

Key Laboratory of Agricultural Engineering in Structure and Environment, Ministry of Agriculture, China Agricultural University

The Key Laboratory of Agricultural Engineering in Structure and Environment (KLAESE), Ministry of Agriculture (MOA), affiliated to China Agricultural University (CAU), is the comprehensive and leading laboratory of the discipline-cluster of Agricultural Engineering in Structure and Environment (AESE), which is among the 30 clusters launched by MOA in 2011. The AESE discipline-cluster consists of one comprehensive key laboratory-KLAESE, four regional/professional key laboratories including Key Laboratory of Farm Building in Structure and Construction, MOA; Key Laboratory of Energy Conservation and Waste Management of Agricultural Structures, MOA; Key Laboratory of Equipment and Informatization in Environment Controlled Agriculture, MOA; Key Laboratory of Protected Horticultural Engineering in Northwest, MOA, and three Scientific Observing and Experimental Stations including Scientific Observing and Experimental Station of Protected Horticulture Engineering in Northeast, MOA; Scientific Observing and Experimental Station of Environment Controlled Agricultural Engineering in Huang-Huai-Hai Region, MOA; Scientific Observing and Experimental Station of Animal Housing System in Southwest, MOA. The AESE discipline-cluster is one of the eight clusters firstly selected and financially supported by MOA in 2013 to enhance its research facilities.

KLAESE was initiated in 1983 and named as a Key Laboratory of MOA in 1993. It has continuously passed the five assessments of MOA since 1993 and was ranked as 'Outstanding' in 2005. Specifically, Agricultural and Bioenvironmental Engineering specialization at CAU offered by KLAESE was among the first credited to award degrees of M.S and Ph.D in China in 1986 and 1996, respectively. Professor Li Baoming, a national academic leader in Structure and Environment, is serving as the Director. Prof. Wang Maohua and Prof. Luo Xiwen, academicians of Chinese Academy of Engineering, are chairing and co-chairing the academic committee, respectively. KLAESE has 47 faculty members, including 18 professors and 24 associate professors, and over 70% of them have Ph.D degrees. The team includes a distinguished professor of the National "1,000 Talent Plan", which recruits internationally renowned professors and is supported by the Chinese Central Government, three professors in China Agricultural Research Systems (CARS), and an "Excellent Talent with an Innovation Team for Agricultural Research" named by MOA.

Since its establishment, the laboratory has been focusing on research and application specialized at production transformation, regional-specific development strategy, alternative production systems in animals and plants, environmental control technology and product, structure and equipment, energy saving and waste treatment technique, and environment-enhancing energy engineering in Structure and Environment area. In over 30 years, technologies and products originally developed and integrated, including highly efficient fan and pad evaporative cooling systems, slightly acidic electrolyzed water disinfection technology, welfare-friendly pig and poultry production system and equipment, multi-span solar greenhouse (Northern China type), plant factory breeding technology, and distributed-network environment control technology etc., have been nationally adopted, significantly benefiting the producers, and greatly contributing to the country's agricultural economy growth.



International Research Center for Animal Environment and Welfare initiated by the laboratory in 2011, with 12 international university members from USA, Canada, EU, Brazil, and Australia, and 4 domestic members



Ping SONG, a former member of the Standing Political Bureau of the CPC Central Committee visited the E²-Energy Lab and inscribed "Retain the sunshine; Strive to sustain future food and energy supply" in July 2013

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Prof. Anthony LEGGETT, a Nobel Laureate, presented and inscribed on 2010 E²-Energy Forum hosted by the laboratory



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KLAESE is well equipped with more than 80 large experiment stations or instruments, including a testing chamber for agricultural fans following international standards, indoor thermal environment and air quality/emission measurement instruments, and an agricultural structure property test station. It will be further equipped after the accomplishment of the special project started by MOA in 2013. The laboratory has established closely international cooperation with over 30 top universities and research institutions worldwide, from the United States, Canada, Holland, Denmark, Australia and Japan, etc. KLAESE founded the "International Research Center for Animal Environment and Welfare" (IRCAEW) and other international platforms, aiming at consolidating international cooperation to improve production efficiency and product quality through technical development and industrial services, and ultimately to better the quality of life for the mankind. In order to facilitate timely exchange of research findings/needs and to further stimulate multi-national interdisciplinary research endeavors, the laboratory now regularly hosts international symposia, including "International Symposium on Animal Environment and Welfare" and "Environment-Enhancing Energy Forum". Under the umbrella, the Beijing International Cooperation Base for Science and Technology on Animal Healthy Environment and Welfare was approved in 2014, to enhance the application of KLAESE's research outcomes.

KLAESE has over 50 ongoing contracts and grants, supported by National Natural Science Foundation of China, Ministry of Agriculture, Ministry of Science and Technology, and international organizations, etc. Since its establishment, more than 100 Ph.D. degrees and 400 M.S. degrees have been awarded by KLAESE, and many alumni have become national leaders in academic and industrial fields or faculties working at internationally renowned universities and institutes. KLAESE researchers have won four National Science and Technology Progress Award, one State Natural Science Award and 16 awards at Ministerial/Provincial level ever since. KLAESE is now annually authorized approximately 10 National Invention Patents and publishes over 100 referred journal articles.



Innovative cultivation technologies in horticultural engineering



KLAESE of MOA at CAU



KLEASE's three generations of slightly acidic electrolyzed water generators for air disinfection



A widely-used high-efficiency & energy-saving closed multi-layered seeding system with LED lighting



A space-efficient egg farm alternative system designed to fit hens' behavior and physiology



Hydrothermal liquefaction (HTL) reactors and analytical instruments in E²-Energy Lab