी के रूप में कार्य कर रही है।

आई.एस.ए.ई. की प्रमुख गतिविधियों में अनुसंधान एवं विकास, कृषि इंजीनियरिंग शिक्षा और प्रशिक्षण, विस्तार, कृषि में अभियांत्रिकी एवं प्रौद्योगिकी का मानक और गुणवत्ता नियंत्रण, विनिर्माण/प्रसंस्करण और क्षेत्र अनुप्रयोग, राज्य और केंद्र सरकारों के साथ संबंध, नीति दस्तावेज तैयार करना, कृषि विषयों से संबंधित संगठनों के साथ निकट संपर्क रखना शामिल है।

किसी भी सोसाईटी की सफलता में इसके संस्थापक-सदस्यों और अन्य सदस्यों के योगदान कभी भुलाया नहीं जा सकता है। इस पुस्तक में पूर्ववर्ती सदस्यों का योगदान और बलिदान का खुबसूरती से वर्णन किया गया है। यह पुस्तक आई.एस.ए.ई. को सक्रिय रखने के लिए विभिन्न प्रारंभिक सदस्यों और अधिकारियों के उत्साह और उनके द्वारा किये गये प्रयासों को भी दर्शाता है। यह पुस्तक सोसाईटी के सदस्यों को कृषि इंजीनियरिंग पेशे को "संघर्षपूर्ण परिस्थितियों" से वर्तमान "प्रभावशाली स्थिति" तक बढ़ावा देने में उनके पूर्ववर्तियों और आई.एस.ए.ई. द्वारा किए गए महत्वपूर्ण योगदान के बारे में भी अवगत कराएगा तथा सोसाईटी की गतिविधियों को तेज करने के लिए प्रेरित करेगा।

इस पुस्तक के प्रकाशन पर मैं आई.एस.ए.ई. से जुड़े हुए सदस्यों, शिक्षण संस्थानों, उद्योग संगठनों को बधाई देता हूं जिनके सहभागिता से आई.एस.ए.ई. के अतीत की जानकारी को एक पुस्तक के रूप में दस्तावेजित करने में सफल प्रयास किया है। आने वाले वर्षों में इसे निश्चित रूप से रुचि के साथ पढ़ा जाएगा और कृषि इंजीनियरों द्वारा समय-समय पर इसका उल्लेख भी किया जाएगा। मुझे उम्मीद है, यह पुस्तक निश्चित रूप से सभी सदस्यों और कृषि अभियांत्रिकी पेशे से जुड़े कईयों के लिये प्रेरणाश्रोत साबित होगा।

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डॉ. हिमांशु पाठक DR. HIMANSHU PATHAK सचिव (डेयर) एवं महानिदेशक (आईसीएआर) Secretary (DARE) & Director General (ICAR) भारत सरकार कृषि अनुसंधान और शिक्षा विभाग एवं मारतीय कृषि अनुसंधान परिषद कृषि एवं किसान कल्याण मंत्रालय, कृषि भवन, नई दिल्ली–110 001 GOVERNMENT OF INDIA DEPARTMENT OF AGRICULTURAL RESEARCH (ICAR) MINISTRY OF AGRICULTURE AND FARMERS WELFARE Krishi Bhavan, New Delhi 110 001 Tel: 23382629 / 23386711 Fax: 91-11-23384773 E-mail: dg.icar@nic.in

Message

I am delighted to know that the Indian Society of Agricultural Engineers (ISAE) is publishing a history book entitled **"The Impression: Treatise of ISAE Growth and Impact"**.

ISAE was established in 1960. Now it is having 36 regional chapters and about 5500 professional members including institutional and corporate members spread in various countries. The objectives of the ISAE are to equip farmers by promoting programmes of their interests in the field of agricultural engineering and technology, to facilitate larger participation of members in professional activities, to organize conferences, seminars and symposia on topics of current interest, to prepare special study reports related to Agricultural Engineering and to disseminate information about Agricultural Engineering programmes and employment. The society is working well with active participation with Government and Private institutions to improve the agricultural production and profitability of the farmers. ISAE is now serving as a "think tank" and is playing important role in increasing agricultural engineering professional activities associated to R&D, education and extension; and offer its services to different line departments and private corporates. The book, "The Impression: Treatise of ISAE Growth and Impact" has attractively drawn the historical course of ISAE with interesting facts and figures. The book describes the contributions and sacrifices of founding members and others who were involved in carrying forward its business in difficult times. The book also describes the chronological development of society since its inception to the present time. The historical description of all its activities and developmental phases shall certainly inspire the coming generations of professionals to intensify the activities of the ISAE for better science and society ahead. It will also make the society's members cognizant about the noteworthy contributions made by their predecessors to excel ISAE in promoting agricultural engineering profession from "struggling stages" to current "impressive positions". The collection of historical information's of the society at one place in the form of thought-provoking story shall be inspirational to the present and future member so as to keep the society's flag always high.

I congratulate the team ISAE and particularly its present President for envisaging and documenting the past information of society in the form of a book, which shall surely motivate to generations to come for doing better and better for the Indian Agriculture. This book will certainly be useful for the professionals and particularly for agricultural engineers in years to come.

(Himanshu Pathak)

3rd October, 2023 New Delhi



FOREWORD

Free India started its journey in 1947 as a 'food deficit' country. With a rising population, this deficit was expected to increase. This raised the specter of a chronic food shortage. The country responded by planning and executing a major shift from the traditional agriculture to a modern production agriculture. Improved seeds, fertilizers, plant protection chemicals, irrigation etc. were considered the essential inputs to realize the plans for higher agricultural production. The proposal to mechanize agriculture, however, met serious opposition from few quarters. Some experts thought that the cost of machines would be beyond the paying capacity of the majority of farmers. It was suggested that the operational holdings were too small, the farmers didn't have mechanical skills, facilities for repair and maintenance were not there, production costs will increase and so will the unemployment in villages. ISAE, through its annual conventions, group meetings and publications argued for planned mechanization of Indian Agriculture. It's joint efforts with other professional organizations succeeded in ensuring that mechanization of Indian agriculture has become a success story. Think what would happen, if the millions of pumps and tube wells, tractors and tillage equipment, seed drills and planters, threshers and combines are suddenly withdrawn from the Indian agriculture.

While mechanization has enabled Indian agriculture to produce enough to meet India's need for food, feed, fibre and raw material for industries, doubts have been expressed regarding the sustainability of the present arrangements. It is felt that groundwater resources and agricultural land are being over exploited. Pumping of groundwater far exceeds the recharge. Also, we are taking more from soil than what we give back to it, which threatens land productivity. These are important issues related to sustainability of agricultural production. ISAE should take the initiative to discuss and evolve a strategy for the management and conservation of land and water resources.

The book, **"The Impression: Treatise of ISAE Growth and Impact"** has beautifully sketched the historical trajectory of ISAE in interesting heads and sub-heads with figures and facts. It beautifully and in interesting ways describes the contributions and sacrifices of founding members and members who kept its business going even in bad weathers. It will certainly inspire the coming generations to intensify the activities of the ISAE for better science and society ahead. I congratulate ISAE and particularly its present President for thinking and documenting past information in form of a book. It will be certainly read with interest and referred by agricultural engineers in the years to come.

Date: 28 September, 2023

B S Pathak PLM-225 & Former President



PREFACE

Food production of the country prior to independence was much less than the requirement. It was Prof. Mason Vaugh, an Agricultural Engineer from USA, working at Allahabad Agricultural Institute, Allahabad since 1921, started a degree programme in the Agricultural Engineering in 1942 to train manpower to handle programmes related to mechanization and modernisation of Indian Agriculture after independence. The Government of India started the second degree programme for this course in IIT Kharagpur in 1952. The Agricultural Engineering Profession and ISAE were facing teething troubles, both, in public recognition as a new profession and also in job opportunities. The Indian Society of Agricultural Engineers (ISAE), to lighten these difficulties, was formally established at IIT Kharagpur on the 15th October 1960 and registered as a society on the 12th February, 1969.

The ISAE played an important catalytic role to convince the concerned authorities in opening of new colleges of Agricultural Engineering, in State and Central Agricultural Universities, IITs and reputed private colleges including establishment of Agricultural Engineering SMD in ICAR. Many stalwarts of our profession of that time and ISAE ran a crusade and convinced the authorities of different departments to make Agricultural Engineers eligible in several departments and the same endeavour is still continuing. The efforts gave positive results. The ISAE passed through several stages from scratches to high rise buildings, scarcity to surplus and is now engaging with domestic organizations to major foreign societies for imparting its contributions in global activities through signing Agreements and MoUs. It has altogether grown from zero to about 5851 members and is now one of the largest scientific society of the country.

The ISAE now works as a "**think tank**" and is playing important catalytic role in enhancing agricultural engineering professional activities. It also plans to extend linkages and facilitates manufacturers/processors in their activities. The ISAE has taken steps in these years to have panels of experts making standards, coordinating with state governments for Establishment of directorate of Agricultural Engineering and is in process of making panels for energy audits, green energy to make carbon positive agriculture.

"The Impression: Treatise of ISAE Growth and Impact" is caligraphing the indelible mark it has put on Engineering in the Indian Agriculture. It reflects the zeal and efforts of various initial members and officials to keep the ISAE live when it actually needed. It also makes members aware about the significant contributions made by their predecessors and the ISAE in promoting our profession from "struggling circumstances" to current "impressive position". The book, we hope, has brought as true as possible story through various sources (print and verbal conversation) in form of interesting language and shall be inspirational to keep the society's flag flying high by the generations to come.

This historic book could not have been possible without members' help. We sincerely acknowledge the information provided by Prof. B. S. Pathak, Prof, Gajendra Singh, Prof. Ambrish Kumar and many more during the conversations and also in writing. We greatly appreciate and acknowledge the helps in extensive editing and rearranging the materials, particularly by Dr. Pramod Rai, BAU Ranchi, Dr. A. K. Thakur & Dr. K. Narsaiah (Agricultural Engineering SMD, ICAR) and Dr. Adlul Islam, NRM Division, ICAR. Helps in digging information through various ISAE old documents by Dr. R. N. Garg, EC members and other ISAE office staff are appreciated and acknowledged. We thank each and every one who has contributed directly or indirectly to bring this book a reality.

Date: 16 October, 2023

S. N. Jha President, ISAE N. S. L. Srivastava Former President, ISAE



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1

INTRODUCTION

The Indian agriculture, prior to independence in 1947, was being practiced in the traditional way. A little was known about the modern ways and means of practicing agriculture. About 85% of the population were living in villages and were dependent primarily on agriculture and allied sectors for their livelihood. The economy was largely (about 95%) dependent on agriculture and allied sectors. Mostly rainfed farming was being practiced. Electric power and oil engines were not available to farmers. Mostly animate (human + animal) power along with the traditional tools and technologies were being used in agricultural production, processing, value addition, storage and rural transport systems.

Problems of drudgery in farm operations, soil erosion, land drainage, lack of irrigation infrastructure and poor irrigation efficiency were major reasons of low production and productivity apart from availability of high yielding varieties and chemical fertilizers. Higher losses of agricultural produce during production and post-production, lack of proper roads and markets in rural areas for transport of produce and their sale; and development of other infrastructural facilities were needed immediate attention of the policy makers and State and Central Governments.

At the time of independence, the population of India in 1947 was about 34 crores and food grains production was about 50 million tonne, which was not sufficient to meet the requirement. Food grains had to be imported to meet the shortages. Major development programmes in the form of First Five Year Plan were started in 1951. The major emphasis during this plan was on how to attain agricultural development to achieve self-sufficiency in food production. Priority was given on land development/ reclamation and development of infrastructural facilities particularly irrigation dams, canal systems, tube wells and lift irrigation systems, fertilizer factories etc. Besides these, major R&D organizations, institutions of higher education and training and other programmes mainly focusing on improving the standards of primary sectors were started. In the beginning of the development. The then Prime Minister Pandit Jawaharlal Nehru once said that *"Everything can wait, but not the agriculture"*. Agricultural education and research also started getting momentum.

In 1950-51, when the First Five Year Plan was started, the country's population was 36.12 crores and food grains production was 50.8 million tonne. Levels of mechanization in agricultural production and processing were dismal. The availability of number of tractors, oil engines and irrigation pumps per one lakh hectare of gross cropped area were only 7, 62 and 16, respectively. Similar was the status of availability of improved post-harvest processing equipment and machinery.

Tracing origin of Agricultural Engineering education in India leads to Prof. Mason Vaugh who

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was basically an Agricultural Engineer and a missionary from USA (Fig. 1). He was already associated with missionary programmes in India since 1921 and was working at erstwhile Allahabad Agricultural Institute (AAI), Allahabad [now Sam Higginbottom University of Agriculture, Technology, and Sciences (SHUATS), Prayagraj]. He realized the problem of drudgery involved in doing agricultural operations in India and thought of modernizing farming operations by introducing engineering and technological interventions in agriculture. He started B.Sc. Agricultural Engineering degree programme at AAI in 1942 to ensure availability of trained manpower for handling these types of activities. This was the first degree programme in Agricultural Engineering in India. Initially the course was for two years' duration, and later it was increased to three years and from 1960 onwards it was made a four year degree programme.



The profession of Agricultural Engineering actually took

birth in India in 1942 and started crawling. Any society has about five stages: birth, growth, maturity, stability or rising/decline/survival, and self-improving stage. Efforts have been made to trace the *Impression* of ancestors of our profession and present in the form of an interesting reading material for present and future generations. This book intends to showcase the efforts, achievements and growth of the ISAE into different stages of its life cycle. It also foresee about the future challenges and opportunities to make ISAE a self-reliant, an Impressive and Progressive Scientific Society of India.



2

INCEPTION AND INFANCY

A few likeminded students and professors initiated agricultural engineering education and started living together, eating together, playing together and thinking about making the Indian agriculture more comfortable and remunerative. After about a year of starting the degree programme in Agricultural Engineering, under the guidance of Prof. Mason Vaugh, Agricultural Engineering Society was formed in 1943, enrolling all undergraduate students. A group photograph of students and faculty members taken at that time is shown in Fig. 2, in which Prof. Mason Vaugh is seen sitting in the first row holding a child. Since this society mostly comprised of students with only few professors, it was basically a students' Society of Agricultural Engineers. By forming the Agricultural Engineering Society at Allahabad, a seed was sown to have a Society of Agricultural Engineers at all India level, which evolved as **"Indian Society of Agricultural Engineers (ISAE)"** over a period of time.

The first batch of Agricultural Engineering students graduated in 1944. Almost during the same period Prof. Mason Vaugh started a factory for development and production of good quality agricultural tools, implement and machinery. He was the first in India to introduce steel in place of cast iron to make farm implement lighter and easier to repair. This factory was called Agricultural Development Society (ADS) and became very popular for manufacturing and supplying quality implement and



Fig. 2: First group photo of Agricultural Engineers at AAI Allahabad

tools during those days and for several decades thereafter. The newly formed Society of Agricultural Engineering remained active at college level only.

The Society was run from the Agricultural Engineering Department of Allahabad Agricultural Institute, Allahabad and used to publish a journal named '*The Agricultural Engineer*'. In one of its Editorial in 1949, the need for creation of 'Indian Society of Agricultural Engineers' with pan India

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presence was stressed. It took some time to take shape. An attempt was made in 1954 to form an Indian Society of Agricultural Engineers at all India level. Prof. Mason Vaugh, Dr C. M. Jacob, Prof. C. V. Paul, Shri S. K. Nandi, Shri S. C. Bhatnagar, Shri H. V. Bhargav, Dr M. P. Sinha, Shri J. S. Bali and many others including faculty members of the Department of Agricultural Engineering, AAI Allahabad met and took a resolution of forming a Society and prepared the draft Constitution and Bye-laws for the same. Prof. Mason Vaugh was nominated as the President and Mr S. K. Nandi as the Secretary, till the formal constitution and bye-laws were framed for the consideration of the General Body. However, the attempt did not succeed and there was no further development. The idea remained dormant till October 1960.



GROWTH AND STABILITY

Establishment of any organisation after conceptualisation and formation is as important as its growth, keeping the momentum of expansion, remaining vibrant and stable are more important than establishment. All depend on its members and executives and other office-beaerers. The ISAE took considerable time in coming out from infancy to childhood phase. This chapter deals with efforts and activities of ISAE in initial stages to its present grown level.

3.1 Formation of ISAE

As mentioned in preceding chapers, till 1960 many attempts were made for formation of the ISAE but could not succeed. A two days' conference was organized by the Indian Council of Agricultural Research (ICAR) at the Indian Institute of Technology (IIT), Kharagpur during October 15-16, 1960. On the 15th October 1960, at 8 PM, a meeting was held in the open lawn of the Department of Agricultural Engineering to consider formation of a professional Society of Agricultural Engineering), Department of Agriculture, Govt. of Maharashtra. About 40 persons consisting of participants of the above conference along with the faculty members, graduate students and Ph.D. scholars of the Agricultural Engineering Department attended this meeting. The important members who attended this meeting included Shri B. M. Laxmipati, Shri H. K. Mohanthy, Shri D. N. Khardekar, Shri S. S. Thimmappa, Shri M. L. Taneja, Shri V. S. Raju, Shri B. K. Bhattacharjee, Shri S. M. Patel, Prof. A. C. Pandya, Prof. A. A. Memon, Prof.

C. V. Paul, Shri J. S. Bali, Prof. S. V. Arya, Dr K. N. Nag, Prof. A. M. Michael, Shri R. V. Ramaiah, Shri K. S. Yadav, Shri A. A. Swamy Rao, Shri J. D. Traywick, Shri P. J. Zakariah, Prof. T. P. Ojha, Prof. N. G. Bhole, Prof. E. J. Rao, Dr M. P. Sinha, Shri H. V. Bhargav, Prof. A. A. Hakim, Shri R. F. Patil, Prof. C. P. Gupta, Shri N. S. Reddy and few others. Dr J. S. Patel, Agricultural Production Commissioner, Ministry of Agriculture, Government of India, who was attending the

Sl. No.	Name and address	Position
1.	Shri B. M. Laxmipati Chief Engineer (Agri. Engg.), Government of Tamil Nadu	President
2.	Dr J. S. Patel Agricultural Commissioner Government of India, Ministry of Agriculture, Krishi Bhawan, New Delhi	Vice President
3.	Mr. J. D. Traywick Consultant, Rockfeller Foundation, New Delhi	Secretary

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The participants of the meeting unanimously elected the office bearers, at all India level, on ad-hoc basis (Table 1). That was the golden occasion when ISAE was born again with its draft constitution, bye-laws and rules and a beginning was made in right direction. In this meeting it was agreed

Table 2: Milestones of ISAE infancy			
Sl. No.	Year	Milestone	
1.	1943	The 1 st attempt to form Society of Agricultural Engineering at AAI, Allahabad	
2.	1949	Publication of editorial emphasising need of ISAE	
3.	1954	The 1 st attempt for formation of ISAE at all India level	
4.	1960	Establishment of ISAE	
5.	1969	Registration of ISAE under Society Registration Act 1860	

that the Society must publish a research Journal named as **"Journal of Agricultural Engineering".** It was also suggested that the Society should have Regional Chapters to have pan India presence as well as to create awareness and impact of the activities of ISAE. In the meeting the question of annual, life and other categories of membership fees were also discussed. Some engineers, present in the meeting paid the membership fee then and there and got themselves enrolled as the founder member of the society. Table 2 shows milestones of ISAE infancy.

3.2 Major areas of initial activities

The major activities of ISAE were decided to have close liaison with organizations related to R&D, Agricultural Engineering education and training, extension, standards and quality control, manufacturing/processing and field application, linkage with State and Central Governments and International organizations, preparing policy documents, compilation of information related to promotion of agricultural engineering profession and activities in the field of agriculture.

The Executive Council during its meeting in 2010 also decided to have ISAE Website. Dr A. Sarangi, Principal Scientist, Water Technology Centre (WTC), Indian Agricultural Research Institute (IARI), New Delhi took the responsibility of this work and got it done. Later in 2022, an upto date ISAE website with numerous features and facilities such as payment gateway, online membership application, job portal, opinion poll portal, online journal management system etc. with almost no downtime was developed, which is now proving like dependable workhorse for running the society at full speed.

3.3 Registration of ISAE

The Society was registered under the Act XXI of 1860 (Punjab Amendment Act 1957) as extended to the Union Territory of Delhi Vide Registration No. 4027 on the 12th February 1969. The memorandum of association of registration is placed in Appendix I. The society started running as per the society act, bye-laws and rules. It is not known whether any bye-laws and rules of ISAE was framed and approved/ adopted in any General Body meeting, but several guidelines, bye-laws, and rules used to get framed and amended frequently as per the need. One of such amendment in 2008 at Nagpur convention was made to stop the election of the President and to select the same by nomination through a committee comprising



The revised, updated constitution, bye-laws and rules approved in 2022 Annual General Meeting (AGM) at Coimbatore with new mission, objectives and preamble is available in book format at ISAE website (www.isae.in). The Preamble by the President ISAE Dr. S. N. Jha in the updated constitution and byelaws states that, "we the members of the Indian Society of Agricultural Engineers (ISAE) having solemnly resolved to make the ISAE more active Professional and Transparent Society and to provide Opportunity to

Table 3: Milestones of Governance				
Sl. No.	Year	Milestones		
1.	1954	First draft Constitution, bye-laws		
2.	1960	2 nd draft Constitution, bye- laws and rules		
3.	1969	Registration of ISAE		
4.	1969-2007	Frequent changes in rules/guidelines		
5.	2008	Discontinuation of President's Election. Selection of President by nomination		
6.	2011	Review for continuation of existing awards and starting of new awards		
7.	2011	Revision and first-time printing of ISAE Constitution, Bye-laws and Rules		
8.	2021	Restoration of President's election, initiation of oath taking		
9.	2022	Approval of new Revised and Updated Constitution, Bye-laws and Rules; and first tagline of the society in the AGM in Coimbatore Convention on the 9 th November 2022 and printing of the same		

all its members for a professional Growth, sense of Belongings, Services to Nation towards food and nutrition security and provide better environment on earth to live with Comfort, Equality of status and opportunity; and to promote them among all FRATERNITY, the Dignity of individual and the Unity of the Society".

The Society during initial period was having the following Mission and Objectives.

3.4 Mission and Objectives

The mission of the Society was to promote sustainable progress in Agricultural and Rural Development through Engineering applications.

Objectives

- The objects of the Society were to promote the science and art of engineering in agricultural, food, rural and biological systems; to encourage research; to foster education; to advance the standards of engineering; to increase and extend the association of agricultural, food, rural and biological engineers among themselves and with allied scientists and technologists; to encourage the professional improvement of its members, and severally and in cooperation with other groups to broaden the usefulness of agricultural, food, rural and biological engineering.
- Establishing mutually beneficial cooperation and working relationship with related professional societies in India and abroad.



- Sponsoring or holding scientific symposia, meetings or conferences to provide forums for presenting and discussing issues on education, research, technology transfer and development related to the engineering profession in India.
- Publishing research, development and education related materials and newsletters of the Society.
- The Society may approve or adopt any report, standard, code, formula, or recommended practice, but shall forbid and oppose the use of its name, emblem, or initials to indicate official or implied approval of any commercial work or business, except to indicate conformity with its standards or recommended practices.
- The Society shall encourage professional development of members.

3.5 Revised Mission and Objectives

As per the revised updated constitution, bye-laws and rules, the revised mission and objectives are as under:

Mission

The mission of the Society is to promote sustainable development of Agricultural and Biological systems through Engineering and Technological interventions.

Objectives

The objectives of the Society are to promote the science and art of engineering and technology in agriculture, natural resources management, environment, energy, food and biological systems through various interventions.

The specific objectives are:

- i. To encourage research, foster education and advance the engineering standard in agriculture,
- ii. To provide consultancy and testing services; and develop standards for agricultural engineering sector, including present day developments,
- iii. To promote the association of agricultural engineers with scientists and technologists of other disciplines, corporates, industries, line departments; Farmers Producer Organizations (FPO's) and start-ups, etc.,
- iv. To coordinate with national and international organizations,
- v. To develop policy papers and briefs related to agricultural engineering and technology; and
- vi. To publish research journals/popular magazines/periodicals/technical bulletins/ reports/ success stories of development, introduction and adoption of new agricultural engineering technologies, industry related materials and their overall impact.
- vii. Establishment of mutually beneficial cooperation and working relationship with other professional Societies in India and abroad.
- viii. Sponsoring or holding scientific symposia, meetings, conferences, institute-industry

interfaces, and to provide forums for presenting and discussing issues on education, research, technology development and transfer related to the agriculture engineering profession in India and abroad.

- ix. The Society may adopt/endorse any technical report, standard, code, formula, and brand for betterment of business related to objectives of the Society; and shall forbid the use of its name, emblem or initial to indicate official or implied approval of any commercial work or business, except to indicate any conformity with its standards or recommended practices.
- x. The Society shall encourage professional development and sense of belonging among its member.

3.6 ISAE Headquarters

On the 15th October 1960, in the evening when the meeting regarding establishment of ISAE was held on the lawn of the Department of Agricultural Engineering, IIT Kharagpur, there were heated arguments on the clause pertaining to the location of the headquarter of the Society. Delhi, Allahabad and Kharagpur was emerging as possible places for locating the headquarter. The meeting almost came to breaking point. At this moment, Prof. A.C. Pandya suggested, "the clause regarding location of the headquarter may be kept pending and other clauses be considered". This approach was readily accepted by all. In the initial stage, for about 3 years the society office was managed from the Department of Agricultural Engineering, IIT Kharagpur.

Later it was shifted to Delhi and located at Rockfeller Foundation at 17 Kautilya Marg, Chanakyapuri where the then Secretary of ISAE, Mr J. D. Traywick was working as a Consultant. Mr Trywick returned to USA in 1965 and Shri M. L. Taneja, who was treasurer became the Secretary and Shri J. S. Bali took charge of Treasurer. The office of ISAE was shifted from Chanakyapuri to Shastri Bhawan and Shri Taneja was operating from his office Room No.104, B Wing, Shastri Bhawan, New Delhi. After sometime Shri Taneja went on FAO assignment and Shri J. S. Bali took over as the Secretary of the ISAE. Shri Bali started functioning primarily from his office in Krishi Bhawan and also from his residence R-551, New Rajendra Nagar, New Delhi and worked for about 10 years. Shri Manohar Singh, a draftsman under Shri Bali, agreed to help him on part time basis in the routine work of the Society at a nominal monthly remuneration.

With the expansion of the activities of the ISAE, need was felt to have its own office. The financial constraints, however, did not allow renting a bigger office space in Delhi. With the courtesy of National Agro-Industries Association, the ISAE office was shifted to their premises located at National Agro House, 2 Tansen Marg, New Delhi, in 1974 and remained there till February 1978. The office was again shifted for about 8 months, from March 1978 to November 1978 to 806 Rohit House, Tolstoy Marg, New Delhi. With the help and cooperation of Dr A. M. Michael, the then Project Director, Water Technology Centre, IARI New Delhi, the ISAE office was shifted to WTC, IARI Campus, New Delhi, in November 1978 and functioned smoothly till November 1981. The ISAE acquired its own premises in Satya Mansion, Ranjit Nagar, New Delhi and moved there in November 1981.

The preceding paragraphs give feeling that for about 21 years the ISAE did not have a proper office of its own and was shuttling from one place to the other. This affected day-to-day working, as well as maintenance of proper records and library adversely.

ISAE ~~~~

3.6.1 ISAE's Office in Satya Mansion, Ranjit Nagar

The 13th convention of ISAE was held at Allahabad Agricultural Institute during December 31, 1974 to January 2, 1975. In the General Body meeting held on the 31st December 1974 at AAI Allahabad, it was decided to have a permanent HQ of ISAE in Delhi, but there was dismal progress. Again importance and necessity of permanent HQ of ISAE was emphasized in Kharagpur Convention held during December 18-20, 1978 and New Delhi Convention held during February 10-12, 1980.

In pursuance of above decisions, a Building Committee was constituted in 1979 comprising of members of the Society, namely Dr B. S. Pathak as Chairman and Dr A. M. Michael, Prof. J. S. Bali and Dr S. R. Verma as members. An intensive fund raising programme was launched. A new category of membership namely Corporate Member was started to get more funds as membership fee. These efforts supported by contributions from individuals and industries resulted into collections of over Rs 2.00 lakh by March 1980. M/s Escorts Tractors gave interest free loan of Rs 20,000/- for the purchase of building for the ISAE HQ. Keeping in view the funds available and very high cost of land and buildings in Delhi, the Building Committee intensified its efforts to locate a suitable site for the ISAE office. Although the intention was to finalise a place on the main road and in the vicinity of IARI but

due to the enormous cost of buildings/flats in that area and limited funds availabile with the society for this purpose, it was not possible to get proper space near to IARI. The efforts continued and the Building Committee finally succeeded in purchasing two adjoining flats No. 305 and 306 of about 93 sq m (1,000 Sq. ft) area in Satya Mansion (3rd floor), in Ranjit Nagar commercial complex, in 1981, which is about 3 km from IARI main entrance. The flat consisted of 2 rooms, one of smaller size and other of bigger size. The bigger size room had two portions; one was being utilized as Secretary's office and the other portion as Committee Room for holding Executive Council and other Meetings. The smaller room was utilized for office



Fig. 3: ISAE Headquarter at Satya Mansion, Ranjit Nagar, New Delhi

staff and storage of publications etc. The Society office was shifted from WTC, IARI to its own flat in November 1981 (Fig. 3).

3.6.2 ISAE HQ in NASC Complex, D. P. S. Marg, New Delhi

The ICAR built a huge infrastructure named National Agricultural Science Centre (NASC) Complex, in Pusa Campus area, located on main Dev Prakash Shastri Marg, New Delhi-110 012. This building has now new two auditoriums, one of about 400 seating capacity and other as Convention Centre with about 1200 seating capacity (which can be divided into 3 halls of 400 capacity each by sliding and foldable



partitions); an Agricultural Museum block, a block for offices of National Academy of Agricultural Sciences, a big air conditioned guest house and an Offices Block of which one portion is for offices of International organizations related to agriculture and other portion is for offices of selected Professional Associations/ National Societies related to Agriculture. There is a bank in the campus and a Post Office nearby. The location to have ISAE HQ in this Complex was most appropriate and considered like a dream, if we could succeed to get office space allotted by ICAR for ISAE HQ. In 2003, due to vigorous efforts of the then ISAE President Dr N. S. L. Srivastava, the ICAR allotted a small portion in the Office/

Society Block for ISAE having 4 rooms, 2 halls and a pantry room, to be shared between ISAE and Indian Society of Soil Conservation (ISSC). ISAE got 2 rooms, a hall and pantry room. All formalities including signing of lease/rent agreement were completed quickly and ISAE, HQ was shifted in this building from Satya Mansion, Ranjit Nagar in 2003 and since then it is functioning there smoothly. ISAE was the first professional society to get the space allotted and possession taken. **The current address of the ISAE, HQ, is G-4, A Block (GF), National Societies Block, National Agricultural**



Fig. 4: Current ISAE Headquarter at NASC Complex, New Delhi

Science Centre (NASC) Complex, Dev Prakash Shastri Marg, New Delhi-110012 (Fig. 4).

The office space/flat purchased in Satya Mansion, Ranjit Nagar, New Delhi was later renovated and given on rent. This has become a regular source of income for the society. The location of society HQ during various periods is shown in Table 4.

Table 4: Chronology of Location of ISAE Head Quarters				
Sl. No.	Period/Years	Location of HQ		
1.	1960 - 1963	IIT, Kharagpur		
2.	1963 – 1965	17 Kautilya Marg, Chanakyapuri, New Delhi & Room No.104, B Wing, Shastri Bhawan, New Delhi		
3.	1965 – 1974	Krishi Bhawan & R-551, Rajendra Nagar New Delhi		
4.	1974 – Feb 1978	National Agro-house, 2, Tansen Marg, New Delhi		
5.	Mar 1978 – Nov 1978	806 Rohit Marg, Tolstoy Marg, New Delhi		
6.	Nov 1978 – Nov 1981	WTC, IARI, New Delhi		
7.	1981-2003	Flat no. 305-306, Satya Mansion, Ranjit Nagar, New Delhi		
8.	2003-till date	G-4, A Block (GF), National Society Block, NASC Complex, D.P.S. Marg, New Delhi 110 012		



3.7 ISAE Constitution

An attempt was made in 1954, at the Department of Agricultural Engineering, Allahabad Agricultural Institute (AAI), to form a Society of Agricultural Engineers at all India level under the Presidency of Prof. Mason Vaugh and passed a resolution of preparing the Constitution and Bye-laws of the society. However, this attempt did not make much progress. Another resolution was passed when the ISAE was formally established on the 15th October, 1960 in a meeting held at IIT Kharagpur. Draft Constitution and bye-laws prepared by Prof. A. C. Pandya, Professor of Agricultural Engineering Department, IIT, Kharagpur and Prof. A. A. Memon, Professor of Agricultural Engineering, College of Agriculture, Pune were considered. The draft in general, except location of the Headquarter of ISAE, was accepted by members present and decision about the ISAE headquarters was deferred for consideration at a later stage. Till that time, it was decided to have the headquarter of the ISAE in the Department of Agricultural Engineering at IIT Kharagpur. The ISAE functioned with that draft constitution till 2010 with minor modifications, from time to time, and one major one in 2010 Annual General Body Meeting (AGBM).

3.7.1 Updating draft Constitution, Bye-laws and Rules in 2011

When the Society was started in 1960, it had prepared a very brief draft Constitution and bye-laws. In 2010 the new ISAE Executive decided to revise, elaborate and update that old draft Constitution. Prof. Gajendra Singh the then President ISAE took the responsibility of revising the Constitution. Dr Radhey Lal Kushwaha, who had served as President of the Canadian Society of Agricultural Engineers and actively involved with the American Society of Agricultural & Biological Engineers (ASABE), provided the required information for the draft. With feedback from many members and after five drafts, a final document was prepared and printed in the form of a booklet.

3.7.2 Important decisions of GBM during the 45th and the 46th ISAE Conventions

The proceedings of the General Body meeting held during the 45th ISAE Convention at Nagpur in 2011 says that in future the President ISAE will not be elected but selected. A Committee of Past-Presidents, appointed by the Executive Committee, will invite nominations and select the most suitable candidate as President and should be approved by the Executive Council. It was also approved that in future the tenure of the Executive Committee will be of three years instead of two years as was being followed earlier. The same GB also approved that Society shall have Patron to further its cause. The Patron should be an individual with a record of meritorious services to any public cause and shall be enrolled only by invitation of the Council with his/her consent. A Patron may be appointed by virtue of the office he/she holds and will cease to be Patron once he/she relinquishes the office.

Later, members started feeling that the discontinuation of election of the President and having an individual as Patron by virtue of his/her position are deterimental for growth of the Society and also denying of equal opportunity to its members.

The Annual General Body Meeting (AGBM) held at Pantnagar in 2012 during the 46th Annual Convention took important decisions such as soft copies of Journal of Agricultural Engineering (JAE) and Agricultural Engineering Today (AET) are to be emailed as attached PDF files to all members. Hard

copies to be mailed to libraries and corporate members only. In addition AGBM also decided that:

- * Continuation of all the awards including fellows to be decided by a Committees;
- * Four Best Paper awards for papers published in JAE should be given, one in each discipline of Farm Machinery & Power (FMP), Post-harvest Engineering & Technology (PHET), Soil & Water Engineering (SWE), and Energy in Agriculture (EA);

ISAE

- * Membership fee to be the same for all: Indians, NRIs and foreigners;
- * A Business Manager should be hired to manage the ISAE Office in New Delhi;
- * Efforts to be made to have Agricultural Engineering Directorate in each state;
- * Establishing a position of Commissioner of Agricultural Engineering in the Ministry of Agriculture, Government of India; and

The Executive Council in its meeting held during the 49th Annual Convention of ISAE at PAU, Ludhiana in February 2015 nominated Prof. Gajendra Singh as the Patron of the society.

Several changes were forced into ISAE. Many members were not happy with them and with discontinuation of election of the President.

3.7.3 Revision and updating ISAE Constitution in 2022

Several important sporadic decisions, guidelines and rules were being made through Annual GBM, but these scattered important decisions were hardly being included in the bye-laws and rules. There was difficulty in finding evidences and approvals of such changes. There was no record of approval of ISAE full constitution, bye-laws, and rules at any time in sixty-two years of the society. After election of Dr. S. N. Jha as President of ISAE in 2021, an idea of committee of senior ISAE members was floated by him to relook the existing constitution, bye-laws and rules with a view to incorporate changes made with the approval of GB or Executive Council during past 11-12 years and revise, update and elaborate the ISAE Constitution, Bye-laws and Rules and get approval of complete Constitution, Bye-laws and Rules in AGM, which hitherto was not available on record. In January 2021, with the approval of the Executive Committee, the President ISAE constituted a Committee of ten Senior ISAE members for drafting/ revising the Constitution, Bye-laws and Rules with Dr. V. M. Mayande (Former President) as Chairman and Dr. N. C. Patel (Former President), Dr N. S. L. Srivastava (Former President), Dr. D. C. Joshi (VC, AU Kota), Dr. B. C. Baboo (Industry representative), Er. Rajeev Chaudhary (Director Agril. Engg., Govt of M.P.), Dr. Manoranjan Kumar (Principal Scientist, CRIDA, Hyderabad), Prof. Deben Baruah (HOD Energy, Tejpur Central University), Dr. Dipankar De (Editor-in-Chief, JAE) as Members and Dr. D. M. Kadam (Vice-President, Activity Council) as Member Secretary. There were 10 terms of references for the committee. Notification of the Committee is appended as Appendix II.

The Committee had 7 virtual meetings and discussed the existing Constitution, its Bye-laws and Rules approved in 2011 point wise and almost re-wrote each clause, inserted many new clauses in byelaws and rules, financial procedures etc.. The committee also elaborated many points including duties and responsibilities of office bearers and members of the society and Regional Chapters. Following ten major changes are included in the revised and updated constitution bye-laws and rules.

* Foreword and preamble were added this time. The preamble of the new constitution, bye-laws



and rules indicates the ethos of the Society in forms of equality, togetherness, prosperity etc. of all members of the society.

- * Instead of having Patron(s) for the ISAE, the Society may appoint an Advisory Committee nominated by the President, approved by the Executive Committee and endorsed by the ISAE council to derive benefits from the experiences of senior members of different sectors for furthering its cause. The term of the Advisory Committee shall be co-terminous with the tenure of the current Executive Committee.
- * The Election for different positions will be conducted in electronic mode and its procedures have been elaborately defined.
- * Election for any post by the same person is limited maximum to two terms.
- * Members awarded as fellow of the Society have to make one-time donation of Rs 5000/- to the Society as a token of appreciation.
- * Financial management rules powers, etc. are defined.
- * Type of awards and their numbers along with procedure for instituting any new awards have been enumerated.
- * Amendment and revision of constitution, bye-laws and rules are made more stringent.
- * Responsibilities along with privileges of all members, officials and awardees have been enumerated.
- * Activities for augmenting funds such as advertisements, endorsing products, investing its funds in instruments other than fixed deposit in bank etc. have been inserted in bye-laws and rules. An ISAE tagline and new logo have been added in the Memorandum of Association.

The Revised and Updated Constitution, Bye-laws and Rules with gist in Preamble were put up in the General Body Meeting of the Society held on the 9th November 2022 during the 56th ISAE Convention at TNAU, Coimbatore, for discussion and approval. After elaborate discussion, the AGBM approved the Revised and Updated Constitution, Bye-laws and Rules which have been printed in a book form (available at <u>www.isae.in</u>) and the same is presently in force.

The mission, purpose and objectives of the society were also revised to promote and encourage the development of the profession of Agricultural Engineering covering all its branches specilizations equally and elaborately.

Tougher provisions for amendments and modification in this constitution, bye-laws and rules were also made so that the changes will be approved only after thorough deliberation. Memorandum of Associations with inserting ISAE tagline (Appendix I), mandatory oath taking by the elected members and revised organogram (Appendix III) were also included in it and submitted to the Society Registration Office in New Delhi in April 2023.

3.8 *Election and Governance*

The elections for different positions of the Executive Committee and Council were carried out as per the draft constitution bye-laws and rules and approved practices being followed by the Society till 2010.

Prof. Gajendra Singh was selected as President by consensus of some senior members of ISAE without an election in 2010. And election was conducted for remaining posts only.

In 2018, Dr. S. N. Jha raised the issue of discontinuation of election of the President in the Annual General Body Meeting during AAU, Anand Convention and rules were then again changed for election

of the President. A committee was formed to recommend the list of eligibility criteria of the candidate for contesting election for the post of the President; and majority of them were included in the revised constitution, bye-laws and rules.

3.8.1 On-line Election of Office Bearers

The election of President along with other positions was thought to be conducted with changed eligibility criteria in 2021 after about ten years. It was decided to have online election using third party election portal recognized by the Government of India to avoid any biasness. The first time online ISAE election using



Fig. 5: Transfer of Charge and Oath taking ceremony of new Executive Council on the 7th December 2021

third party election portal under the convenorship of Dr Pitam Chandra was held successfully. Probably it was the first time that three candidates contested the election for the post of the President. Dr S. N. Jha was elected as President and the newly elected Executive Council took charge on the 7th December 2021. A Photograph of oath taking ceremony is presented in Fig. 5.

The new Executive Council started working very enthusiastically, keeping members informed about the new activities and achievements. The timeliness and quality of publications of ISAE Journal [now renamed as Journal of Agricultural Engineering (India)], Agricultural Engineering Today (AET) and Electronic News Letters of ISAE were improved drastically. Members are getting regular information about the activities and developments of ISAE through WhatsApp messages and now they have become so accustomed to it that they eagerly wait for new messages.

The list of executive committee members of ISAE and photographs of Presidents are given in Appendix IV and V, respectively.

3.9 Membership Growth

During 1960-63, the growth of the society was dismal. Efforts were made to enrol as many members of the society as could be possible so that the society can have sizeable strength to start different activities. Professors and senior engineers in the Department of Agricultural Engineering in different colleges and Government Departments enhanced their efforts to enrol more members.

In 1963, Dr J. S. Patel, the then Agricultural Production Commissioner, Department of Agriculture, Ministry of Agriculture and Cooperation, Government of India became the President of ISAE and



continued up to 1974. He was not an engineer but was having good administrative and managerial experience with interest in Agricultural Engineering. Earlier he was Director of Agriculture, Govt. of Bihar. Students and engineers were encouraged and motivated by him in interviews and meetings to get enrolled as members of ISAE. The society made rapid growth and established firm roots during this period. The establishment of Agricultural Universities from 1962 onwards with a college of Agricultural Engineering in most universities was an important factor in enhancing ISAE activities and membership. In 1964 allotment of membership number was started showing membership category was also created. Most of the major agricultural machinery importers and manufacturers became members of ISAE and started giving their support. Manpower and funds of the Society grew rapidly during this period.

With the establishment of more colleges of Agricultural Engineering in different states in subsequent years, more number of students were coming out as professional engineers. The number of Agricultural Engineering faculty also increased with opening of more new colleges. They were motivated to become members and the strength of the ISAE started further increasing.

With increasing numbers of tractor and farm machinery manufacturers and their dealers, the number of engineers working in those organisations also increased. They were encouraged to become ISAE members. This helped in getting industry people enrolled as member and their participation in ISAE activities also increased. Shri S. P. Nanda, Proprietor of M/s Escorts Tractors and Machinery became a non-official but active patron of the Society. Mr. A. S. Deepak of International Tractors became the Secretary of ISAE and started taking keen interest in ISAE activities. Many other officials from tractor industry like Eicher, Massey Ferguson, Voltas, Mahindra, Swaraj and agricultural implement manufacturers also became the member of ISAE and started taking interest in its activities.

The membership of ISAE till 1970 was only about 100 but slowly it gained momentum and by 2000 grew to more than 1000 Life Members. Several membership drives by executive members were run from time to time. Corporate membership was also started and by 2020, life members grew to about

4,000 on record and corporate members grew to 137. But student members were almost nil. By the year 2022, there were 46 government and about 224 private colleges offering degree programmes in Agricultural Engineering. ISAE has to make more concerted efforts to develop linkages with these private colleges so that the activities and reach of ISAE expand many folds. In 2021-22 a massive membership drive was launched and altogether total membership grew to 5851 including student members of 1140 (Fig. 6). The growth of life membership is shown in Fig. 6a. The graph shows



ISAE-connecting Engineers in Agriculture



3.10 Financial Growth

The major sources of income of ISAE were membership fee and savings sponsorships during annual from conventions. Income, however, used to be hardly more than expenditure. Savings made in earlier years were being spent for publications of the Journal of Agricultural Engineering and Agricultural Engineering Today, dispatching them to members and for some other small activities. Till 2003, society could not exceed its accumulated earnings to even Rs. Five lakh (Fig. 7). The major steps for augmentation of funds were moving the HQ from Ranjit Nagar to NASC complex in 2003 and putting that flat on rent, keeping minimal contractual staff at headquarter, getting better sponsorships for annual



ISAE

and Expenditure approx.) of ISAE

conventions and saving on rents. These steps helped in growing the income from less than Rs. Five lakh in 2003 to about Rs. 22 lakh in 2023 and raising the Fixed deposit to about two crore in September 2023. The contribution of Dr. Amar Singh and Dr. Anil Kumar as President and Secretary General, respectively in this period was note worthy. It gained further momentum after taking various policy decisions such as advertisement in AET, E-newsletter and conducting more programmes with sponsorships during 2022-23. The financial growth of ISAE given in Fig. 7 indicates the gap between commulative expenditure and income is increasing and thus saving of revenues is increasing day-by-day. Still regular income of the society is not enough to expand its activities which could be sustainable and self-reliant. Further avenues such as special drive for increasing membership in general, and corporate and Institutional membership in particular, increasing sale of journals, products endorsement fee, developing standards and taking consulting jobs under the umbrella of ISAE were initiated in 2023. All these endeavours may pave the

The Impression: Treatise of ISAE Growth and Impact



way to make society self-sustaining and a creditable scientific society of the country.

3.11 Activities of ISAE

The major activities of ISAE are discussed under different heads such as chapters, publications, conferences and symposiums, awards, catalytic role in opening of two national institutes (CIAE and CIPHET) and creating the Division of Agricultural Engineering at ICAR HQ, collaboration with international societies, opening of new agricultural engineering colleges, job opportunities for our engineers and technicians, establishment of Directorates of Agricultural Engineering in states, and motivating agricultural machinery manufacturers and agro and food processing industries to have their associations at State and National level so that their voices are heard properly and seriously.

Government realized the importance of agricultural engineering input in agriculture and started giving more importance to activities related to agricultural mechanization, post-harvest technology, value addition and agro-processing, and energy in agriculture. Several programmes in these areas were started and more funds were/are being also allotted by State and Central Governments for such developmental activities. This increased the demand of agricultural engineers in these areas. Corporate houses, big manufacturers and many small scale industries and enterprises have also started investing in programmes related to agricultural mechanization, agro-processing and value addition and energy in agriculture. With the opening of new Central and State Agricultural Universities and Colleges of Agricultural Engineering and Technology in government and private sectors, more and more number of undergraduates, graduates and Ph.D. professionals in Agricultural Engineering are now available every year. The society, therefore, has now expanded its activities in new areas, such as standard development, consultancy, product endorsement and advertisement, trainings and individual liaising. As a result, the gowth and image of the Agricultural Engineering profession as well as that of ISAE in recent years have improved considerably.

3.11.1 ISAE Chapters

In order to expand the activities of the ISAE in different regions, ISAE Chapters were established. During 1960-74, 10 Chapters at AAI Allahabad, IIT Kharagpur, OUAT Bhubaneshwar, MPUAT Udaipur, GBPUAT Pantnagar, PAU Ludhiana, IARI New Delhi, JNKVV Jabalpur, MPKV Rahuri and TNAU Coimbatore were established. Number of chapters increased to 15 by 1985. Many of these chapters organized special seminars/ meetings/ mini conventions in their areas. Interaction with industries increased and they started taking more interest in ISAE activities. This increased membership and activities of ISAE. Chapters became quite active and their number also increased during 1986-2000.

During 2000-2021 although the number of chapters increased to 36, but majority of them were either inactive or in hibernation. During 2022, special efforts were made and all chapters were awakened and made active. Election of the chapters were conducted. All chapters were encouraged to open bank account and ISAE headquarter has transferred Rs. 5000/- as seed money to many chapters to conduct local activities. Quarterly meetings of the chapters are being organized. Best chapter award, based on their activities and performances, was re-introduced in 2023. List of ISAE Chapters with their addresses

and Email ID is given in Appendix VI and their locations are depicted in Fig. 8.

3.11.2 Publications

The Society organized its first Convention at IIT Kharagpur in October 1960. In this convention, matters related to enrolment of more members, collecting more funds and starting publication of "Journal of Agricultural Engineering (JAE)" was discussed. Prof. S. V. Arya was nominated as the Chief Editor of the JAE. He was requested to start the work of publication of the journal. The first issue of the "Journal of Agricultural Engineering (JAE)" was brought out in 1964. There were many ups and downs in regular and timely publication of JAE but its publication was continued. During the tenure of Dr B. S. Pathak as President ISAE, the content and quality of publication of the Journal of Agricultural Engineering improved substantially with timeliness in publication.

During the tenure of Prof. M. M. Mehta as President, **Agricultural Engineering Directory**, popularly known as **Orange Book**, was published



Fig. 8: Location map of ISAE chapters (Prepared by Dr. K.D. Gharde LM No.9984 ISAE Akola)

in 1983. This was revised, updated and published second time by Bhopal Chapter of ISAE in 1998.

ISAF

To meet the continuous demand of the industries for data on farm mechanization, a regular Newsletter was started by Er P. N. Pangotra in 1974 which was later upgraded by Prof. M. M. Mehta in 1976 in the form of a quarterly Journal, named **"Agricultural Engineering Today (AET)"**. This was in addition to the Society's quarterly research journal JAE. The AET was publishing information about production of tractors, power tillers and other agricultural machinery; new products developed by the R&D institutions and industry, new initiatives being taken by the State and Central Governments related to agricultural mechanization, soil and water engineering, post-harvest technology and developmental activities, renewable sources of energy in agriculture sectors. It also contained information about the activities and programmes of Directorates/ Departments of Agricultural Engineering of States and many other information of general interest to agricultural engineers. Besides these, the journal also had papers about new developments, success stories etc. The AET became very popular amongst all the agricultural engineers, manufacturers and extension workers. There was a constant demand from the Companies for data and estimates of future demand of tractors and farm machinery. Shri B. K. S. Jain wrote a very useful ISAE Bulletin on tractor demand, which helped manufacturers to plan their products and production more realistically. This publication projected the ISAE as a serious scientific



organization. Parliament Questions and their answers given by the Ministries were also incorporated as a regular feature in the AET. Thus AET became popular and was read by both academicians and members from industries.

Sometime during 2011–12, ISAE also started quarterly e-newsletter compiled and edited by Dr R. T. Patil covering various aspects of current activities of ISAE and its members. It was published for few years and stopped after change in the executive council. In due course of time, AET became another scientific journal with mostly covering research papers of preliminary nature. Its timely publication after 2003 was also hampered and became irregular. In 2022, with the change of Editor-in-chief and Editorial Board, the AET has been again reoriented as a popular magazine with more emphasis on topics of interest to industry and farmers'/entrepreneurs. It is published timely now in both online and offline mode. Its content and quality of publication is meeting the level of the International standard. From December 2022 onwards, AET's Hindi version as Adhunik Krishi Abhiyantriki (आधुनिक कृषि अभियांत्रिकों) is also being published in online mode and is circulated to all concerned including farmers and entrepreneurs. It has also been made open access for increasing the readership and attracting better articles and advertisements for generating more revenue and making ISAE financially self-sustainable. ISAE has also planned to publish AET in other Indian regional languages, based on assessment of readers' demand. Number of educational and research institutes subscribing for the ISAE journals have also increased substantially from January 2022. Publication of on line bi-monthly e-newsletter has again been started with new features and articles, besides some advertisements etc. and is being circulated to all concerned readers, including officials of line departments. To register this publication, application for ISSN has been submitted in 2023.

The ISAE also started printing ISAE wall calendar on different themes of Agricultural Engineering from 2022. These calendars are being distributed in selected Government and private offices related to agriculture and to the members of the society for increasing the visibility of the ISAE. Now people are eagerly waiting for new years' ISAE wall calendar.

In the age of citations, JAE was still struggling to keep pace with other International journals. In 2022 a completely new ISAE interactive/dynamic website was developed and online journal management system portal on this website was launched on the 26th January 2023.

Even after about 60 years of its publication, the JAE was not being indexed by the most credible agencies such as SCOPUS, Web of Science, SJIF, RJIF etc. Thoughts were given several time, but no attempt was made to apply for a single time. The major reason was that the wishful thoughts were not getting implemented, probably because of lack of devotion and knowledge, and understanding of the importance of formal indexing along with lack of uniqueness in name of the journal at global level. Italian Journal of Agricultural Engineering was also being abbreviated as JAE and clashing with the name JAE of our ISAE. After lot of debate and consultations, the name of our JAE was changed to Journal of Agricultural Engineering (India) (JAEI) in 2022. An application for Scientific Journal Impact Factor (SJIF), an international platform, was made and first score for 2019, 2020, 2021, 2022 and 2023 have been obtained as 5.931, 5.98, 6.268, 6.012 and 7.442, respectively, which are considered to be quite high. Efforts were put to enroll with various International indexing agencies and ISAE applied for indexing in RJIF, Web of Science, SCOPUS and membership of COPE. Crossref similarity check



(powered by iThenticate) has been implemented to check plagiarism of submitted manuscripts. JAEI is getting attraction now and it is being abstracted & indexed in AGRICOLA, CAB Direct, Google Scholar, j-Gate, PubAg, SJIF, etc. Application has been made for indexing JAEI in Engineering Village databases, namely, EI-Compendex and GEOBASE. EBSCO has also signed MoU and has started indexing our JAEI. It will increase citation index of JAEI many folds, besides 20% of royalty of papers purchased through its source (EBSCOHOST). This will also help in improving the financial health of our society. The JAEI has been reviewed by Content Selection and Advisory Board (CSAB) of Scopus, and has been suggested to improve citations in Scopus indexed Journal for further consideration.

Further steps such as special theme-based issues comprising authors from abroad are in pipeline and efforts are being put to improve citation scores. Till now, 63 volumes of JAE/JAEI, each comprising of four issues, have been published. Now journal is having both paper print and on-line version with different ISSN numbers. The journal publication milestones are given in Table 5.

Table 5: Publication Milestones				
Sl. No.	Year	Milestones		
1.	1960	JAE editorial board formation in 1st ISAE Convention		
2.	1964	1 st issue of JAE		
3.	1976	1 st issue of AET		
4.	2011	Publication of quarterly E-newsletter		
5.	2022	 22 JAE renamed as JAEI. Previous and Restructuring AET as popular magazine and bringing out its Hindi Version as आधुनिक कृषि अभियांत्रिकी Restart of Bi-monthly E-newsletter Publication of ISAE-wall calendar 		
6.	2023	JAEI got indexing SJIF, EBSCO and several other agencies Applied for COPE, web of Science, Scopus and RJIF etc.		

3.11.3 Conferences and Symposiums

Annual Conventions of ISAE were held regularly at different locations and were attended by large number of ISAE members, Govt. officers, manufacturers, and policy makers. In early days of ISAE, response was not very good for annual conventions and other conferences. It was usual practice for Ministry of Agriculture to send advice to State Governments to depute their officials for participation in the ISAE Annual Conventions/conferences. It was considered to be in the public interest. Later, when the Society became popular, there was no need of such advices. Important dignitaries like Governor, Chief Minister, Agriculture Minister from Centre and States, Vice Chancellors, Eminent Scientists and other high officials and policy makers from Central and State Governments or prominent industrialists were invited to inaugurate the Conventions/Conferences time to time. This helped in highlighting the importance and achievements of our profession for their information and to share their views about the expected roles of our agricultural engineers in various sectors. Recommendations of the ISAE The Impression: Treatise of ISAE Growth and Impact



conventions used to get sent to the concerned departments for follow up action.

The first two days' conference on "Design, Development, Testing and Popularization of Agricultural Implement" was organized by the Indian Council of Agricultural Research at IIT Kharagpur during October 15-16, 1960. It was attended by senior engineers/officers dealing with Agricultural Engineering Programmes in the State and Central Governments Departments of Agriculture, ICAR, educational institutions and private organizations.

A Symposium on "Farm Mechanization-Problems and Prospects" was organized by the ISAE Ludhiana Chapter on the 3rd June 1978 at India International Centre, New Delhi, which was attended by over 150 participants from Agricultural Universities, ICAR Institutes, Govt Officials and agricultural machinery manufacturers. The symposium deliberated on different aspects of mechanization and was very successful. Another National Conference on Farm Mechanization was organized at Tractor Testing and Training Institute Budni (M.P.) on the 2nd March 1993.

A number of short- and long-term training programmes for researchers, Government officials, manufacturers, artisans were organized with the help of ICAR Institutes, SAUs and government departments. Manufacturers were encouraged to form their own associations at regional levels. Close linkages were developed with manufacturers of tractors, power tillers and farm implement, processors, government departments, progressive farmers, field engineers and other professionals. Farm machinery exhibitions, demonstrations of newly developed machinery and technologies, farmers fairs became quite common. The ISAE played catalyst's role in organizing such programmes in different states.

ICAR started giving an annual grant to ISAE for holding conventions/ conferences and publication of journals. The ISAE was prompt in utilizing the funds and giving audited utilization certificates in time. At one stage, Prof. M. S. Swaminathan, the then Secretary, Department of Agricultural Research and Education, Government of India and Director General, Indian Council of Agricultural Research remarked that ISAE was the most active Society in properly utilizing the funds and submitting utilization certificates timely.

3.11.4 Silver Jubilee Celebration

Silver Jubilee Celebration of ISAE along with the 22nd ISAE Annual Convention was held at CIAE Bhopal during October 29-31, 1985. Dr T. P. Ojha was President and Dr N. S. L. Srivastava was Convener. This was a grand programme attended by about 500 participants including around 40 foreign delegates. An exhibition of agricultural machinery and agricultural input suppliers was also organized with participation of 105 organizations. More than 3000 farmers visited the exhibition and took keen interest in different types of agricultural machinery.

Major highlights of this event were that papers selected for presentation in the Convention were printed in 4 Volumes (Farm implements and Machinery, Soil and Water Engineering, Agricultural Processing & Value Addition, and Energy in Agriculture). An exhaustive souvenir covering important papers on the growth of ISAE, Agricultural Engineering Education and Research and other important topics, along with large number of advertisements from manufacturers and suppliers of agricultural machinery and farm inputs was published. Messages received from the President and Prime Minister of



India, Union Minister of Agriculture, past presidents of ISAE and other dignitaries were also published in the souvenir. Stalwarts of agricultural engineering profession narrated stories and their personal experiences related to the growth of ISAE. A nice memento with ISAE Logo was presented to all ISAE members having uninterrupted membership of 15 years and above. There was wide coverage of the Silver Jubilee celebration and the 22nd ISAE convention in local papers, All India Radio, Bhopal station and Bhopal Doordarshan.

3.11.5 The 28th Convention and Golden Jubilee of starting Degree Programme

Under the Presidentship of Dr T. P. Ojha and Convenorship of Dr N. S. L. Srivastava, the 28th Annual Convention of ISAE and Golden Jubilee Celebration of starting of Agricultural Engineering Education in India were organized at CIAE, Bhopal during March 2-4, 1993. Stalwarts of our profession, namely, Prof C. V. Paul, Prof A. C. Pandya, Prof S. V. Arya, Dr K. N. Nag, Dr T. P. Ojha, Prof M. M. Mehta, Prof R. N. Pahalwan, Prof Soleman Jaswant Singh and many others shared their old memories related to starting of and initial phases of development of the degree programme in the Department of Agricultural Engineering at Allahabad Agricultural Institute. They also shared their experiences about the working and great contributions of Prof. Mason Vaugh. The 28th Annual Convention was a grand success. It was attended by more than 300 participants.

3.11.6 Golden Jubilee Celebrations and the 44th Annual Convention

During the Presidency of Er. Amar Singh, the 44th Annual Convention of ISAE and Golden Jubilee Celebration were held at the Indian Agricultural Research Institute, New Delhi during January 28-30, 2010. Senior professionals of our society narrated their experiences about the struggles and continous growth of the society. They also recounted the major contributions of some of the members who helped the society in its difficult phases. The achievements of the society, in 50 years from its inception, were presented.

The wide spectrum of participants including large number of academicians, researchers from ICAR institutes, State Agricultural Universities (SAUs), Department of Science & Technology (DST), Council of Scientific & Industrial Research (CSIR); officials and policy makers of state and central government departments of agriculture and line ministries, Ministry of New and Renewable Energy (MNRE), Bureau of Indian Standard (BIS); manufacturers, processors and progressive farmers attended the convention. The good participation of all stakeholder reflected strong linkages formed by ISAE with all stakeholders. The 44th Annual Convention was very successful and about 300 participants attended the same. Large number of good quality papers were presented in technical sessions in the convention.

Along with the 45th Annual Convention of ISAE held during January 17-19, 2011 at Nagpur an "International Symposium on Water Management" was also organized and attended by many participants from USA, Canada and Japan, besides a large number of participants from India. The convention and the International Symposium were very successful.

3.11.7 Other important Conferences/Conventions organised by ISAE

Dr Indra Mani as President and Dr. Manoj Khanna as Secretary General, organized a "Brain



Storming Session to identify research areas in Agricultural Engineering" on the 18th June 2018. This programme was sponsored by the Department of Science & Technology (DST), GOI. Dr Ramesh Chand, Member NITI Ayog, was the Chief Guest. In light of the discussion during Brain Storming Session, the DST invited research proposals for funding.

ISAE, time-to-time, has also organized several International conferences in collaboration with the International agencies. American Society of Agricultural & Biological Engineering (ASABE) and ISAE jointly organized a "Global Water Security Conference for Agriculture and Natural Resources" at Hyderabad during October 4-7, 2018. Dr. Indrajeet Chaubey of ASABE and Dr. Indra Mani of ISAE were the Co-chairmen. The Conference was attended by about 320 participants representing 19 different countries. Progressive farmers from India and USA also participated and shared their views on water security. In an interactive session among Heads of Departments of Agricultural & Biological Engineering of the USA and Deans and Heads of Agricultural Engineering from India shared the details of the curriculum being followed at their institutions for cross learning.

During October 14-17, 2019, PAU and ISAE jointly organized the "8th Asian-Australian Conference on Precision Agriculture" at PAU, Ludhiana. Dr Manjeet Singh of PAU was the Organizing Secretary. The conference was attended by about 300 participants including delegates from Japan, Korea, Malaysia, China, USA, Canada, Europe, and Russia.

In an ISAE Convention at BHU, Varanasi during January 28-30, 2019, the Vice Chancellor agreed in principle to start B. Tech (Agricultural Engineering) programme. BHU was already offering M. Tech and Ph. D. programs in Farm Engineering. There was a very successful interactive session on "Industry-Academia Partnership" during the Convention.

The 54th Annual Convention of ISAE was organized by MPKV Rahuri and held in Hotel Hyatt Regency, Pune during January 28-30, 2020; and was very successful. An International Symposium on "Artificial Intelligence based Technologies in Agriculture" was also organized along with the Convention with many foreign participants and industry experts.

During the Covid-19 pandemic in 2020 and 2021, ISAE organized several webinars on topics like automation, micro-irrigation, protective cultivation, urban agriculture, conservation agriculture, precision agriculture, etc. with good attendance of academicians, industry, government, and field personnel. These were ably moderated by Dr Syed Ismail.

The 56th Annual Convention of ISAE was held at TNAU Coimbatore during November 9-11, 2022. The theme of the Convention was "Agricultural Engineering Innovation for Global Food Security". An International symposium was also organized along with the convention. The theme of the international symposium was "India@2047: Agricultural Engineering Perspective". The programme was attended by more than 500 participants from India and abroad and was very successful. The historic General Body meeting held on the 9th November 2022 during the Coimbatore Convention discussed, deliberated and approved the whole Revised and Updated Constitution, Bye-laws and Rules prepared by a Committee under the Chairmanship of Dr V.M. Mayande. Glimpses of the Coimbatore convention 2022 are given on back cover of this book, and venues with dates of ISAE Annual Conventions are presented in Appendix VII.

3.11.8 ISAE Awards

To encourage and recognize good work done by the members, the society started giving different kinds of awards to its members. ISAE started 17 awards during 1970-2011. Out of those 9 were initiated by ISAE on its own and 8 were sponsored ones. The ISAE awards became very popular amongst its members and each member was striving for the same. The top most awards till 2011 was the ISAE Gold medal. After a few years, continuation of sponsored awards became unviable proposition. The sponsorers were approached to enhance their endowments for the continuation of the award. The responses however were not encouraging and thus, thought to review continuation of all awards.

ISAE

3.11.9 Review of existing Awards and Institution of New ones

In 2011 the Executive Committee decided to review the existing awards given by the ISAE. A

Table 6: ISAE Awards and their Status				
Sl. No.	Award Name	Year of Start	Status	
1.	ISAE Gold Medal	1970-71	Continuing	
2.	ISAE Fellow	1970-71	Continuing	
3.	Commendation Medal	1970-71	Continuing	
4.	Distinguished Service Award	1979-80	Continuing	
5.	ISAE Student Paper Award	1980-81	Continuing	
6.	Best Chapter Award	1980-81	Continuing	
7.	Outstanding Book Award	1985-86	Continuing	
8.	Shankar Memorial Award	1985-86	Discontinued from 2011	
9.	R K Jain Memorial Award	1985-86	Discontinued from 2011	
10.	ASPEE Foundation Gold Medal	1985-86	Discontinued from 2011	
11.	Reddy Award	1986-87	Discontinued from 2011	
12.	Jyoti Award	1987-88	Discontinued from 2011	
13.	Jain Irrigation Award	1987-88	Discontinued from 2021	
14.	ISAE Team Award	1989-90	Continuing	
15.	Individual Research Award	1989-90	Discontinued in 1995	
16.	Dr K N Nag Gold Medal	2009-10	Discontinued from 2011	
17.	S J Hiran Memorial Award	2009-10	Discontinued from 2011	
New Aw	vards Initiated			
18.	Mason Vaugh Agricultural Engineering Pioneer Award	2011	Continuing	
19.	ISAE TAFE Sivasailam Memorial Student Gold Medal Award	2021	Continuing	
20.	Prof. Gajendra Singh ISAE Education Gold Medal	2021	Continuing	



Committee was constituted under the Chairmanship of Dr B. S. Pathak and Dr V. K. Sharma as Secretary. The committee reviewed the feasibility of continuing the existing awards and observed that many of the sponsored awards were started with small contributions and presently it was not economically viable to continue them. The earlier sponsors were not enthusiastic to contribute additional amount for continuation of those awards. The committee was of the view that for any award to be continued in future, the sponsors should pay Rs 5.00 lakh, Rs 10 lakh and Rs 20.00 lakh for continuation of the award for 5,10, and 15 years' period respectively. Accordingly, recommendations were made and out of 17 awards, 8 were recommended to be continued while 9 were recommended to be discontinued from 2011 onwards. The details of those awards are given in Table 6.

The committee recommended to start a new ISAE Award in the name of Prof. Mason Vaugh as **"Mason Vaugh Agricultural Engineering Pioneer Award"** which is now being considered as the highest and rare award of ISAE. This award was started in 2011. The first recipient of this award was Prof. R. C. Hay of the University of Illinois, USA, who helped in establishment of agricultural engineering programs at IIT Kharagpur and GBPUAT Pantnagar. He was awarded posthumously in 2012 at the 46th ISAE Convention at Pantnagar. A List of recipients of ISAE Gold Medal, ISAE Fellow and ISAE Mason Vaugh Pioneer Award is available on ISAE website under "Awards" tab.

The ISAE constituted Prof. Gajendra Singh Education Gold Medal Award upon sponsoring by Prof. Singh in 2021 to recognize professionals whose career and accomplishments represent the highest level of achievements in education, outreach, and/or technology transfer in one or more of the subject matters associated with ISAE. The first recipient of this award was Dr Vijay P. Singh, Distinguished Professor at Texas A&M University, USA and it was given in the Patna Convention in November 2021.

With a generous donation from TAFE, ISAE established TAFE (Sivasailam Memorial) Student Gold Medal Awards from 2021 onwards, one each for the best Ph. D. and M. Tech thesis specializing in Farm Machinery & Power.

3.12 Institutions, Colleges, and Collaborations

3.12.1 Creation of Agricultural Engineering Division in ICAR

The stalwarts of ISAE actively lobbied for a subject matter division in ICAR and the same named as "Agricultural Engineering Division" was created and established at ICAR Headquarter in 1988. Its major

roles are planning, coordination and monitoring of research and development activities related to production and post-production mechanization of agriculture, use of conventional and non-conventional energy sources and automation in irrigation and drainage system.

3.12.2 Establishment of Central Institute of Agricultural Engineering, Bhopal



Fig. 9: Administrative Block of CIAE, Bhopal, Madhya Pradesh

In 1965 ISAE convention which was held at IARI, one of the major recommendations of the General Body Meeting was to request the Ministry of Agriculture and Cooperation, Government of India, to establish a National Institute of Agricultural Engineering in India. This recommendation was pursued

vigorously and reminders were sent from time to time. This effort of ISAE resulted into establishment of Central Institute of Agricultural Engineering (CIAE) at Bhopal, Madhya Pradesh by the Indian Council of Agricultural Research, New Delhi, on the 15th February 1976 (Fig. 9). An Agricultural Engineering extension project of CIAE which was running at Coimbatore has formally been upgraded in 2023 as Regional Centre of CIAE Bhopal.



Fig. 10: CIPHET, Ludhiana, Punjab

3.12.3 Establishment of Central Institute of Post-Harvest Engineering and Technology, Ludhiana

The ISAE pursued and requested the Ministry of Agriculture and Cooperation, Government of India and ICAR to establish a National Institute of Post-harvest Engineering and Technology, as it is an important area and the country suffers from huge post-harvest losses of agricultural commodities. The matter was pursued with both the organizations by meeting the senior officials and the Minister of Agriculture. On October 3, 1989 ICAR notified a full-fledged research institute namely Central Institute of Post-Harvest Engineering and Technology (CIPHET) at PAU Campus Ludhiana, Punjab (Fig. 10). A second campus of CIPHET was also started at Abohar in Firozepur District of Punjab during the year 1993. This centre has also been upgraded as full fledged Regional Centre of CIPHET in 2023. After vigorous persuation of the present president and SMD Research Centre on Makhana Darbhanga was brought under Agricultural Engineering division as regional centre of ICAR-CIPHET Ludhiana and is notified as NRC on Makhana.

Now ISAE is strongly pursuing the case for opening of Agricultural Engineering Departments in majority of IITs/NITs by writing letters, sending journals and magazines to all line ministries continuously and meeting the relevant ministers from time to time for the purpose. ICAR has also been requested to open a new National Institute of Agricultural Robotics and Artificial Intelligence (AI) through Agricultural Engineering Division of ICAR, and consultations are on with big corporate houses to have it in ICAR-CIAE campus in PPP mode.

3.12.4 Collaboration with International Societies

During 2000-2021, ISAE entered into MOU with many Agricultural Engineering Societies of other countries to have joint programmes and activities. Such joint programs with ASABE were organized in 2005 and in 2011. ISAE joined as a member of the Engineering Council of India (ECI), consisting of many engineering professional societies and works for the advancement of engineering profession in various

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disciplines and for enhancing the image of engineers in the society. ISAE has been participating in their various events and annual functions regularly. The ISAE joined CIGR (International Commission of Agricultural and Biosystems Engineering) as National Member in 2011.

The 54thAnnual Convention of ISAE and International Symposium on **"Artificial Intelligence based Technologies in Agriculture"** was organized by MPKV Rahuri at Pune during January 28-30, 2020. The event was very successful. Recognizing the strength of the Agricultural Engineering profession in India, Agricultural Engineering Societies of



Fig. 11: Signing of MoU between ASABE and ISAE at Omaha, Nebraska, USA

Republic of Korea, Malaysia and Nepal signed MOUs with ISAE. In 2022 collaboration with Society for Automation Engineering of India was started and conceptathons were organized in collaboration with several universities and institutions. The ASABE and ISAE signed an agreement in 2023 during ASABE Annual International Meeting at Omaha in Nebraska to have partnership/collaboration in global activities of interest. Glimpses of signing MoU are shown through pictures in Fig. 11.

3.12.5 Catalytic role played by ISAE in Opening of New Agricultural Engineering Colleges

Prof. Mason Vaugh, a missionary from USA, started two years' B.Sc. Ag. Engg degree programme at Allahabad Agricultural Institute (AAI), Allahabad (now Sam Higginbottom University of Agriculture, Technology and Science, Prayagraj) in 1942. Later it was made three years' course and in 1960 it was made a four years' programme.

The first Indian Institute of Technology (IIT) was established in 1952 at Kharagpur, West Bengal with a Department of Agricultural Engineering having 4 years B. Tech. Programme in Agricultural Engineering. In absence of a proper building at that time, the first IIT was established in abandoned buildings of erstwhile Hijli Jail.

From the very beginning of its establishment in 1960, the ISAE has been playing catalytic role in approaching and convincing higher authorities and policy makers to have separate programmes for Agricultural



[In addition, about 230 Private colleges also started graduation in Agricultural Engineering in last decade]



Engineering Education in each State (Fig. 12). During 1960-74, the State and Central Governments started Twelve new Agricultural Engineering colleges at GBPUAT Pantnagar, PAU Ludhiana, OUAT Bhubaneshwar, MPUAT Udaipur, UAS Bangalore, JNKVV Jabalpur, MPKV Rahuri, Dr PDKV Akola, AAU Jorhat and TNAU Coimbatore. In addition to this, postgraduate programmes in Agricultural Engineering and Dairy Engineering were started in two existing ICAR institutes namely IARI New Delhi and NDRI Karnal, respectively.

During 1974-85, five more Agricultural Engineering Colleges or Departments were started at BHU Varanasi (U.P.), ANGRAU Bapatala (A.P.), RAU Pusa (Bihar), JAU Junagadh (Gujarat) and NDUAT Ayodhya (U.P.).

During 1986 to 2000, eleven new colleges or Departments of Agricultural Engineering were started at VNMKV Parbhani (Maharashtra), HAU Hisar (Haryana), CAET Raichur (Karnataka), MGCGVV Chitrkoot, Satana (M.P.), NERIST Nirjuli (Arunachal Pradesh), CSAUAT Etawa (U.P.), TNAU Trichurapalli (T.N.), BCKV Mohanpur (W.B.), Deptt. of PHT, AMU Aligarh (U.P.), College of Agricultural Engineering IGKV, Raipur (Chhattisgarh), and Dr B. Sawant Krishi Vidyapeeth Dapoli (Maharashtra) which further increased the number of Agricultural Engineering graduates passing out every year.

During 2001-2023, 17 new Colleges of Agricultural Engineering and Technology were started by State and Central Governments at SVPUAT Meerut, SKUAST Srinagar, SKUAST Jammu, CAEPHT Ranipool Gangtok, Sikkim; RSM College of Agril. Engg. Mungali, Chhattisgarh; P. K. Institute of Engineering and Technology, Puducherry; College of Food Processing and Bio-Energy, AAU Anand; College of Agricultural Engineering and Technology Godhara under AAU Anand; Dept. of Agril. Engg. Mahatma Jyoti Rao Phoole University Achrol, Jaipur; CAE Sardar Krushinagar, Gujarat; CAE Banda UAT Banda; CAE, PJTSAU, Sangareddy, Hyderabad; CAE Madakasira, ANGRAU, Andhra Pradesh; CAE Birsa AU, Kanke, Ranchi; CAE GAU Navsari, Gujarat; Faculty of Agril. Engg., Agri. University, Mandore, Jodhpur. During 2023 undergraduate programme in Agricultural Engineering has been started in IARI New Delhi.

The ISAE was also approaching and convincing private engineering colleges to start degree and diploma programmes in Agricultural Engineering in their colleges. As a result, about 234 private colleges in India have been started and now running educational programmes in Agricultural Engineering, besides colleges in central and state government run institutions and SAUs.

A list of 46 Agricultural Engineering Colleges/ Institutes in IIT and Central and State Agricultural Universities and deemed universities is given in Appendix VIII. With increase in number of colleges, more and more new Agricultural Engineers are available every year, and so the membership of ISAE is also increasing steadily.

3.13 Job opportunities

During 1960-70, the Agricultural Engineering profession was neither known to many nor jobs were easily available to our graduate engineers. Most of the engineering posts existing in the Agriculture Departments of State and Central Governments, Agro Industries Corporations and other departments, which were very much suiting to Agricultural Engineers, were managed and headed by Mechanical, Civil and or Electrical Engineers (Appendix IX). Most of the agricultural engineering jobs in farm machinery were advertised with eligibility only for mechanical engineers. Similar were the cases for



the soil conservation engineering and lift irrigation vacancies in the States with only civil engineering as eligible qualification and mechanical and/or electrical engineering as eligible qualification for Postharvest technology, agro processing and value addition requirements. For farm power and energy related jobs like tractor/ power tiller testing and demonstration work, design, testing and extension work related to biogas/ producer gas and other renewable sources of energy equipment, the usual practice was to list mechanical and electrical engineering as eligible qualifications. Every such advertisement was objected strongly with representation from the ISAE.

Dr. H. S. Chauhan, the then Dean, College of Technology, GBPUAT, Pantnagar and Dr. K. N. Nag, the then Dean, College of Agricultural Engineering and Technology, Udaipur launched a crusade for convincing different departments/organisations where agricultural engineers can be eligible for existing jobs or creating new jobs for agricultural engineers where they are better trained and most suited. They usually used to scan the newspapers for any such "improper/erroneous" advertisements where agricultural engineering. Such information was being sent to the Secretary ISAE who used to take up the issue with the concerned Governments/organizations. They also used to meet Secretaries and other higher officials of the State Government to convince them that the agricultural engineers are better trained for engineering jobs in the field of agriculture. Deans and Directors of other Agricultural Engineering Colleges were also trying their best to see that more and more vacancies were created for Agricultural Engineers.

Simultaneously, Dr K. N. Nag made another effort to get agricultural engineering as an approved subject in Indian Administration Service (IAS) and Public Commission Service (PCS) examination. His efforts gave partial success and agricultural engineering was approved as one of the subjects in PCS and in subordinate services of Government of Rajasthan. He also made very useful contributions in the crusade for creating jobs for Agricultural Engineering graduates in Command Area Development, Land Development and Minor Irrigation Departments of Rajasthan Government. This resulted in creating more posts and also promotional opportunities for agricultural engineers in those departments in different positions. The performance of our engineers in those departments was very much appreciated and they were promoted to different/higher ranks.

For creating job opportunities to agricultural engineering graduates, the Government of India requested Shri Ramakant Rath, IAS, the then Under Secretary, Ministry of Agriculture and Cooperation to study and submit a report on Employment of Agricultural Engineers. He did an excellent job and submitted a useful report which helped in promoting employment of agricultural engineers.

With use of some contacts and influence of their official positions, Shri J. S. Bali, the then Deputy Commissioner (Soil Conservation) and Shri P. John Zachariah, the then Joint Commissioner (Machinery) in the Department of Agriculture, Ministry of Agriculture and Cooperation, Government of India succeeded in changing the recruitment rules for the posts of engineers related to agriculture for many departments. State Governments were persuaded to accept agricultural engineering graduates for engineering jobs in the field of agriculture.

There was a need to ensure that agricultural engineers are well trained in balanced manner covering all the 4 major fields of agricultural engineering. ISAE, in initial stages, interacted with the Deans/

Directors of different agricultural engineering colleges to give equal stress on theory, practical/lab works and field works, student seminars, apprenticeship and publication of papers and books. It was also being suggested to give equal coverage to all the 4 major fields of agricultural engineering (agricultural implement and machinery; soil and water conservation as well as field irrigation and drainage; agricultural structures and process engineering and energy in agriculture including renewable energy), so that the students passing out from those colleges have good theoretical and practical knowledge of all those four fields. Prof. A. P. Bhatnagar wrote a useful book on the Storage Engineering subject. Dr. A. M. Michael and Dr. T. P. Ojha wrote two very useful books on Agricultural Engineering. Professors of other colleges also wrote many books and bulletins. These books and bulletins became very popular amongst the students.

In 2022-23, Dr. S. N. Jha, ISAE President, wrote several letters to all State Governments, Union Territories, Central Ministries and autonomous bodies for eligibility of Agricultural Engineering in their jobs and opening of Directorates of Agricultural Engineering. This resulted in recruitment of Agricultural Engineers in large number in the States of Bihar, Jharkhand, Odisha, Andhra Pradesh, and many more in Central Government Departments such as in Department of Agriculture and Farmers' Welfare (DAFW), Ministry of Agriculture, Food Corporation of India, Ministry of Consumer Affairs. A job portal on ISAE website is in operation for both job seekers and job providers since 2022 and till now hundreds of our engineers have taken advantage of this facility. Training programmes of ISAE are also helping members to shape their career in a better way.

3.14 Directorates of Agricultural Engineering in States

ISAE and College of Agricultural Engineering JNKVV, Jabalpur were making sincere efforts in 1980s with the state Govt. to open Directorate of Agricultural Engineering in Madhya Pradesh. The engineering students of JNKVV Jabalpur were sitting on agitation in front of the Chief Minister's residence to press for their demand. Their efforts brought fruitful results. Silver Jubilee Convention was held at CIAE Bhopal during 28-30 October 1985. Shri Moti Lal Vora, the then Chief Minister of M.P., graced the occasion as the chief guest of the inaugural function held on 28th October 1985. He announced the decision of the State Govt. about creation of a separate Directorate of Agricultural Engineering in M.P. in the gathering. This was very pleasant news and all the members thanked the Chief Minister by giving a standing ovation.

During the period 2001 to 2023, there has been rapid growth of the ISAE. Government realized the importance of agricultural engineering input in agriculture and started giving more importance to activities related to agricultural mechanization, post-harvest technology, value addition and agroprocessing and energy use in agriculture. Several programmes in these areas were started. This increased the demand of agricultural engineers and more funds were also made available for such activities. With the opening of new State Agricultural Universities and Colleges of Agricultural Engineering and Technology; greater number of undergraduates, graduates and Ph.D. degree holders in Agricultural Engineering are now available every year to meet the additional demand of qualified agricultural engineering for different types of activities. This has improved the image of the Agricultural Engineering Profession and also ISAE during recent years. *The Impression: Treatise of ISAE Growth and Impact*



Opening of Directorate of Agricultural engineering in each state is a dream of every Agricultural Engineer but not much have been achieved. Now, with the efforts of Dr S.N. Jha, DDG (Agril. Engg.) and President ISAE and scientists at Agricultural Engineering SMD of ICAR, several letters by the Cabinet Ministers, Secretaries and DDG Agricultural Engineering have been written to all state Governments for opening the said directorate.

With the efforts of SMD in ICAR, a subgroup of Secretaries also agreed in principle for Directorates of Agricultural Engineers (AE) and sought a report for its modalities. The Agricultural Engineering Division of ICAR made a Committee of different State Government officials and submitted a report to the Department of Agriculture and Farmers' Welfare, which was endorsed to different state Governments. With the efforts of Agricultural Engineering SMD, Hon'ble Chairman of Parliamentary Standing Committee on Agriculture, Animal Husbandry and Food Processing (2022-23) on the subject "Research and Development in Farm Mechanization for Small and Marginal Farmers in the Country" also recommended in its report to create Directorate of Agricultural Engineering in each state for accelerating agricultural mechanization. In response to the recommendation, Hon'ble Union Minister for Agriculture and Farmers' Welfare Shri Narendra Singh Tomar also wrote letters to all states for taking appropriate action for creation of Directorate of Agricultural Engineering in September 2022. In addition, the efforts of DDG Agricultural Engineering and current President in raising demands through several press and media are bearing fruits. Three states such as Punjab, UP, Chhattisgarh have already announced to creation of Directorates of Agricultural Engineering in their States. Some other states have appointed large number of Agricultural Engineers in their respective states. The President ISAE personally is meeting several state officials for convincing them for the need of Directorates, making state officials aware about its urgencies through several statements in press and media.



Since establishment of ISAE on the 15th October 1960, the ISAE has travelled a long path of undulation and reached to stability stage. The newly Revised and Updated Constitutions, Bye-laws and Rules 2022 has again put the ISAE in the path of accelerated growth. The mission and objectives of the ISAE have been revised keeping in view the important role of agricultural engineers in achieving environmental security, sustainability and profitability of agricultural enterprises and in the current age.

During 2021-22, special massive membership drive was launched that resulted in increase in the number of members to 5851. Now in term of membership, the ISAE has become one of the top scientific societies of the country.

The Journal of Agricultural Engineering (JAE) has been renamed as Journal of Agricultural Engineering (India) (JAEI) in 2022 (from Vol. 59, No. 3, July-September 2022) and it has got Scientific Journal Impact Factor (SJIF) of 7.442 during early 2023 which is considered as a quiet high score. The JAEI is now being abstracted and indexed in AGRICOLA, CAB Direct, EBSCO, Google Scholar, j-Gate, PubAg etc. which is really remarkable achievements during 2023. The whole process of submission of paper, editorial review of paper and final acceptance in journal management system has now been made online.

All ISAE chapters have been activated and their number in 2022 grew to 36. Forty six Colleges of Agricultural Engineering and Technology in central and state universities and also in Deemed Universities and about 234 in private sectors are running currently. Many Directorates of Agricultural Engineering opened/ announced to be opened in recent years.

A job portal on ISAE website is proving to be a boon to both job seekers and job providers and hundreds of members have effectively used this facility.

Several avenues for increasing the revenues have been opened such as revamping the publication of AET in vernacular language, bi-monthly e-newsletter, wall calendars etc.. These steps increased the readership due to wider circulation and is helping in garnering more revenue from advertisements. Some more activities such as development of standards for agricultural machinery, products, consultancy services, trainings etc. have been added in the activities of ISAE. The annual cummulative fixed deposit of the society has grown to about Rupees two crores in September 2023. About Rs. 60 lakh has been added in last two years only.

The current ISAE Executive Committee and Executive Council (2021-24) are working at full pace so that role of Agricultural Engineers can further be recognized by Central Government, State

The Impression: Treatise of ISAE Growth and Impact



Governments, private sector, non-governmental organizations etc. The goal is to make **ISAE a power house of think tank** for advocacy to Central Government, State Government, Private sector, non-governmental organization etc. in formulating their policy and investment not only in India but around the world. The aim is also to make ISAE a publication house of Agricultural Engineering and play a major driving force for mechanization and automation of production and post-production systems of Indian agriculture. It aspires to be the largest scientific society in terms of membership and revenue; and be recognized as one of the best administered and sought-after society not only in the country but at the global level for policy advocacy and services to society in the field of modern agriculture.

5



IMPACT AND IMPRESSION

The ISAE, since its establishment in 1960, has played important role in creating a strong base in terms of producing large number of qualified agricultural engineers. It started with its first degree programme in Agricultural Engineering by Allahabad Agricultural Institute (AAI), Allahabad [now Sam Higginbottom University of Agriculture, Technology and Science (SHUATS), Prayagraj], and currently 46 Colleges and Institutes under Central and State Agricultural Universities/IIT and Deemed Universities; and about 234 private colleges are running educational programmes in Agricultural Engineering. The ISAE has played a very active and catalytic role in establishment of these Colleges/Institutes and producing highly trained manpower in the field of Farm Machinery and Power, Soil and Water engineering, Post-Harvest Technology, Energy use in Agriculture including renewable energy and other emerging areas. Its several members have put pioneering efforts to initiate new fields of research such as sensor technologies, non destructive evaluation of food quality, including establishment of food testing laboratories in India by Dr. S. N. Jha, and micro encapsulation by Dr. K. Narsaiah, etc., which are now being taught and researched throughout India.

The ISAE is holding annual conventions and international symposiums at different locations in the country with participants from India and abroad representing research scientists, academia, industry, Government organizations and progressive farmers. Recommendations of these conventions are being sent to Central and state government departments, industries, social organizations for implementation. Many of them have already been implemented. Several colleges, institutions and new avenues for jobs for agricultural engineers upon recommendations and presuations of ISAE have been opened and also helped the country to make green revolution a grand success. Think what would had happened, if millions of pumps and tubewells, tractors and tillage equipment, seed drills and planters, threshers and combines, storage structures and rice/ wheat mills etc. could not have been made available to make the green revolution a grand success.

The ISAE is acting as a fountain head of knowledge through its publications. Journal of Agricultural Engineering (India) (JAEI) is publishing quality research papers and Agricultural Engineering Today (AET) is publishing recent developments and futuristic agricultural engineering technologies to create awareness for its members and other stakeholders involved in farm to fork in food supply chain.

The ISAE is operating through its 36 chapters established throughout India having 5851 members as on 30th September, 2023. These chapters are playing pivotal role in development of country through close liaisoning with organizations related to R&D, State and Central Governments, preparing policy documents, and working in close collaboration with Industries and social organizations. The executive



committee and its members at regional chapters are playing pro-active and catalytic role in disseminating agricultural engineering technologies through state government departments, NGOs, self-help groups, farmer producer organizations etc.

The challenges faced by our country in the field of Agricultural Engineering are diverse and need technological solutions. This is primarily achieved through research and development activities of Agricultural Engineering Division of ICAR and Agricultural Engineering colleges running in State, Central and Deemed Universities. Apart from this, members of the society under various All India Coordinated Research Projects (AICRPs) running in different ICAR institutes and agricultural engineering colleges are conducting region specific research to fulfill the needs of local conditions. The ISAE is playing crucial role in bringing R&D Organizations, agricultural machinery manufacturers, agro-processors, educational institutions, entrepreneurs, farmers and end users to deliberate on the issues/problems faced by them and find suitable solutions. It helped in reaching mechanization of production agriculture to about 47% and in saving of post-harvest losses of more than 30-40 million tonnes of food annually.

Overall, ISAE is now on fast track in its right direction of journey and having considerable impact and acquiring recognition among peer societies. The proof of it lies with the growing numbers of memberships, particularly corporate members, Institutional members including NITs and IITs and offer of collaborations from overseas and domestic institutions/ associations/ organizations such as ASABE, Engineering Council of India, EBSCO, etc.



CHALLENGES AND OPPORTUNITIES

The ISAE has achieved several milestones and expanded its recognition in all walks of life directly and indirectly, and is now getting global recognition from overseas organizations with common interests. There appeared symptoms of stagnation in term of membership growth and activities in the recent past. With vigorous efforts of the Executive Committee and members of the society, during the last few years, it has picked up and now the membership and activities are growing at a faster speed and gaining momentum. The ISAE, in future, is having ample opportunities in the age of fast changing technologies.

The financial strength is crucial for healthy operation of our society and it is not so rosy when compared to other agricultural engineering societies operating world over. Even now the regular income of the society is not enough to expand its activities which could at least be sustainable and self-reliant. There is need to expand membership in general and corporate and Institutional membership in particular. There is also need to expand subscriber base of our journals and magazines, endorsing products, making standards and taking consultancy jobs under the banners of the Society. These will make the ISAE self-sustaining and a credible scientific society of the country.

The other challenge is the recognition of the agricultural engineering degree as an essential and desirable qualification for jobs dealing with engineering interventions in agriculture. Contributions and importance of Agricultural engineering in the Indian Agriculture are acknowledged, but still most of officials who are large in numbers in state and Central Government, do not want to agree on papers to handover the jobs to agricultural engineers which can be better handled by them. They still do not understand or not want to understand that what will be better for the country. Challeges still exist to make them understand for the betterment of the Indian agriculture. To face these challenges, enhanced efforts are needed for lobbying and working in close collaboration with central and state government departments and industries.

Ensuring active participation of members in society's work is another major challenge. Bringing all together to contribute in multifaceted and multi-fold activities of ISAE is need of the hour. These challenges can be tackled by offering several activities with benefits to the members and keeping them glued with the ISAE. Frequent correspondence and dialog with them using all means and platforms may activate and enthuse all categories of the members.

ISAE can take up responsibility of creating repository of agricultural engineering technologies, developed in India as well as in different parts of the world, which can cater the needs of farming enterprises. This will not only help members but also the industries and other stakeholders. Industry is important and ultimate player in penetrating technologies to the field on a larger scale. Thus, there

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is urgent need to work in close collaboration with industry bodies to solve their problems through the ISAE platform.

It is very heartening that our Journal of Agricultural Engineering (India) (JAEI) has received Scientific Journal Impact factor (SJIF) for 2023 as 7.442 and getting abstracted and indexed in AGRICOLA, CAB Direct, EBSCO, Google Scholar, j-Gate, PubAg, SJIF, NAAS India etc. But there is challenge of further improvement in its citation/rating and indexing by Scopus and Thompson Reuter in order to get quality contributions in large number from authors of national and international repute. The current executive is trying hard and has applied for indexing including membership of Committee as Publication Ethics (COPE) and abstracting in engineering villages databases for getting world wide recognition of JAEI.

As scarcity of labours, skill and climate change are affecting agriculture and agriculture based entrepreneurship /industries, everyone including Government and private sectors, NGOs and FPOs, individual farmers and entrepreneures advocates the need of mechanisation, automation and mobile based applications for bringing comfort, efficiency resilience in the Indian Agriculture. The society therefore need to expand its activities in all such spheres including development of standards, consultancy, product endorsement and advertisement, trainings and industrial liasoning for having its presence in all walks of life. As all members and affiliates of the society are skilled in these fields, the current situations give a big opportunity for ISAE to demonstrate its importance and further expand the envelop of its activities in all directions.

The unemployment and under-employment are big issues for our country. Therefore, Central and State government are working on various schemes to address these issues. Industrialization of agriculture has immense potential to create jobs. Keeping these facts in mind Government of India has started startup and skill development programme. Recently, our society has developed a job portal on ISAE website for both job seekers and job provider in 2022 and getting popular and many are taking advantage of this portal. This activity need to be expanded and accelerated using the skill of its members and speedy working of current and future Executive Committee. The ISAE in close collaboration with its regional chapters need to work extensively so that these ambitious programmes can be implemented on ground throughout India. The focus on these issues will give a very good face value to our society.



7

MAKING FUTURE PERFECT

Development of any society or organization is a continuous process involving changes within its systems to help it perform more effectively. It comprises of both the "hard" and "soft" aspects within its operation. The hard side includes goals, systems, and strategy and the soft one relies on perceptions and refers to people's behaviour, culture, etc. Any organization is formed when people recognise some issues. Our ancestors identified problems of Indian farming long back in 1940s and formed the society which formally came into existence in 1960.

The speed at which an organization experiences phases of evolution and revolution is closely related to the market environment, zeal and will of members in identifying activities to meet contemporary requirements of the society, country and finally the world. Existence and future depend totally on how a society and/an organization adapt to the current situation and contribute actively in the modern-day agenda for growth, prosperity of living beings and environment surrounding them.

Our society the "Indian Society of Agricultural Engineers" had grown and matured fully long back and was showing symptoms of stagnation stage in recent years. It saw various ups and downs and survived in all situations, but its progress/ sustainable growth is demanding some extraordinary changes in tune with current developments in the world. A note of these situations was taken and many changes were made to accelerate the growth. The first was to revive the election process by updating the membership numbers and conducting election in electronic mode in 2021, followed by revising and updating the Constitution, Bye-laws and Rules of the Society which was done in 2021-22 to become more proactive, professional and pre-determined to achieve the set goals and grow sustainably.

The ISAE envisages to be a top notch publishing house for academia, researchers, industries and policy makers in very near future. It has already attracted attention not only from within the country, but also from similar overseas organizations. Its magazines Agricultural Engineering Today and *Adhunik Krishi Abhiyantriki* are now being read by more than one lakh stakeholders. Its edition in other Indian languages shall further enhance number of admiring partners of ISAE. Its scientific face "Journal of Agricultural Engineering (India)" has started getting international impact factors and abstracting and indexing by several international organizations. Strong base has been laid to make these mouth pieces of the society self-sustainable and self-dependent. The current Executive Committee is expanding its wings taking several steps such as forming panels of experts in different fields of agricultural engineering for developing standards, coordinating with state governments for establishing directorate and is in process of making panels for energy audits, green energy to make carbon positive agriculture, insurance auditors', food quality auditing guidelines, on-site equipment testing, endorsing products and



machinery, conducting seminars and conferences abroad etc.

Industries are coming forward to participate and partner in its activities. Overseas members are coming forward to contribute to society and stakeholders are making it richer by providing financial contributions in terms of advertisements and advertorials. The new ISAE wall calendar is hanging in more than 1000 offices and houses throughout the year and reminding the contributions of the society to social and industrial fabric of India. Vibrancy of all thirty-six chapters is felt in states and central Governments, Indian Council of Agricultural Research and ensures that future of the ISAE has been made perfect.

Spinal cord of any organization is its members and their thoughts along with financial resources. Anything and everything need money. The ISAE therefore needs to generate a greater number of proactive, enthusiastic and willing to work members of all categories, besides funds. The society has to enroll a greater number of Institutional, corporate and life members, has to cut costs using technologies and web-based activities and simultaneously needs to expand revenue generating activities such as consultancies, standard making for equipment and machinery, endorsing industries' products in all kind of media and need based survey and documentation of facts and figures for the industries and policy makers. Besides, ISAE is conducting number of conferences in collaboration with the similar international organizations. The society is striving to be unique and pioneering by defining Scientific Society's Social Responsibility (SSSR) and setting an example for other professional bodies by fulfilling that responsibility. It gives immense pleasure to see that almost all these activities have been initiated in 2022-23. The revised bye-laws, rules, expanded activities in all directions and aspirations and eagerness of member are right stepping stones to make the future of ISAE perfect.

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APPENDICES



Appendix I

MEMORANDUM OF ASSOCIATION

INDIAN SOCIETY OF AGRICULTURAL ENGINEERS

(Registered No. 4027 dated 12 February 1969)

- 1. The name of the Society shall be "Indian Society of Agricultural Engineers". It shall be a professional non-profit organization.
- 2. The registered office of the Society shall be in New Delhi.
- 3. The Aims and objectives of the Society shall be:
 - a) To promote and encourage the development of the profession of the Agricultural Engineering in all its branches and to coordinate its various activities and
 - b) To advance the standards of Agricultural Engineering in the areas of research, education and its practical applications.
- 4. The Society shall have the powers to do all lawful acts, deed and things as are incidental or conducive to the furtherance and attainment of the above aims and objectives.
- 5. The management of the affairs of the Society and its properties shall be entrusted to an Executive Council which shall function in accordance with the Rules and Regulations of the Society.
- 6. The names, occupations, designations and addresses of the members who formed a Society named Indian Society of Agricultural Engineers under the Societies Registration Act XXI of 1860 (Punjab Amendment Act, 1957) as extended to the Union Territory of Delhi, in pursuance of this Memorandum of Association are given below:

Name	Address
Shri J. K. Jain	Joint Commissioner (Minor Irrigation), Ministry of Food and Agric. C.D. & Coop. (Department of Agriculture) Krishi Bhawan, New Delhi.
Shri P. J. Zachariah	Joint Commissioner Machinery, Ministry of Food Agri. C.D. & Coop (Department of Agriculture), Krishi Bhawan, New Delhi.
Shri D. N. Kherdeker	Director, Agricultural Implements, Ministry of Food, Agri., C.D. & Coop (Department of Agriculture) Krishi Bhawan, New Delhi.
Shri M. L. Taneja	Specialist, Agricultural Implements, Ministry of Food., Agri., C.D. & Coop. Room No.115, B-Wing, Shastri Bhawan, New Delhi.
Shri J. S. Bali	Deputy Commissioner (Soil Conservation Engg.), Ministry of Food, Agri., C.D. & Coop. (Department of Agriculture Room No. 398 A, Krishi Bhawan, New Delhi.
Shri C. S. Sridharan	Deputy Agricultural Commissioner (Engg.), I.C.A.R., Krishi Bhawan, New Delhi.
Shri S. S. Behl	Asstt. Extension Officer, Implement Unit, Ministry od Food, Agri., C.D. and Coop. (Agriculture Department) Krishi Bhawan, New Delhi

In 2022 a tagline "Connecting Engineers in Agriculture" was added to the this MoA and revised Constitution, bye-laws and rules was submitted to the Society Registration office in 2023

Appendix II

NOTIFICATION OF COMMITTEE FOR REVISION OF CONSTITUTION

Notification



INDIAN SOCIETY OF AGRICULTURAL ENGINEERS

G-4, A-Block (Ground floor), National Agricultural Science Centre Complex, Dev Prakash Shastri Marg, Pusa Campus, New Delhi -110012 Tel: 011-21520143 E-mail: <u>isae1960@gmail.com</u> Website: <u>www.isae.in</u> GSTIN No. 07AAATI6307C1Z3

Notification of ISAE Constitution Amendment Committee

Date: 14.01.2022

The President, Indian Society of Agricultural Engineers (ISAE) with approval of the Executive Council is pleased to form a committee for drafting/amending the existing Constitutions, bye-laws and rules with Terms of Reference (TOR) enumerated as below:

1)	Dr. V.M. Mayande (Past President ISAE)	Chairman
2)	Dr. N.C. Patel (former ISAE President)	Member
3)	Dr. N.S.L. Srivastava (former ISAE President)	Member
4)	Dr. D.C. Joshi, VC, AU, Kota, Rajasthan	Member
5)	Dr. B.C. Baboo, Industry representatives	Member
6)	Er. Rajeev Chaudhary, Director, Agril. Engg, MP Govt.)	Member
7)	Dr. Manoranajan Kumar, Principal Scientist, CRIDA, Hyderabad	Member
8)	Prof Deben Baruah, Professor & Head (Department of Energy),	Member
	Tezpur Central University	
9)	Dr. Dipankar De (Chief Editor, JAE)	Convener
10)	Dr. D.M. Kadam (Vice-President, Activity Council)	Member Secretary

TOR for Constitution Amendment/revision Committee

- i. To review the constitution, bylaws and rules of other similar societies/associations of India and abroad.
- To get best of these reviewed societies/associations and draft amended ISAE constitutions/ bye-laws and rules.
- To define constitution of election committee, their power including financial power, after declaration of election.
- iv. To suggest Financial sanctioning power and disbursement rule for executives including President of ISAE
- v. To define clear-cut Power/rights of Nominations of unelected members in executive committee, council and formation of other need based committees
- vi. To recommend expansion of Executive Council including induction elected members, removal of/addition in in ECs including industry and Government agencies, if any,
- vii. Define final authority for decision making in Executive Committee and Executive Council on various issues.
- viii. To recommend power of EC and GB for instituting new awards, signing MOUs with other societies, review of existing MoUs including that of outside country and also suggest guidelines of the same.
- ix. To frame guidelines/eligibilities of awards and also the duties and obligation of awardees.
- x. Any other issues which can help ISAE to become more vibrant, as per present time and beyond.

The committee is also free to consult any bonafide members, groups who work in the mandated field of ISAE to take wider views for incorporation in Constitution/bylaws/rules. It is desirable that a draft may be presented and discussed before the EC and then submitted the amended/revised constitutions/bylaws of ISAE within two months of notification of this committee.

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(S. N. Jha) President, ISAE



ISAE-connecting Engineers in Agriculture

Appendix IV

Dr N.S.L. Srivastava Dr A K Bhattacharya Dr Surendra Singh Dr Surendra Singh Dr Surendra Singh Dr A.P. Srivastava Prof. M.M. Mehta Prof M.M. Mehta Prof M.M. Mehta Prof M.M. Mehta Er P.N. Pangotra Dr B.S. Panesar Dr Mamta Jain Dr D.K. Singh Chief Editor/ Editor-in-Chief Dr M.J. Khan AET Dr S.M.Ilyas Dr B.S. Bisht Dr N.S.L. Srivastava Dr N.S.L. Srivastava Dr N.S.L. Srivastava Prof A.P. Bhatnagar Prof A.P. Bhatnagar Prof A.P. Bhatnagar Prof. N.N. Sirothia Dr Pitam Chandra Dr Pitam Chandra Dr Pitam Chandra Dr A.P. Srivastava Dr A.M. Michael Dr Dipankar De Dr H.S.Chauha Dr B.S.Pathak Prof S.V.Arya JAE Dr G. Singh Dr G. Singh Dr G. Singh Secretary General Dr R.K. Srivastava Dr Manoj Khanna Er Deepak Bhalla Er J.D. Traywick Secretary/ Er M.L. Taneja Er A.S. Deepak Er R.N. Sharma Er R.N. Sharma Er R.N. Sharma Dr S.K. Tandon Dr Amar Singh Er Amar Singh Dr Indra Mani Dr Indra Mani Dr Indra Mani Er A.K. Singh Dr P.K. Sahoo Er Anilkumar Prof J.S. Bali Dr S.M. Ilyas Dr J.P. Mittal Dr J.P. Mittal Dr S M Ilyas Er D.C. Das Dr Bachchan Singh Dr. Bangali Baboo Dr Rajvir Yadav Dr D.M. Kadam Dr Anwar Alam Dr S.D. Sawant Dr K.P. Pandey Dr C.M. Jacob Dr S.R. Verma Dr A.G. Power Dr R.K. Gupta Activity Prof C.V. Paul Dr V.K. Mittal Er B.K.S. Jain Dr C.P. Gupta Dr K.S.Reddy Dr. R. T. Patil Dr Y.C. Bhatt Shri D.C. Das Dr J.K. Singh Dr. R.T. Patil Dr R.T. Patil Vice President Dr D.N. Kherdekar Dr Ambrish Kumar Dr. Jaswant Singh Dr A.P. Srivastava Dr A.M. Michael Dr M.M. Pandey Dr R.N. Pandey Dr V.K. Sharma Dr. S. M. Ilyas Dr C.R. Mehta **Fechnical** Dr K.N. Singh Dr. D S Taneja Dr A.K. Singh Dr C.P. Singh Dr S.M. Ilyas Dr K.N. Nag Dr C.P. Singh Dr N.K. Das Dr J.S. Patel Dr T.P. Ojha Dr G. Singh Dr R. T. Patil Prof Gajendra Singh Er B.M. Laxmipathy Dr N.S.L. Srivastava Dr N.S.L. Srivastava Dr V.M. Mayande Prof A.C. Pandya Prof M.M. Mehta Prof B.P.N. Singh Dr A.M. Michael Dr Anwar Alam Dr Anwar Alam President Er Amar Singh Dr B.S. Pathak Dr S.R. Verma Dr Indra Mani Dr Nawab Ali Dr N.C. Patel Dr K.N. Nag Dr T.P. Ojha Dr J.S. Patel Dr T.P. Ojha Dr S.N. Jha 1974-78 2010-12 2012-15 2015-18 1960-63 963-74 1984-86 1992-94 994-96 2008-10 978-81 1981-84 1986-88 1988-92 996-98 998-00 2000-02 2002-04 2004-06 2006-08 2018-21 2021-24 Year SI. So. ._; 0 П. 12. 13. 4 S. 16. ri ć. 17. Г. 9. 4 Ś 6 ø 18. 20. 21. 22. 19.

LIST OF EXECUTIVE COMMITTEE MEMBERS OF ISAE (1960-2023)

ISAE



Appendix V

ISAE PRESIDENTS (1960-2024)



Er B.M. Laxmipati 1960-63



Dr J.S. Patel 1963-74



Prof. A.C. Pandya 1974-78



Dr B.S. Pathak 1978-81



Prof. M.M. Mehta 1981-84



Prof. B.P.N. Singh 1994-96



Er Amar Singh 2008-10



Dr S.N. Jha 2021-24



Dr T.P. Ojha 1984-86



Dr A.M. Michael 1996-98



Dr Gajendra Singh 2010-12

Dr S.R. Verma 1986-88



Dr A. Alam 1998-2002



Dr V.M. Mayande 2012-15



Dr NSL Srivastava 2002-06



Dr N.C. Patel 2015-18

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2006-08



Dr Indra Mani 2018-2021







Dr Nawab Ali



Appendix VI

DETAILS OF ISAE CHAPTERS

No.	State	Names & Locations
1.	Andhra Pradesh	ISAE Andhra Pradesh Chapter Dr N.T.R. College of Agricultural Engineering, Karlapalem, Baptla-522 101 Email: <u>isaeapchapter@gmail.com</u>
2.	Arunachal Pradesh	ISAE Arunachal Pradesh Chapter Department of Agricultural Engineering, NERIST, Itanagar, Nirjuli-791 109 (Arunachal Pradesh) Email: <u>isae.arunachal@gmail.com</u>
3.	Assam NE (except Sikkim and Arunachal Pradesh) Chapter	ISAE Assam NE (Except Sikkim and Arunachal Pradesh) Chapter Department of Food Engineering and Technology, Tejpur University, Napaam,Tejpur-782 028, Assam Email: <u>isaeassamne@gmail.com</u>
4.	Bihar	ISAE Bihar Chapter College of Agricultural Engineering and Technology. Dr Rajendra Prasad Central Agricultural University, Pusa, Samastipur-848 125 Email: <u>isaebihar@gmail.com</u>
5.	Chhattisgarh	ISAE Raipur Chapter Swami Vivekanand College of Agricultural Engineering and Technology and Research Station, Indira Gandhi Krishi Vishwa Vidyalaya, Raipur-492 012 Email: cgcisae22@gmail.com
6.		ISAE Junagarh Chapter College of Agricultural Engineering &Technology, Junagarh Agricultural University, Junagarh-362 001 Email: <u>isaejunagarhgujarat@gmail.com</u>
7.	Gujarat	ISAE Anand Chapter College of Food Processing Technology & Bio-energy, Anand Agricultural University, Anand-388 110 Email: <u>isaeanand@gmail.com</u>
8.	Haryana	ISAE Haryana Chapter College of Agricultural Engineering and Technology, CCS Haryana Agricultural University, Hisar-125 004 Email: <u>isae.haryana@gmail.com</u>
9.	Himachal Pradesh	ISAE Himachal Chapter Department of Agricultural Engineering, CSK HPKV, Palampur-176 061 Email: <u>isae.himch@gmail.com</u>
10.	Jammu & Kashmir	ISAE J&K Chapter College of Agricultural Engineering, Shar-e-Kashmir University of Agriculture and Technology, Shalimar (J&K) Email: <u>isaesrinagar@gmail.com</u>
11.	Jharkhand	ISAE Jharkhand Chapter College of Agricultural Engineering, Birsa Agricultural University, Kanke, Ranchi-834 006 Email: <u>isaejharkhandranchi@gmail.com</u>



12.	<i>v</i>	ISAE Bangaluru Chapter College of Agricultural Engineering, University of Agricultural Sciences, GKVK Campus, Bangaluru-560 065 Email: <u>isaebangaluru@gmail.com</u>
13.	Karnataka	ISAE Raichur Chapter College of Agricultural Engineering, University of Agricultural Sciences, Raichur-584 104 Email: <u>isaeraichur@gmail.com</u>
14.	Kerala	ISAE Kerala Chapter KCAET, Tavanur-679 573 Email: <u>isaekerala2021@gmail.com</u>
15.	Madhua Deodoch	ISAE Jabalpur Chapter College of Agricultural Engineering, Jawaharlal Nehru Krishi Vishwa Vidyalay, Jabalpur-482 004 Email: <u>isaecaejbp@gmail.com</u>
16.	Madiiya Fradesii	ISAE Bhopal Chapter ICAR-Central Institute of Agricultural Engineering, Nabi Bagh, Berasia Road-462 038 Email: <u>isaebhopalchapter@gmail.com</u>
17.		ISAE Rahuri Chapter Dr Annasaheb Shinde College of Agricultural Engineering & Technology, Mahatma Phule Krishi Vidyapeeth Rahuri-413 722. Email: <u>isae.rahuri@gmail.com</u>
18.		ISAE Akola Chapter Dr Pajabrao Deshmukh Krishi Vidya Peeth, Akola-444 104 Email: <u>isaeakola@gmail.com</u>
19.		ISAE Dapoli Chapter College of Agricultural Engineering and Technology Dapoli-415 712 Email: <u>isaedapoli@gmail.com</u>
20.	Maharashtra	ISAE Parbhani Chapter College of Agricultural Engineering & Technology, VNMKV Parbhani-431 401 Email: <u>isaeparbhanichapter@gmail.com</u>
21.		ISAE Mumbai Chapter ICAR-CIRCOT, Adenwala Road, Matunga, Mumbai-400 019 Emai.: <u>isaemumbai@gmail.com</u>
22.	New Delhi	ISAE Delhi NCR Chapter Division of Agricultural Engineering, Indian Agricultural Research Institute, New Delhi-110 012 Email: <u>isaedelhi@gmail.com</u>
23.	Odisha	ISAE Odisha Chapter College of Agricultural Engineering & Technology, Orissa University of Agriculture and Technology, Bhuwaneshwar-751 003 Email: <u>isaeodisha@gmail.com</u>
24.	Punjab	ISAE Punjab Chapter College of Agricultural Engineering and Technology, Punjab Agricultural University, Ludhiana-141 004 Email: <u>isaepunjabchapter@gmail.com</u>
25.	Rajasthan	ISAE Udaipur Chapter College of Agricultural Engineering and Technology, Maharana Pratap University of Agriculture and Technology, Udaipur-313 003 Email: <u>isaerajasthanchapter@gmail.com</u>

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26.	Sikkim	ISAE Sikkim Chapter College of Agricultural Engineering and Post Harvest Technology, Central Agricultural University, Ranipool, Gangtok-737 135 (Sikkim) Email: <u>isaesikkimchapter@gmail.com</u>
27.	Tamil Nadu	ISAE Coimbatore Chapter College of Agricultural Engineering and Research Institute, Tamil Nadu Agricultural University, Coimbatore-641 007 Email: <u>isaecoimbatore@gmail.com</u>
28.		ISAE Thanjavur Chapter NIFTEM-T Pudukkottai, Thanjavur-613 005 Email: <u>isaethanjavur@gmail.com</u>
29.	Telangana	ISAE Telangana Chapter ICAR-Central Research Institute for Dryland Agriculture, KVK Rangareddy, District Santoshnagar, Saidabad, Hyderabad-500 059 Email: <u>isaehyderabad@gmail.com</u>
30.	Uttarakhand	ISAE Pantnagar Chapter College of Agricultural Engineering and Technology, G.B.Pant University of Agriculture & Technology, Pantnagar-263 145 Email: <u>isaepantnagar@gmail.com</u>
31.		ISAE Allahabad Chapter Vaugh Institute of Agricultural Engineering and Technology, Sam Higginbottom University of Agriculture, Technology & Science, Allahabad-211007 Email: <u>isaeallahabad@shuat.edu.in</u>
32.		ISAE Lucknow Chapter Division of Agricultural Engineering, ICAE-Indian Institute of Sugarcane Research, Taebareli Road, P.O. Dilkusha, Lucknow-226 002 Email: isaelkochapter@gmail.com
33.	Uttar Pradesh	ISAE Narendranagar Chapter Mahamaya College of Agricultural Engineering & Technology, Narendra Dev University of Agriculture and Technology, Akbarpur, Ambedkar Nagar-224 122 Email: <u>isaenarendranagar@gmail.com</u>
34.		ISAE Varanasi Chapter Department of Farm Engineering, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi-221005 Email: <u>isaevaranasi@gmail.com</u>
35.	West Bengal	ISAE Kharagpur Chapter Agricultural and Food Engineering Department, Indian Institute of Technology Kharagpur-7 Email: <u>isaekharagpur@gmail.com</u>
36.	-	ISAE Kolkota Chapter ICAR-NINFET, 12 Regent Park, Kolkota-700 040 Email: <u>isaeatcityofjoy@gmail.com</u>

Appendix VII

ISAE

VENUES AND DATES OF ANNUAL CONVENTIONS

Sl. No.	Year	Date/Month	State	Organization
1.	1960	October	Kharagpur, West Bengal	IIT
2.	1964	April	Kharagpur, West Bengal	IIT
3.	1964	November	Allahabad, Uttar Pradesh	AAI
4.	1965	November	New Delhi, Delhi	IARI
5.	1966	November	Bhopal, Madhya Pradesh	State Govt.
6.	1967	December	Bangalore, Karnataka	UAS
7.	1969	February	Pantnagar, Uttar Pradesh	GBPUAT
8.	1970	February	Ludhiana. Punjab	PAU
9.	1970	December	Udaipur, Rajasthan	CTAE
10.	1972	February	Jabalpur, Madhya Pradesh	JNKVV
11.	1973	January	Coimbatore, Tamil Nadu	TNAU
12.	1974	04-07 March	Bhubaneswar, Orissa	OUAT
13.	1975	31 Dec 74-02 Jan 75	Allahabad, Uttar Pradesh	AAI
14.	1976	January	Hyderabad. Andhra Pradesh	APAU
15.	1977	10-12 February	Pune, Maharashtra	Agric. College
16.	1978	18-20 December	Kharagpur, West Bengal	IIT
17.	1980	06-08 February	New Delhi, Delhi	IARI
18.	1981	26-28 February	Karnal, Haryana	CSSRI
19.	1982	15-17 February	Udaipur, Rajasthan	CTAE, RAU
20.	1983	05-07 March	Pantnagar, Uttar Pradesh	GBPUAT
21.	1984	05-07 April	New Delhi, Delhi	IARI
22.	1985	28-30 October	Bhopal, Madhya Pradesh	CIAE
23.	1987	09-11 March	Jabalpur, Madhya Pradesh	JNKVV
24.	1988	21-23 January	Akola, Maharashtra	Dr. PDKV
25.	1989	05-07 January	Udaipur, Rajasthan	RAU
26.	1990	07-09 February	Hisar. Harvana	HAU
27.	1991	October	New Delhi, Delhi	IARI
28.	1993	02-04 March	Bhopal, Madhya Pradesh	CIAE
29.	1994	February	Junagarh, Guirat	GAU
30.	1995	April	Coimbatore, Tamil Nadu	TNAU
31.	1995	28-30 December	Thrissur, Kerala	KAU
32.	1997	16-18 April	Ludhiana, Punjab	PAU
33.	1998	21-23 September	Bhopal, Madhya Pradesh	CIAE
34.	1999	16-18 December	Hisar, Haryana	CCS HAU
35.	2001	22-24 January	Bhubaneswar, Orissa	OUAT
36.	2002	28-30 January	Kharagpur, West Bengal	IIT
37.	2003	29-31 January	Udaipur, Rajasthan	MPUAT
38.	2004	16-18 January	Dapoli, Maharashtra	Dr. BSSKKV
39.	2005	02-04 February	Hyderabad, Andhra Pradesh	ANGRAU
40.	2006	19-21 January	Coimbatore, Tamil Nadu	TNAU
41.	2007	29-31 January	Junagadh, Gujarat	JAU
42.	2008	07-09 February	Bhopal, Madhya Pradesh	CIAE
43.	2009	15-17 February	Ranchi, Jharkhand	BAU
44.	2010	28-30 January	New Delhi, Delhi	IARI
45.	2011	17-19 January	Nagpur, Maharashtra	Dr. PDKV
46.	2012	27-29 February	Pantnagar, Uttarakhand	GBPUAT
47.	2013	28-30 January	Hyderabad, Andhra Pradesh	DRR
48.	2014	21-23 February	Udaipur, Rajasthan	MPUAT
49.	2015	23-25 February	Ludhiana, Punjab	PAU
50.	2016	19-21 January	Bhubaneshwar, Orissa	OUAT
51.	2017	16-18 February	Hisar, Haryana	CCSHAU
52.	2018	08-10 January	Anand, Gujrat	AAU
53.	2019	28-30 January	Varanasi, Uttar Pradesh	BHU
54.	2020	07-09 January	Hyatt Hotel, Pune	MPKV, Rahuri
55.	2021	23-25 November	Convention Centre, Patna	RPCAU, Pusa
56.	2022	09-11 November	Coimbatore, Tamil Nadu	TNAU
57.	2023	06-08 November	Raichur, Karnataka	UAS



Appendix VIII

LIST OF GOVERNMENT AGRICULTURAL ENGINEERING COLLEGES

1. 1942 Uttar Pradesh College of Agricultural Engineering, Allahabad Agricultural Institute, (now Yough Institute of Agricultural and Food Engineering, Indian Institute of Technology, SHUAT) Prayagraj 2. 1952 West Bengal Department of Agricultural and Food Engineering, Indian Institute of Technology, KIATAP Prayagraj 3. 1962 Uttar Pradesh (now in Uttara Khand) College of Agricultural Engineering 4. 1964 Punjab College of Agricultural Engineering 5. 1965 Odisha College of Agricultural Engineering and Technology, Blubaneshwar 6. 1965 Rajasthan College of Agricultural Engineering, Motanal Sukhadia University of Agricultural Engineering, Motanal Sukhadia University of Agricultural Engineering, Motanal Engineering, Motanal Engineering, Motanal Engineering, Motanal Engineering, Motanal Engineering, Matanal Puta University of Agricultural Engineering, Matanal Puta University, College of Agricultural Engineering, Matanal Puta University, College of Agricultural Engineering, Matanal Puta University, College of Agricultural Engineering, Matanal Puta Engineering, Matanashtra 10. 1967 Haryana College of Agricultural Engi	Sl. No.	Year	State	Name of the college with location
2. 1952 West Bengal Institute, (now Yaugh Institute of Agricultural Engineering, Indian Institute of Technology, Kharagpur 3. 1962 Uttar Pradesh (now in Uttara Khand) College of Technology, Govind Ballabh Pant University of Agricultural Engineering 4. 1964 Punjab College of Agricultural Engineering 5. 1965 Odisha College of Agricultural Engineering & Technology, Bhubaneshwar 6. 1965 Rajasthan College of Agricultural Engineering, College of Agricultural 7. 1965 Karnataka Department of Agricultural Engineering, College of Agricultural 8. 1967 Delhi Diversity of Agricultural Engineering, College of Agricultural 9. 1967 Haryana Division of Agricultural Engineering, Mathe Agricultural Engineering, Mathema Pratey 9. 1967 Haryana Division of Dairy Engineering, Mathema Pratey 10. 1967 Madhya Pradesh College of Agricultural Engineering, Mathema Pratey 11. 1969 Maharashtra College of Agricultural Engineering, Mathema Pratey 12. 1969 Maharashtra College of Agricultural	1.	1942	Uttar Pradesh	College of Agricultural Engineering, Allahabad Agricultural
2. 1952 West Bengal Department of Agricultural and Food Engineering, Indian Institute of Technology, Govind Ballabh Pant University of Uttara Khand) 3. 1962 Uttar Pradesh (now in Uttara Khand) College of Technology, Govind Ballabh Pant University of Technology, Buthanesh 4. 1964 Punjab College of Agricultural Engineering Technology, Studural University, Ladhiana 5. 1965 Odisha College of Agricultural Engineering and Technology, Bhubaneshwar 6. 1965 Rajasthan College of Agricultural Engineering, College of Agriculture, University of Agricultural Engineering, College of Agriculture, University of Agricultural Engineering, College of Agriculture, University of Agricultural Engineering, MTech & Ph.D.) 7. 1965 Karnataka Department of Agricultural Engineering, College of Agriculture, University of Agricultural Engineering, MTech & Ph.D.) 8. 1967 Delhi Division of Agricultural Engineering, MTech & Ph.D.) 10. 1967 Haryana Division of Dairy Engineering, Mathia 11. 1969 Maharashtra College of Agricultural Engineering, Mathia 12. 1969 Maharashtra College of Agricultural Engineering, Banaras Hindu University, Varanasi 13. 1969 Assam College of Agricultural En				Institute, (now Vaugh Institute of Agricultural Engineering and
2. 1952 West Bengal Department of Agricultural and Food Engineering, Indian Institute of Technology, Kharagpur 3. 1962 Uttar Pradesh (now in Uttara Khand) College of Technology, Govind Ballabh Pant University of Agricultura and Technology, Fourpart (and the properties) 4. 1964 Punjab College of Agricultural Engineering & Technology, Odisha 5. 1965 Odisha College of Agricultural Engineering & Technology, Bhubaneshwar 6. 1965 Rajasthan College of Agricultural Engineering and Technology, Odisha University of Agricultura and Technology, Udaipur 7. 1965 Karnataka Department of Agricultural Research Institute, New Dehli B. Tech programme also started in 2023. 9. 1967 Haryana Division of Agricultural Research Institute, Karnal 10. 1967 Madhya Pradesh College of Agricultural Engineering, Mational Dairy Research Institute, Karnal 11. 1969 Maharashtra College of Agricultural Engineering, Daharashtra 12. 1969 Maharashtra College of Agricultural Engineering, Banaras Hindu University, Vagneeth Akola 13. 1969 Assam College of Agricultural Engineering, Banaras Hindu University, Varanasi 14. 1972 Tamil Nadu				Technology, SHUAT) Prayagraj
3. 1962 Uttar Pradesh (now in Uttara Khand) College of Technology, Govind Ballabh Pant University of College of Agricultural Engineering 4. 1964 Punjab College of Agricultural Engineering 5. 1965 Odisha College of Agricultural Engineering and Technology, Bubaneshwar 6. 1965 Rajasthan College of Agricultural Engineering and Technology, Mohanlal Sukhadia University (now Maharana Pratap University of Agricultural Engineering, College of Agriculture, University of Agricultural Engineering, College of Agriculture, University of Agricultural Engineering (MTech & APh.D.) 7. 1965 Karnataka Department of Agricultural Engineering, College of Agriculture, University of Agricultural Engineering, IMTech & APh.D.) 8. 1967 Delhi Division of Dairy Engineering, MTech & APh.D.) 10. 1967 Haryana Division of Dairy Engineering, MTech & APh.D.) 11. 1969 Maharashtra College of Agricultural Engineering, MTech Akola 12. 1969 Maharashtra College of Agricultural Engineering, Drajabrao Deshmukh Krish Viyapeeth Akola 13. 1969 Assam College of Agricultural Engineering, Tenhology, Assam 14. 1972 Tamil Nadu College of Agricultural Engineering, Samatstipu 15. </td <td>2.</td> <td>1952</td> <td>West Bengal</td> <td>Department of Agricultural and Food Engineering, Indian Institute of</td>	2.	1952	West Bengal	Department of Agricultural and Food Engineering, Indian Institute of
3. 1962 Utar Pradesh (now in Uttar Khand) College of Technology, Govind Ballabh Parau University of Agriculture and Technology, Pant Nagar 4. 1964 Punjab College of Agricultural Engineering Punjab Agricultural University, Ludhinan 5. 1965 Odisha College of Agricultural and Technology, Bhubaneshwar 6. 1965 Rajasthan College of Agricultural Engineering and Technology, Mohanlal Sukhadia University (now Maharana Pratap University of Agriculture and Technology), Udaipur 7. 1965 Karnataka Department of Agricultural Engineering, College of Agriculture, University Definieering, Punjaba Davity Engineering, National Dairy Research Institute, Karnal 10. 1967 Madhya Pradesh College of Agricultural Engineering, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur. Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur. 11. 1969 Maharashtra College of Agricultural Engineering, Dr Panjabrao Deshmukh Krish Viyapeeth Akola 13. 1969 Assam College of Agricultural Engineering, Tamil Nadu Agricultural University, Coimbatore 15. 1981 Uttar Pradesh College of Agricultural Engineering, College of Agricultural Engineering, College of Agricultural Engineering,				Technology, Kharagpur
Uttara Khand)Agricultura and Technology, Pant Nagar College of Agricultural Engineering Punjab Agricultural Engineering & Technology, Odisha University of Agricultura and Technology, Bubaneshwar5.1965OdishaCollege of Agricultural Engineering & Technology, Odisha University of Agricultura and Technology, Mohanla Sukhadia University, Icudiana Pariabula Sukhadia University, College of Agricultura end Technology, Mohanla Sukhadia University of Agricultura Engineering, Rogiculture and Technology, Udaipur7.1965KarnatakaDepartment of Agricultural Engineering, Rogicultura Engineering, Materna Partap University of Agricultural Sciences, Banguluru Boisos arted in 2023.8.1967DelhiDivision of Agricultural Engineering, Mational Dairy Research Institute, New Delhi B. Tech programme also started in 2023.9.1967HaryanaDivision of Dairy Engineering, Jawaharlal Nchru Krishi Vishwa Vidyalaya, Jabalpur.10.1967Madhya PradeshCollege of Agricultural Engineering, Jawaharlal Nchru Krishi Vishwa Vidyalaya, Jabalpur.11.1969MaharashtraCollege of Agricultural Engineering, Dr Panjabrao Deshmukh Krish Viyapeeth Akola13.1969AssamCollege of Agricultural Engineering, Dr Panjabrao Deshmukh Krish Viyapeeth Akola14.1972Tamil NaduCollege of Agricultural Engineering, Dr Panjabrao Deshmukh Krish Viyapeeth Akola15.1981Uttar PradeshCollege of Agricultural Engineering, Acharya N. G. Ranga Agricultural E	3.	1962	Uttar Pradesh (now in	College of Technology, Govind Ballabh Pant University of
4. 1964 Punjab College of Agricultural Engineering 5. 1965 Odisha College of Agricultural Engineering & Technology, Odisha University of Agricultura Engineering, and Technology, Mohanlal Sukhadia University (now Maharana Pratap University of Agriculture and Technology), Udaipur 7. 1965 Karnataka Department of Agricultural Engineering, College of Agricultural Engineering, College of Agricultural Engineering, College of Agricultural Engineering, College of Agricultural Research Institute, New Delhi B. Tech programme also started in 2023. 9. 1967 Haryana Division of Agricultural Engineering, National Dairy Engineering, Jawaharal Nethr Krish Visyapeeth, Rahuri 10. 1967 Madhya Pradesh College of Agricultural Engineering, Jawaharal Nethr Krish Visyapeeth, Rahuri 12. 1969 Maharashtra College of Agricultural Engineering, Jawaharal Nethr Krish Visyapeeth Akola 13. 1969 Assam College of Agricultural Engineering, Jawaharal Nethr Krish Visyapeeth Akola 14. 1972 Tamil Nadu College of Agricultural Engineering, Jawaharal Nethr Krish Visyapeeth Akola 13. 1969 Assam College of Agricultural Engineering, Aranasi 16. 1983 Andhra Pradesh College of Agricultural Engineering, College of Agricultural Engineering, Acharya N. G. Ranga Agricultural Engineering, Cuig			Uttara Khand)	Agriculture and Technology, Pant Nagar
5. 1965 Odisha College of Agricultural Engineering & Technology, Odisha University of Agricultural Engineering and Technology, Mohanla Stukhadia University (now Maharana Pratap University of Agricultura and Technology), Udaipur 7. 1965 Karnataka Department of Agricultural Engineering, Gollege of Agriculture, University of Agricultural Engineering, Gollege of Agriculture, Mohanla Stukhadia University (now Maharana Pratap University of Agricultural Engineering, College of Agricultural Engineering, College of Agricultural Sciences, Banguluru 8. 1967 Delhi Division of Agricultural Engineering, Michael Sciences, Banguluru 9. 1967 Haryana Division of Dairy Engineering, National Dairy Research Institute, New Delhi B. Tech programme also started in 2023. 9. 1967 Madrya Pradesh College of Agricultural Engineering, National Dairy Research Institute, Xarnal 10. 1967 Madharashtra College of Agricultural Engineering, Mahatma Phule Krishi Vishyapeeth, Aklahuri 12. 1969 Maharashtra College of Agricultural Engineering, Mahatma Phule Krishi Vishyapeeth Akola 13. 1969 Assam College of Agricultural Engineering, Mahatma Agricultural University, Combatore 15. 1981 Uttar Pradesh College of Agricultural Engineering, Coligrat Agricultural Engineering, Mahamaya College of Agricultural Engineering, Coligrat Agricultural Engineering, Coligrat	4.	1964	Punjab	College of Agricultural Engineering
5. 1965 Odisha College of Agricultural Engineering & Technology, Odisha University (or Mariana Pratap University of Agricultura end Technology), Udaipur 6. 1965 Rajasthan College of Agricultural Engineering and Technology, Mohanlal Sukhadia University (now Maharana Pratap University of Agricultura end Technology), Udaipur 7. 1965 Karnataka Department of Agricultural Engineering, College of Agricultural Engineering, College of Agricultural Engineering, Mice and Technology), Udaipur 8. 1967 Delhi Division of Agricultural Engineering, Mice and Echnology, Indian Agricultural Research Institute, New Delhi B. Tech programme also started in 2023. 9. 1967 Haryana Division of Dairy Engineering, National Dairy Research Institute, Karnal 10. 1967 Madhya Pradesh College of Agricultural Engineering, Javaharlal Nchru Krishi Visyapeth, Rahuri 12. 1969 Maharashtra College of Agricultural Engineering, Dr Panjabrao Deshmukh Krish Visyapeth Akola 13. 1969 Assam College of Agricultural Engineering, Tanil Nadu Agricultural University, Coimbatore 15. 1981 Uttar Pradesh College of Agricultural Engineering, Tanil Nadu Agricultural University, Coimbatore 17. 1983 Bihar College of Agricultural Engineering, College of Agricultural Engineering, Acharya N. G. Ranga Ag				Punjab Agricultural University, Ludhiana
6. 1965 Rajasthan Odisha University of Agricultural Engineering and Technology, Bhubaneshwar 6. 1965 Rajasthan College of Agricultural Engineering, College of Agriculture 7. 1965 Karnataka Department of Agricultural Engineering, College of Agriculture, University of Agricultural Sciences, Banguluru 8. 1967 Delhi Division of Agricultural Engineering (MTech &Ph.D.) 9. 1967 Haryana Division of Dairy Engineering, 10. 1967 Madhya Pradesh College of Agricultural Engineering, 11. 1969 Maharashtra College of Agricultural Engineering, 12. 1969 Maharashtra College of Agricultural Engineering, 13. 1969 Assam College of Agricultural Engineering, Tamil Nadu Agricultural Engineering, 14. 1972 Tamil Nadu College of Agricultural Engineering, Tamil Nadu Agricultural Engineering, 15. 1981 Uttar Pradesh College of Agricultural Engineering, Tamil Nadu Agricultural Engineering, 16. 1983 Andhra Pradesh College of Agricultural Engineering, Tamil Nadu Agricultural Engineering, 17. 1983 Bihar College of Agricultural Engineering, Ta	5.	1965	Odisha	College of Agricultural Engineering & Technology,
6. 1965 Rajasthan College of Agricultural Engineering and Technology, Mohanlal Sukhadia University (now Maharana Pratap University of Agriculture and Technology), Udaipur 7. 1965 Karnataka Department of Agricultural Engineering, College of Agriculture, University of Agricultural Engineering, College of Agriculture, Bao started in 2023. 8. 1967 Delhi Division of Agricultural Research Institute, New Delhi B. Tech programme also started in 2023. 9. 1967 Haryana Division of Dairy Engineering, Mational Dairy Research Institute, Karnal 10. 1967 Madhya Pradesh College of Agricultural Engineering, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur. 11. 1969 Maharashtra College of Agricultural Engineering, Mahatma Phule Krishi Viyapeeth, Rahuri 12. 1969 Maharashtra College of Agricultural Engineering, Mahatma Phule Krishi Viyapeeth Akola 13. 1969 Assam College of Agricultural Engineering, Tamil Nadu Agricultural University, Coimbatore 15. 1981 Uttar Pradesh College of Agricultural Engineering, Acharya N. G. Ranga Agricultural Engineering, Dr Rajendra Prasad Central Agricultural University, Jangatha 17. 1983 Bihar College of Agricultural Engineering, Culge of Agricultural Engineering, Cultarda Pradesh 1984				Odisha University of Agriculture and Technology, Bhubaneshwar
Mohanlal Sukhadia University (now Maharana Pratap University of Agriculture and Technology), Udaipur7.1965KarnatakaDepartment of Agricultural Engineering, College of Agriculture, University of Agricultural Seineering, College of Agriculture, University of Agricultural Seineering, College of Agriculture, University of Agricultural Seineering, College of Agriculture, University of Agricultural Research Institute, New Delhi B. Tech programme also started in 2023.9.1967HaryanaDivision of Dairy Engineering, National Dairy Research Institute, New Delhi B. Tech programme also started in 2023.10.1967Madhya PradeshCollege of Agricultural Engineering, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur.11.1969MaharashtraCollege of Agricultural Engineering, Mahatma Phule Krishi Vidyapeeth, Rahuri12.1969MaharashtraCollege of Agricultural Engineering, Dr Panjabrao Deshmukh Krish Viyapeeth Akola13.1969AssamCollege of Agricultural Engineering, and Technology, Assam Agricultural University, Jorhat14.1972Tamil NaduCollege of Agricultural Engineering, famil Nadu Agricultural University, Coimbatore15.1981Uttar PradeshCollege of Agricultural Engineering, Adricultural Engineering, Mahamaya College of Agricultural Engineering, Guirat Agricultural Engineering, Guirat Agricultural Engineering, College of Agricultur	6.	1965	Rajasthan	College of Agricultural Engineering and Technology,
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7. 1965 Karnataka Department of Agricultural Engineering, College of Agriculture, University of Agricultural Sciences, Banguluru 8. 1967 Delhi Division of Agricultural Engineering, (MTeck &Ph.D.) 10. 1967 Haryana Division of Dairy Engineering, National Dairy Research Institute, New Delhi B. Tech programme also started in 2023. 9. 1967 Haryana Division of Dairy Engineering, National Dairy Research Institute, Kamal 10. 1967 Madhya Pradesh College of Agricultural Engineering, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur. 11. 1969 Maharashtra College of Agricultural Engineering, Mahatma Phule Krishi Vishwa Vidyalaya, Jabalpur. 12. 1969 Maharashtra College of Agricultural Engineering, Mahatma Phule Krishi Vishwa Vidyalaya, Jabalpur. 13. 1969 Assam College of Agricultural Engineering, Dr Panjabrao Deshmukh Krishi Vishwa Vidyalaya, Jasama Agricultural University, Coimbatore 15. 1981 Uttar Pradesh College of Agricultural Engineering, Asmaras Hindu University, Varanasi 16. 1983 Andhra Pradesh College of Agricultural Engineering, Acharya N. G. Ranga Agricultural Engineering, College of Agricultural Engineering, College of Agricultural Engineering, College of Agricultural Engineering, College of Agricultural Engineering, Gujrat Agricultural Eng				Agriculture and Technology), Udaipur
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Note: In addition to these colleges run by State and Central Governments and IIT, several private engineering colleges started Agricultural Engineering programme and altogether total number is about 270.



Appendix IX

GOVERNMENT DEPARTMENTS SUITABLE FOR AGRICULTURAL ENGINEERS

Sl. No.	Activities and related Departments	Earlier managed by	Activity falling in major discipline of Agri. Engineering
1.	 i) Most of the engineering posts existing in the Agricultural Departments of States and Central Governments. ii) State Agro–Industries Corporations. iii) Government State Mechanized Farms. iv) Land reclamation and land development activities. v) Works related to farm machinery for manufacture, testing, field operations, field demonstration, popularization, repair and maintenance of agricultural, implements and machinery for farm operation, land leveling and grading. vi) Mechanized plant protection of field horticultural, commercial and plantation crops. vii) Mechanization of Green house cultivation and handling of produce. 	Mechanical Engineers/Civil Engineers	Agricultural Engineers with specialization in Farm Machinery and Power Engineering
2.	 i) Land development and land leveling related activities and departments. ii) Soil and Water Engineering related activities. iii) Works related to minor irrigation projects; micro irrigation projects; laying of distributaries from main water supply systems and efficient application of water in the fields, runoff management. iv) Agricultural drainage projects works. v) Reclamation of saline and alkaline soil and related departments. vi) Manufacture and marketing of technologies related to land development, irrigation and drainage of agricultural lands. 	Civil Engineers	Agricultural Engineers with Specialization in Soil and Water Engineering, Irrigation and Drainage Engineering
3.	 i) Assessment of Harvest and Post Harvest Losses and their remedial measures. ii) Primary, Secondary and Tertiary processing of agricultural produce for food, animal feed and fiber. iii) Storage structures for safe storage of perishable and semi perishable agricultural and horticultural produce. iv) Value addition and food processing of agricultural produce, horticultural produce, milk and milk products, animal products, inland and marine fishery, poultry, piggery, silkworm and honey products. v) Food processing, packaging and storage. vi) Seed processing, packaging and storage vii) Processing and value addition of natural fiber (cotton, jute, remi, sisal, mulberry etc.) 	Mechanical/ Electrical Engineers	Agricultural Engineers with Specialization in Agricultural Structures and Process Engineering.



	 viii) Processing and value addition of spices and condiments, cut flowers; rasins and gums. ix) Processing of sugarcane for jiggery and other value-added products. x) Processing and value addition of plantation crops (tea, coffee, coconut, arecanut etc.) xi) Manufacture, repair & maintenance, promotion and marketing of Post-Harvest Technologies and Value-Added Products. 		
4.	 i) Efficient Utilization of Animate Energy, assessment of their capacity of working/ load carrying/ draught ability and working out work rest cycles to improve their outputs. ii) Testing of tractors and power tillers. iii) Energy management in agriculture with increased efficiency and assessment of command area of different sources of farm power under different field conditions and cropping systems. iv) Development and Efficient use of Solar, Wind, Biomass and other sources of renewable energy in agricultural production and processing. v) Use and promotion of Biogas Plants, Bio-CNG, Producer Gas etc. vi) Production and processing of bio-fuels from different sources. vii) R&D, promotion and marketing of Renewable Energy 	Mechanical and Electrical Engineers	Agricultural Engineers/ Engineers with Specialization in FMPE and Renewable Energy.

Technologies in Agriculture for Different purposes.

