



POLITECHNIKA LUBELSKA
WYDZIAŁ INŻYNIERII ŚRODOWISKA



ZHIHONG CAO

The Honorary Professor
of
the Lublin University of Technology

Lublin 2013

POLITECHNIKA LUBELSKA



**Professor
Zhihong Cao Ph.D.**

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of
the Lublin University of Technology**



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**The resolution No. 2/2013/I
of Senate of the Lublin University of Technology
of February 28, 2013**

***on the awarding Prof. Zhihong Cao Ph.D.
the title of Honorary Professor at the Lublin University of Technology***

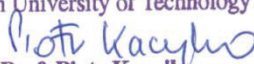
Pursuant to § 7a of the Senate of the Lublin University of Technology,
the Senate adopts as follows:

§ 1.

The Senate of the Lublin University of Technology awards the title of Honorary Professor to *Prof. Zhihong Cao Ph.D.* for his valuable contribution to the development of the scientific cooperation between the Faculty of Environmental Engineering of the Lublin University of Technology and the Chinese Academy of Sciences.

§ 2.

The resolution shall enter into force on the date of signing the document by the Rector of the Lublin University of Technology.

RECTOR
Lublin University of Technology

Prof. Piotr Kacejko

Marzenna R. Dudzińska
Deputy Rector of Scientific Affairs
Lublin University of Technology

LAUDATION

**Laudation on the occasion of conferring the title
of the Honorary Professor of the Lublin University of Technology
to Professor Cao Zhihong**

Distinguished Professor Cao,
Honorary Professors of the Lublin University of Technology,
Honourable Guests,
Magnificence Vice-Chancellor,
Members of the Senate,

It is my privilege and pleasure to present you the profile of professor Zhihong Cao, the Professor Emeritus of the Institute of Soil Science at the Chinese Academy of Sciences in Nanjing, and Special Invited Professor of the Zhejiang Agriculture and Forestry University in Hangzhou, China and a great friend of the Lublin University of Technology on the occasion of bestowal of the title of the honorary professor.

Professor Cao began his university education at the Soil and Agrochemistry Department at the Zhejiang University in Hangzhou, China, in 1960. He obtained a Bachelor's degree in August 1964. The next step in his education was writing and defending a paper entitled "Efficiency of ^{15}N labeled Urea Deep placement in wetland Rice Fields". As a result Cao achieved a Master of Science degree and started his international career.

He studied at the Agronomy Department of the International Rice Research Institute in Manila, Philippines and the Soil Science Department at the University of Philippines at Las Banos, Philippines between 1979 and 1981.

Cao's Ph.D. program was conducted at the Institute of Soil Science at the Chinese Academy of Sciences in Nanjing, China. The subject of his thesis was "Phosphorus Chemistry of Calcareous Soils in Northern China". From 1989

to 1998, after obtaining his Ph.D. degree, Cao took a postdoctoral program at the Soil Science Department of the Northern Carolina State University in Raleigh NC, USA.

During his professional career he took positions of the Assistant Director, Executive Deputy Director and Director General at the Institute of Soil Sciences at the Chinese Academy of Sciences. He was also appointed as the President of the Chinese Society of Soil Sciences.

Professor Cao's scientific researches refer mainly to soil science. However, during his professional career he extended and explored the areas of scientific knowledge becoming interested in crop science, fertilizers, soil quality evolution, and pollutants pathways. Nonetheless, his main aim was to serve people and make their life better.

He was involved in a number of projects to ensure the safety of food. He started his active career as a team member but, as he gained experience, he became the head of a number of projects. Cao was appointed the head of the research group of the Study on Soil Organic Pollution and Remediation, between April 1966 and November 1969. The research was organized by the Chinese Academy of Sciences in Beijing. The results of the project proved to be successful and, as an effect, the group received the "Advanced Team in Science Research" Award granted by Jiangsu Provincial Government in 1969.

Further scientific career involved participation in the research on the Improvement of N Use Efficiency and Developing Slow Release Fertilizers in the 1970's. As a result, among other advances, the group designed the "Double Roller Compaction Granulator" machine, which was an essential invention. The group obtained the National Science Award in 1978 for the development of the innovative technology.

Among others, he was involved in the National 6th Five Year's Plan Project on the Improvement of Low-Middle Yield Land in the Northern China. Cao was nominated as the head of the research station. The project proved to be very demanding because of the extent and the complexity of the preformed trials. The project enabled Cao to conduct research to his Ph.D. thesis. Due to the devotion of the team the project was granted with the National 2nd Class Award in 1988.

Another crucial project in Cao's scientific career was the International Cooperative Project on the Rational Fertilization of Cash Crops in China, during 1985 -2000. Being the head of the research team, Professor Cao introduced advances and innovations to the rapidly developing industry of complex fertilizers.

Professor Cao was also the coordinator of 12 provinces appointed to participate in the International Project on Sulfur Fertilizer in Chinese Agriculture and Environment, during 1997-2004. Extensive field experiments were conducted to examine the crop yield and quality response to sulfur fertilizer. The results were presented at two Sulfur Conferences in Korea and India.

Professor Cao participated in various research projects to enhance the quality of agriculture. Among the most important projects are: the Study on Soil Quality Evolution and the Sustainable Use of Soil Resource in China – 973 project (1999-2004), the Study on Prehistoric Paddy Soils and the Chronosequence Paddy Soils (2004-2011) and the Study on Forest Soils and Environment and Carbon Sequestration by Agricultural and Forest Soils (2005-2013).

Leading the research teams Professor Cao promoted 12 doctors and was the tutor of 6 postdoctoral coworkers.

During Professor Cao's scientific career he was awarded numerous times. He obtained the awards not only as a group member, but also as an individual scientist. Among the most important are the awards from the Chinese Government, the Provincial Governments and the public. His achievements were of essential economic and agricultural values. He received two 2nd Class Science and Technology Advance Awards from the Chinese Academy of Sciences in 1990 and 1996, the 3rd Class of State Award for Science and Technology Advance from the Ministry of Science and Technology and the 2nd Class of Scientific/Technology award from the Jiangsu Government in 1999.

Professor has published the total of 264 papers in Journals. Among which, there are 168 papers in Chinese and 96 in English. Apart from the articles, he published 9 books, 6 in Chinese and 3 in English.

Despite of publishing his own papers Professor Cao also performed a very good job being both the editor and the member of the editorial boards of several acknowledged international journals. As the editorial board member he

contributed to the journals entitled: “Acta of Plant Nutrition and Fertilizer”, “Acta of Tobacco Science”, which are both published in Chinese, “Journal of Plant Nutrition”, “Archives of Environment Protection”, “International Journal of Agrophysics”, which are published in English. Cao also held the position of the editor in chief of the “International Journal of Pedosphere.

Professor joined the Institute of Soil Sciences at the Chinese Academy of Sciences in Nanjing, China in 1964 and the collaboration finished in 2007. Since 2005 until present he cooperates with the Zhejiang Agriculture and Forestry University in Hangzhou, China. He holds the position of a Special Invited Professor.

An essential element in Professor Cao’s career accomplishments is the international activity. These include two study leaves to Manila, Philippines and Raleigh NC, USA to enhance his studies. Moreover, since 1995 he has been involved in numerous transnational scientific organizations. His collaboration involved the positions of a standing council member of the International Union of Soil Sciences. He was also the Deputy Head of the Commission I - Soil Physics at IUSS, the Chair Person at the Asia Center of the Global Soil Remediation Net Work, the Honorary Scientist of Rural Development Administration of Korea, and the Academic Adviser of International Foundation of Science.

Another dimension of his activities was the collaboration with Polish institutions, all from Lublin. The partnership between the Faculty of Environmental Engineering of the Lublin University of Technology and Professor Cao began in 1995, when the first agreement of cooperation between the Institute of Environmental Protection Engineering, the Lublin University of Technology, the Institute of Agrophysics of Polish Academy of Science, Lublin and the Institute of Soil Science Academia Sinica, Nanjing was signed.

As a result of this cooperation, under the guidance of Professor Lucjan Pawlowski, a Ph.D. dissertation of Zhu Xiaoping entitled: “Behavior of Aluminum in the Environmental due to Acidification” was written and defended in 1998.

In September 1999 in collaboration with Professor Cao the XII “*Chemistry for Protection of the Environment*” International Conference was organized. The conference was located in Nanjing, China. It brought together

environmental scientists, engineers and policymakers to present innovative solutions to environmental problems.

After a few years, as it naturally happens, the official agreement of collaboration expired.

However, Professor Cao remains the great friend of our University. In 2008, the agreement on teaching and research cooperation between Professor Cao and the Lublin University of Technology was renewed. The declaration covered four main areas of cooperation: the exchange of scientists to conduct research, the exchange of teachers to give lectures and short courses, the invitation of scholars to participate in conferences and symposia, the exchange of information, materials and publications of mutual interest.

Professor Cao was a co-promoter of Yucheng Cao's Ph.D. thesis, entitled "Sustainability evaluation of energy recovery from sewage sludge". Research for the dissertation was performed at the Faculty of Environmental Engineering. In June 2012, Yucheng Cao defended his doctoral thesis with honorable mention. Research results in a number of joint publications.

For the acknowledgement of Professor Cao's initiatives and the major role in strengthening the bonds between the Lublin University of Technology and China. We feel proud and privileged that he became the Honorary Professor of the Lublin University of Technology.

ACADEMIC CAREER AND SCIENTIFIC RESEARCH



Cao— the son of a rice farmer.

Academic Activities in Soil and Environment Sciences:

Learning Soil Science at Zhejiang Agricultural University (ZAU) Hangzhou China during 1960-1964 and the Joint Institute of Soil Science, Academia Sinica (ISSAS) in 1964

Zhihong Cao started his academic career at the first of September, 1960 when he began his soil science studies in Zhejiang Agricultural University (ZAU), which is now incorporated in Zhejiang University - the top 5th University in China since early 1990. ZAU is located at Hangzhou, a beautiful tourist city in China. Cao received both a good theoretical background in soil science, and good training in technical practices for laboratory analysis, as well as gained skills of conducting field experiments in ZAU. Cao had good credit records for most of the course works and as a class monitor he assisted teachers and helped his classmates. Cao enjoyed his additional work and proved to be willing to serve his classmates not only in classes they have taken, but also in those daily life needs,



Cao and his classmates learning how to survey and map, 1962; (From left to right: Miss Y.J. Wang, Ch.L. Liang, C.J. Lv and Cao, associate Prof. Qin and X.Q. Zhang).



Cao and his classmates graduating from ZJAU in June, 1964 (There were 24 Classmates in total in his group, Group No.602).

such as contributing his food tickets to those in need (during that period in China food has been supplied with special coupons - similar to a paper currency) and money he donated the money he had saved to others in 1960's. That won him a great number of friends. Cao was fond of learning English and reading foreign novels. He enjoyed singing together with friends or alone, though he knew his voice is not professional.

Cao respects all of his teachers and elders at the university, such as Professor Zuxiang Zhu who got his Ph.D. at the Massachusetts Institute of Technology, USA and returned to China for scientific reasons and was teaching in the 1940's. Prof. Zhu was the author of a textbook in Chinese entitled "Soil Science I", which was used not only by ZAU, but also many other universities in China from 1948 to 1970. As an academic, Professor Zhu was also a friend of ISSAS – a honorary Professor and a member of an academic committee. Prof. Zhu was proud of his former students who have been working in ISSAS, in particular, when they made noticeable achievements.



Prof. Zhao, academic Professor Zuxiang Zhu's wife and Cao, meeting with some students working in ISSAS; from left to right: Dr. G.S. Hu, Professor. Z.T. Gong, Cao, and Prof. Z.G. Li.

Cao was assigned to work in ISSAS, which was the top Institution in Soil Science of China, when he graduated from ZAU in June, 1964. As a research assistant he joined the Department of Agricultural Chemistry in ISSAS which was headed by an academic Professor Qingkui Li, who got his Ph.D. at the University of Illinois, USA and returned to China in 1948. ISSAS was the accurate place to start his soil science research. ISSAS constructed 50 years of Cao's professional career.

Study on Soil Organic Pollution and Remediation during 1966-1969

Cao was appointed as the head of Soil Organic Pollution and Remediation research group during 1966.04 -1969.11, which was his first project. The project was organized by the headquarters of Chinese Academy of Sciences (CAS) in Beijing in cooperation with the Institutes of Botany, Plant Physiology and Zoology, which enabled to create research groups of various disciplines. His

group has taken part in tasks concerning identification, monitoring and quantitative measurement of the soil organic pollutants in situ and to remediate it as soon as possible. Those organic pollutants in soils mostly come from pesticides, herbicides, sanitizers, fungicides etc. and sometimes from industrial or transportation accidents. With the help and supervision of some elder specialists the group mainly consisted of 17 young scientists from ISSAS. Cao worked very hard and cooperated well with his team members in laboratory, field investigation and experiments which led this creative research in a new direction. After 3 years, they received satisfying results for identification, monitoring and applying quantitative measurement methods in field and laboratory, providing some effective remediation agents. They edited a textbook of analysis methods for organic pollutants in soil. Thanks to these results, his group received the “Advanced Team in Science Research” Award from the Jiangsu Provincial Government in 1969 (which was called ‘Revolutionary Committee of Jiangsu Province’ during that time in China).

Research on the Improvement of N Use Efficiency and Developing Slow Release Fertilizers in 1970’s

Cao joined the research team for the improvement of nitrogen fertilizer use efficiency and study on the development of release controlled or slow- release N fertilizers in 1970, which was headed by Professor Q.K. Li, who was the first academic in ISSAS; he obtained the positions of the Director General of the Soil Science Society of China (1956-1987), deputy director of ISSAS (1960-1967) and Honorary General Director of ISSAS (1985-2001). Cao was appointed as one of the deputy heads for this group to assist Professor Li and to be in charge of the processing technology for granulate of ammonium bicarbonate (ABC) — one of main N fertilizer manufactured and widely used in China during 1960-1995. Due to its unstable chemical properties, it is easily lost via NH_3 volatilization process after application to soil surface. The most effective way of reducing NH_3 volatilization losses is a deep placement of the fertilizer into soil in a granulated pellet form. But ABC is a wet fine crystallized fertilizer powder and is very difficult to granulate in situ at the production line in a small N factory by normal techniques. The group had to develop a new technique to granulate ABC. Under the supervision of Professor Li and in cooperation with: the local

agricultural machinery factory of Jintan County, Jiangsu province, Department of Chemical Industry, Nanjing Engineering College (now it is a part of Nanjing Chemical Technology University) and Nanjing Chemical Industry Design Institute etc. they worked on a newly designed ‘double roller compaction granulator’ and finally they achieved successful results after 2-3 years of hard work. The 25# type ‘Double Roller Compaction Granulator’ machine has a capacity to produce pellet (1g /granulate) ABC fertilizer in 4-5 tons per hour.



Prof. Li, Cao et al., in Jintan Agricultural Machinery Factory, 1975.

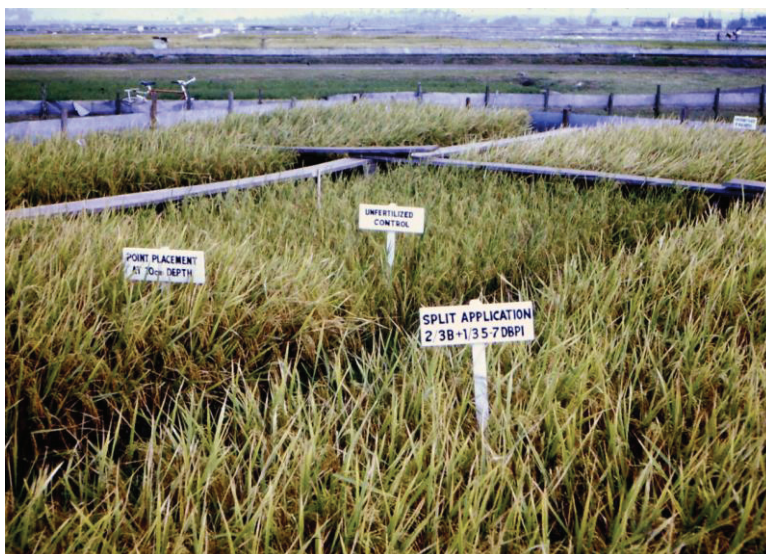


Prof. Li, Cao et al., in Jintan Chemical Fertilizer Factory, 1975.

It can be used in the small nitrogen fertilizer factory and can directly produce large amount of pellet ABC in situ. Therefore, deep placement of pellet ABC fertilizer could extend to a large scale usage with various crops and in different Provinces. According to the data collected from 5 provinces' field trials in rice, wheat, cotton, corn and other crops, it was proven that deep placement of pellet ABC fertilizer can increase both N use efficiency by 30% as compared with traditional fertilization and yield by 12-15%. Professor Li and Cao, as specially invited speakers, attended the National Fertilizer Use Technical Symposium, Beijing, in August, 1974 which was organized by the Ministry of Agriculture, the Ministry of Commerce, CAS, and National Sciences & Technology Association. Professor Li allowed Cao to make a presentation at the conference theatre to introduce this new technology. It was well received by various provincial officers, who invited ISSAS for administering further tests.



Wheat response to deep placement of Pellet ABC fertilizer in Jintan County, 1976. From left to right: Mr. Ping. Yang, Cao and local people in field.



Rice response to deep placement of granulated urea, at IRRI, 1981.

After 2 years of large scale demonstration trials in various places and crops, data showed the same results as the previous one. A 25# type 'Double Roller Compaction Granulator' was installed in ISSAS during 1974-76 to produce pellet ABC for demonstration and extension trials in the suburban area of Nanjing. Cao, as a specialist in operating and managing the machine, produced Pellet ABC in two seasons a year for rice and wheat application. He had no time to prepare his own lunch and supper and had no time to pick up his children from kindergarten. Cao could not stop because of the farmer's tractors that were standing in the line at the university's campus waiting for processing their fertilizers. The Chinese Academy of Sciences decided to organize a larger national conference to promote the research and Cao could not be replaced at that time.

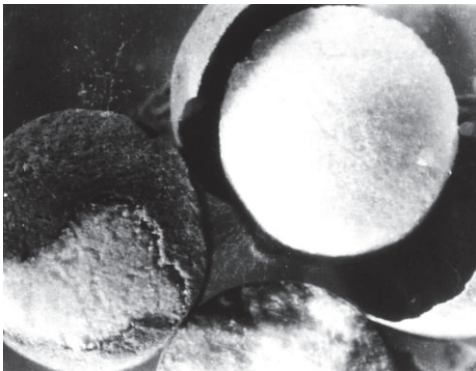
In order to promote this technique widely in China, it was decided by headquarters of CAS in Beijing and in cooperation with the Ministry of Chemical Industry, the Ministry of Agriculture, and National Supply and Marketing Cooperatives to organize a National Technical Site Meeting for production and appliance of pellet ABC fertilizer. It was prepared and hosted by ISSAS and the Government of Jintan County, Jiangsu Province. Cao was appointed to be responsible for preparing the demonstrations about: (a).

manufacturing the ‘Double roller compaction granulator’ in Jintan agricultural machines factory; (b). processing pellet ABC fertilizer in Jintan nitrogen fertilizer factory; (c). the layout of a large scale field trials in rice, cotton, vegetable etc. More than 600 participants from 28 provinces attended that meeting in August 1976. Cao made a keynote presentation to summarize this new technology. After this conference, it was listed as one of the 10 national extension techniques and advocated by the state government during 1977-78. It received the National Sciences Conference Award in 1978.



Cao's presentation at National Conference at Jintan, 1976.

Cao, together with Prof. Guangsong Liu, Prof. Yuanchang Liu and others in slow-release fertilizer research team, developed several types of slow-release ABC and urea with some new technologies. One of the most successful techniques was coating by calcium-magnesium phosphate reaction with phosphate acids under normal temperature and usual pressure to form a coat on pellet ABC or granulated urea. The release rate and duration time can be adjusted according to the crop needs. They published 12 papers and one monograph from that research with all technical details, unfortunately at that time they were not aware of the procedure of applying for national patents.



Slow- Release Pellet ABC fertilizer,
1976.



Wheat roots surround to SRP ABC,
1976.

Master of Science degree program at the International Rice Research Institute (IRRI) and the University of Philippines at Los Banos (UPLB) during 1979-1982

Cao was promoted by ISSAS to be a research associate in 1978 and passed the National English Qualification Exam in Beijing, which enabled him to study abroad. Professor N.C. Brady, (the former General Director of International Rice Research Institute (IRRI) at Manila Philippines) and Professor S.K. De Datta (the former Head of Agronomy Department, IRRI) had their first visit to China and ISSAS, Nanjing. Cao was one of the members of the reception team and was appointed to introduce the results of how deep placement of pellet N fertilizer causes the increase N use efficiency. Both Professors were surprised and pleased by his presentation, and praised this work as pioneering in the world N fertilizer research. They decided to offer a scholarship to Cao (who was recommended by Professor Li) and Mr. Chen (who was recommended by Prof. Yi Xoin) to IRRI / University of Philippines at Los Banos (UPLB) for MS degree program.

In September 1979, Cao and Chen went to IRRI from Beijing to Manila by Civil Aviation Administration of China (CAAC) and started their Master of Science program at IRRI / UPLB. Cao took the total of 11 courses in UPLB within 3 years, with an average score



Cao in the front of IRRI, 1979.



Cao at the campus of UPLB, 1979.

of 1.18 for all courses. Cao was one of the eldest among his classmates from various countries or regions, such as Thailand, India, Malaysia, Korea, Pakistan, Indonesia, Philippines and Taiwan, some from various regions in Asia and some from south America and Europe. Before an exam, his classmates organized study groups with Cao for preparation, therefore he had to do his best and be ready to help them.



Cao and his classmates, IRRI, 1980.



Cao and his classmates, UPLB, 1981.

“Those might be the best records in UPLB until today”, both Professor P.D. Espanto (UPLB) and Professor S.K. De Datta (IRRI) praised him when they reported his final official marks at the defending of his MS.

In the mean time, Cao did two seasons of rice field trials for his thesis: on N use efficiency of deep point placement of ^{15}N labeled super granulated urea

paddy in rice soil. Both trials were very successful and attracted a lot of attention of IRRI and numerous international experts, when they visited IRRI during 1981-1982.



Professor S.K. De Datta discussing the dissertation with Cao in IRRI, 1981.



From left to right: Professors S.K. De Datta, Y. Xiong, Z.L. Zhu and Cao in IRRI, 1981.



Cao at field trails in IRRI farm, 1981.



According to Cao's classmate, Professor S.K. De Datta has always praised Cao at different meetings, when Cao was not there. He said "Cao did a very good job, not only the first class course work in UPLB, but he also had the first class field experiments in IRRI". Then Cao would explain: "That was to encourage me because I was seen as the eldest brother among my classmates; I had to work harder than others."

Those good results guaranteed a high quality thesis. After his defense examination in December, 1981, he was invited to attend the 13th Annual Meeting of the Crop Science Society of Philippines in Cebu city, April 27-30, 1982, Philippines. He made an essential presentation entitled: “Effect of placement methods on recovery of applied N (¹⁵N-labeled urea) in lowland rice”. This paper was awarded as one of the 10 best papers by the Crop Science Society of Philippines in April 14, 1982. Before he returned to China he sent two papers to SSSAJ for publishing and got the scholarship from Connell University for his Ph.D. program.



Cao meeting with Professors from IRRI at the International Conference of Paddy Soils, Nanjing, 1992, 10 years after he left IRRI. From left to right: Professor C.P. Mamaril, Cao, Professor I. Watanabe and Professor S.K. De Datta.

Cao made friends with some Professors in IRRI and in UPLB. The photo above shows Professor S.K. De Datta, Professor I. Watanabe (from IRRI), Professor C.P. Mamaril (from UPLB/IRRI) and Cao at the meeting in Nanjing on the International Conference of Paddy Soils hosted by ISSAS, Nanjing, 1992. The photo recalls good times for Cao at IRRI.



Cao meeting with his classmates of ZAU at the International Conference of Paddy Soils, Nanjing, 1992. From left to right: Professor C.F. Meng, Cao, Professor C.Y. Huang and Professor Y.M. Zhu.

According to Professor John Freney from CSIRO, this technology of deep point placement of granulated urea developed by Cao was still in use in large areas of South and Southeast Asia, such as Nepal, Indonesia, Vietnam, and Philippines until the year 2002. The method brought benefits to the local farmers because of the use of safe fertilizers and increased yield.

National 6th Five Year's Plan Project: the Improvement of Low-Middle Yield Land in Huang – Huai – Hai Plain in Northern China during 1982-1987

In May 1982, Cao returned to ISSAS, Nanjing, China. Prof. Q.K. Li was happy of his return and knew he received a scholarship from Connell University for his Ph.D. program. Prof. Q.K. Li accompanied by Cao went to Beijing in June 1982 to gain the approval for Cao going to the USA for a Ph.D. program. The Chinese Academy of Sciences immediately gave a green light, but it was stopped by the Chinese Academy of Agricultural Sciences (CAAS). The Foreign Affairs Office of CAAS said that “IRRI had made the cooperation agreement with CAAS: any scholarship from IRRI or related with IRRI can only be awarded to the staff member in Institutions which belong to the Ministry of Agriculture. Since ISSAS is not included in our list, therefore, they could not approve of Cao's studies in the USA”.

Professor Li got angry with this irrational reason, but had no possibility to change it. So that he invited Cao to push his Ph.D. under his own supervision. Professor Li was a highly respected academic in soil science not only in China, but also in the world. Of course, Cao had to obey this decision and only mentioned that he would like to go to the USA for a postdoctoral work after the completion of the Ph.D. program in China. Prof. Li nodded his head and said: “let's see if there is an opportunity”. In May 1983, Prof. S.K. De Datta used his personal relationship with the USA; and offered another Ph.D. scholarship from the University of California at Davies. But Cao himself decided not to go, because he had applied for a Ph.D. program in CAS under the supervision of Professor Q.K. Li. Cao explained that situation to Prof. S.K. De Datta with apology and appreciation of his kindness.

CAS made a decision to organize a large research project entitled the Improvement of Lower and Middle Yield Land in Huang-Huai-Hai Plain as a

part of the National 6th Five Years Plan Project in the mid July, 1982. Professor Songhua Li came to ISSAS, she as a project leader was looking for some young scientists to work on this project in ISSAS, who would be in charge of setting up a new comprehensive research station in Henan Provinces. Madam Li had already spent 3-4 days in Nanjing, but no one responded to her offer. She discussed the matter with Professor Q.K. Li and then he called Cao to his office. After listening to Madam Li's introduction, Prof. Q.K. Li asked "Cao, do you prefer to take this responsibility and work there?" Cao answered: "I am not familiar with upland crops but if it is an urgent society's need for food security, the improvement of the lower and middle yield land in Huang-Huai-Hai plain should be one of the key measures. As a young soil scientist, I have no reason to refuse this task. Under your guidance I think that I could do it and would do my best", "Good young man" Professor Q.K. Li praised him and his idea: "your Ph.D. thesis could be on the Characteristic of Phosphate Fertility of Loess Soils in Huang-Huai-Hai Plain, you can take care of both work and thesis there".

Cao was nominated as the head, Professor Renpai Yu and Professor Guoan Gu as two vice heads for the project in ISSAS (1983-1985), after madam Li had left in early August 1982. Cao and Prof. Yu managed a field survey team to the Valley of Tianran-Wenyan Canal which covered Yuanyang, Yanjiang and Fengqiu, three counties in northern Henan Province. They did a large scale soil sampling and field survey in September, 1982. The results indicated that the most soils were of lower fertility with less than 1% of SOM, 0.04-0.07% of total N, and ≤ 10 mg/kg of available P, which should be the limiting factors for the lower-middle yields of wheat and corn. The salt content in soil was at a safe level and had been decreased to deeper horizons due to groundwater table dropped enough at that time. So that salinization was no longer the limiting factor for soils to gain higher productivity in this area. According to this data, Cao made recommendations to ISSAS and CAS as to improve lower fertility soil in Huang-Huai-Hai Plain the major task was to raise crop yields. Secondly, there was an urgent need to develop various rotation systems and change mono cropping system to maintain biological diversity and ecological safety. After reading Cao's report, Professor Q.K. Li agreed with his proposal and requested many colleagues in the Departments of Soil-Plant Nutrition Chemistry, Soil Microbiology, Soil Physics and Soil Physical Chemistry to send groups of

scientists to work there with different methods and various techniques in raising yield of crops and regional development of that area. Prof. Zhaoliang Zhu (N), Prof. Beifan Jiang (P), Prof. Ziyu Liu (plant physiology of nutrition), Prof. Zun Liu and Prof. Jjiqing Zhu (micronutrients) et al., as well as many others from ISSAS gathered there to turn to these key problems.

In addition to the designed long term experiments, field extension trials were performed. Cao had done many daily services to those scientists coming from different Institutes of CAS. Also he gave technical advice to local farmers. Large scale extension trials for deeper placement of Pellet ABC fertilizer and granulated urea in wheat and corn brought very good results. Cao's group also introduced the usage of MAP/DAP – new phosphate fertilizers in this area and some new fungicides. Due to these innovations, there are new agrochemical products which are very effective in increasing yield, improving quality of products and controlling disease and insects. Therefore, these new products were well accepted by the local cadres and farmers. The effect of different rotation systems on N use efficiency in wheat and maize with ^{15}N labeled urea also got clear data.

Results revealed that deep placement of Pellet ABC in maize increased N use efficiency dramatically by 100 %, yield was raised by 11.7%. The demonstration of the sound results of deep placement pellet ABC fertilizer quickly got popular by means of the word of mouth in Fengqiu County and in Henan Province. Prof. Q.K. Li and the vice president of CAS visited Fengqiu station twice and noticed the queue before Fengqiu nitrogen fertilizer factory to purchase pellet ABC fertilizer. The best rotation system was groundnut-wheat / corn –wheat in this area for both higher yields and soil fertility. Cao and his group used all the opportunities to popularize them among farmers in open-air cinemas and in rural markets etc.



Prof. Z.H. Xu preaching to farmers in corn field, 1983.



Chart exhibition at a rural market, 1984.

As the head of Fengqiu experiment station of CAS at Henan Province, Cao did a lot of basic management and service for colleagues from Nanjing, Wuhan, Beijing, Chengdu and Shanghai etc. Cao suggested Prof. Q.G. Zhao that Fengqiu station should be constructed and facilitated in China as the Rothamsted Experimental Station in the UK. After gathering the opinions of scientists from different institutes, as well as, from local and provincial governments, it was decided to establish this experiment station in Pandian village of Fengqiu County. It was now ranked as one of top field experiment stations in China and named as National Agro-Ecosystem Experiment Station since 2001 by the Ministry of Science and Technology.

Cao and his colleagues worked at this station for about 200 days per year during 1983-1984, besides daily management and general research fieldwork, Cao himself also did 3 ~ 4 batches of greenhouse experiments and numerous laboratory analyses for his Ph.D. dissertation. Cao also acted as a translator for the National Course on soil phosphate chemistry organized by Professor Rukun Lu with eight lectures and related discussions made by Prof. J.K. Syers, who came from the Massey University of New Zealand in October, 1983.

Cao completed his thesis: “On the characteristics of phosphorous chemistry in loess soils” and passed the defense exam, he got philosophy doctor degree in May, 1985. He published 4 papers in Chinese Journals and got promoted to an associate professor in that year. During his Ph.D. program Cao attended two international conferences held in Xian, China, and in Honaunau, USA.

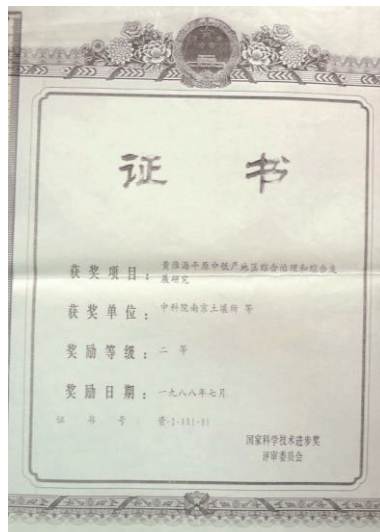


Prof. Li supervising Cao's thesis at a greenhouse, 1984.



Cao at Ph.D. dissertation defense, 1985.

This 6th Five Years Plan Project: Improvement of Low-Middle Yield Land in Huang – Huai – Hai Plain in Northern China was a part of the 2nd Class National Award in 1988, Cao was not in China at the application time but in the USA, that is why, he was not included on the list of awarded scientists.



National 2nd Class Award, 1988.

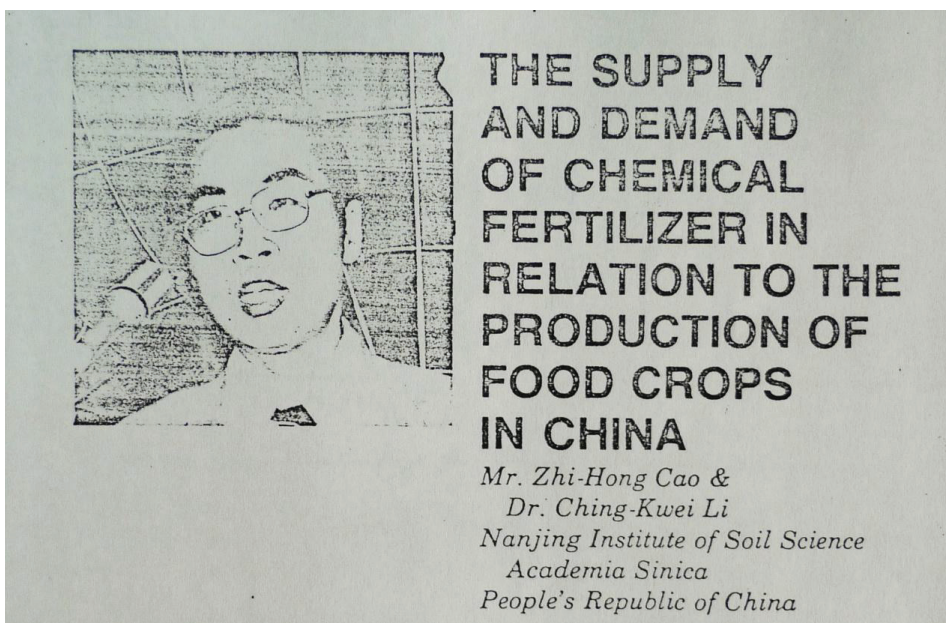


Prof. Li and Cao in Honolulu, USA, 1984.

Attending the World Food Conference in Honolulu, USA, 1984

Professor Q.K. Li and Cao were invited to participate in the 15th World Food Conference hosted in Honolulu, Hawaii, USA in November, 1984. Cao made a crucial presentation, in the conference theater, entitled “The Supply and Demand of Chemical Fertilizer in Relation to the Production of Food Crops in China”. He was the first Chinese expert making oral presentation in this series of conferences. Under Professor Li’s instruction the paper was prepared by Professor R.K. Lu and some other scientists in the Department of Soil – Plant Nutrition Chemistry, ISAS. After that Cao prepared and organized all the slides; his presentation was clear, data was coherent, logic and easy to understand. It showed the status of Chinese fertilization and food production since 1949. It was received with great attention and interest from more than a thousand people in the audience from around the world. Many participants shook hands with Cao and expressed congratulations, namely Dr. P.J. Stangel, the Deputy Managing Director of IFDC USA, and Prof. Pretty, the Director of PPIC et al. Local TV presenters and Newspaper journalists requested to interview Cao. A number of

fertilizer producers such as SQM Chile PPIC etc. visited Cao and offered him opportunities of cooperation for fertilizer research, demonstration and marketing in China and direct or indirect preparation for introducing their products onto the large Chinese market.



Cao making an oral presentation at the World Food Conference in the USA, 1984.



Local TV interview with Cao after his presentation in Honaunau, USA, 1984.

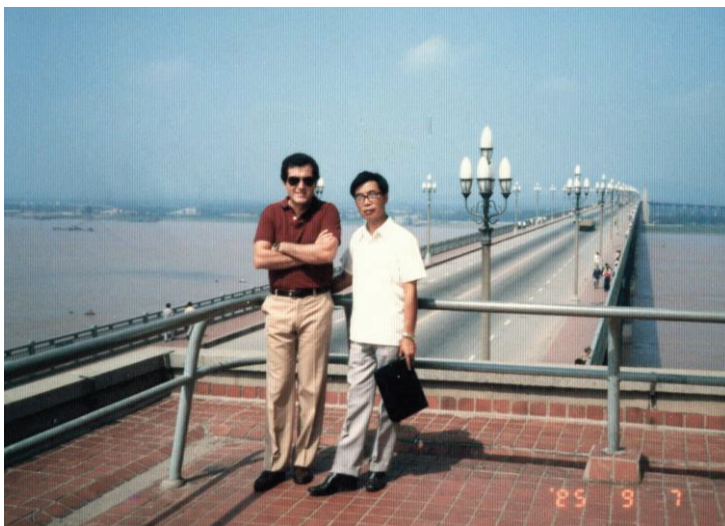


Cao meeting with Prof. Kumazawa in Tokyo, Japan, on their way home from Honolulu, USA, November 1984.

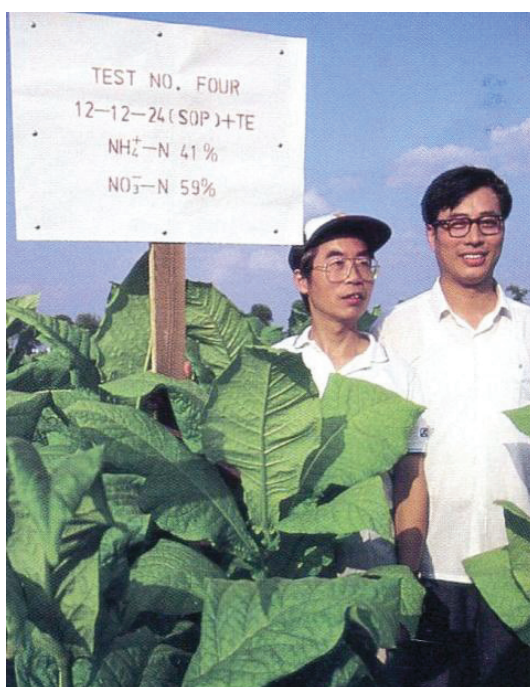
On the way back to China from Honaunau, USA, Prof. Li and Cao both dropped at Narita air port and visited Tokyo University of Japan for 3 days to meet Professor Kumazawa, the Chairmen of Soil Science Society of Japan and his successor Professor Dr. M. Chino, just before he came to ISSAS. During his visit to Nanjing, he signed the cooperative memorandum with Prof. Zhiyu Liu--she was a popular plant physiologist in China. A close relationship between ISSAS and Tokyo University began since then and lasted more than 30 years.

International Cooperative Project on the Rational Fertilization of Cash Crops in China during 1985-2000

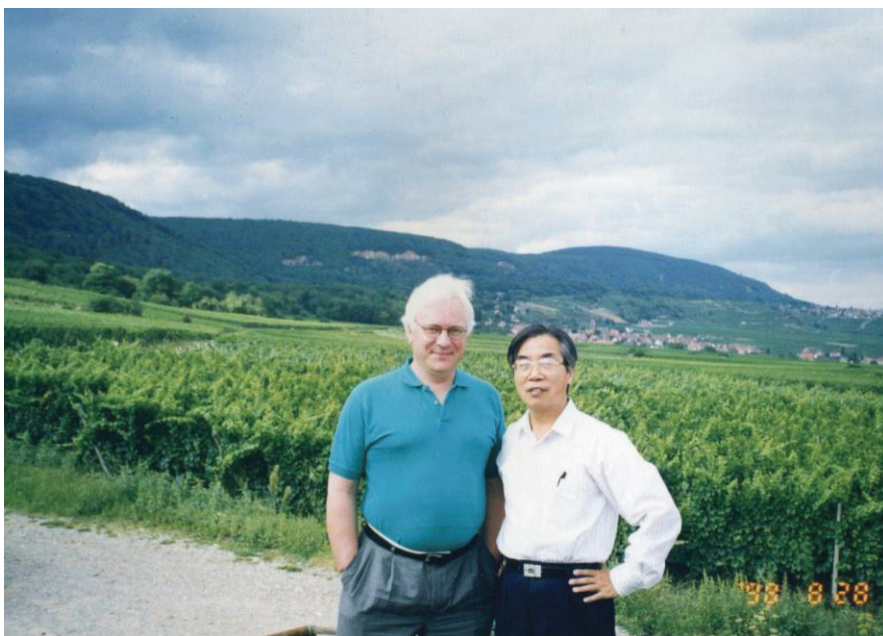
Under Professor Li's guidance, Cao headed the research team on rational fertilization of cash crops such as sugar-beet, sugarcane, citrus, vegetables and flue-cured tobacco etc. during the period of 1985 to 1990 in cooperation with 16 provincial institutions and 7 Chinese/or foreign fertilizer manufacture companies, such as China National Agricultural Materials Co., China National Tobacco Co., IMC of the USA, SQM of Chile, KEMIRA of Finland, SCPA of France. Cao's group also designated and tested a special complex fertilizer formula for certain crops and areas, contributed to the rapid development of complex fertilizer industry in China during 1980-1990s.



Mr. E. Pons (SQM Chile) and Cao, at Yangtze Bridge of Nanjing, 1985.



Prof. Huju Zhe of NAU and Cao at Fertilizer (Kemira Finland) trials on flue-cured tobacco, at Donghai, Jiangsu, 1986.



Mr. M. Narch and Cao at a grape orchard in France during Cao's visit to France, 1998.

For these innovative achievements and higher economic value, Cao and his group received two 2nd Class Science and Technology Advance Awards from CAS in 1990 and 1996, the 3rd Class of State Award for Science and Technology Advance from the Ministry of Science & Technology in 1997. The greenhouse production technology and drip irrigation combined with fertilization got the 2nd Class of Scientific/Technology Award from the Jiangsu Government in 1999, which was awarded to Prof. Shenqiang Duan and his group. Due to this award research was initiated and the team received a grant from Jiangsu Government. Cao greatly participated in this work, he designed the formula fertilizers. Therefore, he was ranked no. 3rd for this award.



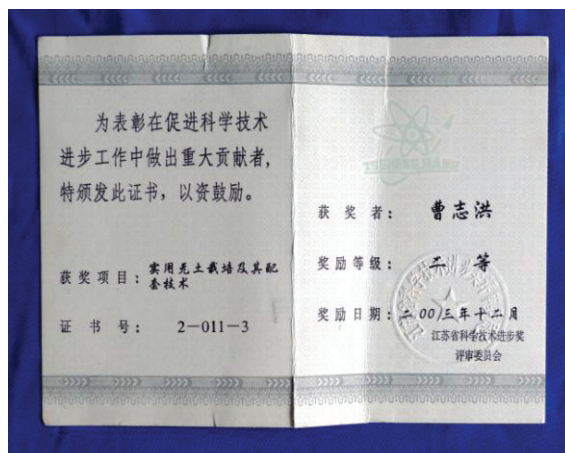
2nd Class Science and Technology Award from CAS, 1990.



2nd Class Science and Technology Award from CAS, 1996.



3rd Class National Science and Technology Award from the Ministry of Science and Technology, China, 1997.



2nd Class Science and Technology Award from the Jiangsu Provincial Government, 2003.

Post doctoral Research at North Carolina State University (NCSU), during 1988-1989

Cao went to the USA for a postdoctoral program in the Departments of Soil Science and Agronomy in North Carolina State University (NCSU) in February, 1988. The major topic of his work was the effect of nitrate and ammonium

nitrogen on soil microbes and growth of flue-cured tobacco. Cao was supervised by Professor A.G. Wollume II, Professor Golden Miner, Professor G. Jones and Prof. M. Cook. Cao observed the typical symptoms of Chlorine toxicity to tobacco leaf in greenhouse experiment and symptoms of potassium deficiency on tobacco leaf in field. Results also showed that ^{15}N use efficiency was higher with nitrate N than ammonium N in tobacco leaf production. Based on these findings Cao published two papers at the “Journal of Tobacco Science” in 1992.



From left to right: Prof. and Mrs. Jones, Cao and Li, USA, 1988.



From left to right: Mrs. Cook, Li, Cao, Prof. Cook, USA, 1998.



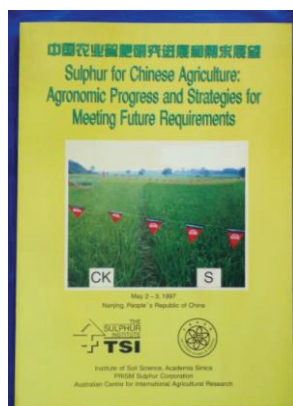
Cl toxic symptom on Tobacco plants, 1988.



Potassium deficiency in tobacco field, 1988.

International Project on Sulfur Fertilizer in Chinese Agriculture and Environment (1997-2004)

In May, 1995, Cao hosted an International workshop on “Sulfur Research Progress and Developing Strategy for Future Agriculture” at Nanjing, China. There were more than 60 delegates from Australia, Canada, China, France, Germany, and the USA. Under the proposal of Prof. Cao and financial support from International Sulfur Institute (USA), Sulfur companies in Canada, International Potassium Institute (IPI), and PPIC etc. decided to start a “Sulfur Fertilizer Testing Net in China”(SFTNC). Cao (represent of ISSAS) was elected as the coordinator for 12 provinces in the southern China of SFTNC. Large scale research program was designed and tested in Jiangsu, Zhejiang Anhui, Jiangxi, Hunan, Hubei, Fujian, Guangdong, Guanxi, Guizhou Yunnan and Shanghai etc. and with crops of rice, wheat, corn, groundnut, oil rapeseed, sugarcane, soybean, cotton, tea, tobacco, vegetable and citrus etc. The field trials examined not only crop yield and quality response to sulfur fertilizer, but also the effects of soil and moisture condition on sulfur availability to crops, as well as interactions between S with N, Ca^{2+} , Mg^{2+} and other nutrients in soils. Altogether there were 387 field trials completed during 1997-2002. Meanwhile, sulfur balance and sulfur forms transfer in soil –water system were also studied in field and laboratory. Cao and his group organized four meetings in Hefei, Anhui; Putian, Fujian; Beijing and Suzhou, Jiangsu to exchange results and progress, adjusting the next year’s plan etc. Cao was invited to present his papers



Sulfur Workshop in Nanjing, 1997.



Prof. Schnoug and Cao in Beijing, 1999.

in Sulfur Conference hosted by the Korean Soil and Fertilizer Society in Seoul, Korea, Oct.1996 and by the Fertilizer Association of India in New Delhi, India, Dec.1996. Cao made a panel presentation in both Korea and India.

Cao and his colleagues published more than 200 papers in Chinese and International Journals, from this project. Cao, Professor C.F. Meng and Professor Z.Y. Hu made a summary and edited the book entitled “Sulfur in Agriculture and Environment of China” published by Science Express Beijing in 2011.



Sulfur Conference in Korea, 1996.



Sulfur Conference in India, 1997.

Study on Soil Quality Evolution and the Sustainable Use of Soil Resource in China - 973 project (1999-2004)

In 1998, Cao on the behalf of the National Soil Science Society headed a team from ISSAS, applying for a state important basic research project. Following the advice and support of many old generation soil scientists nationwide and the importance of soil for food security, environment and economic development, through our continuous effort, finally our proposal of “Study on Soil Quality Evolution and Sustainable Use of Soil Resources in China” was one of the first batch 973 project – G 19990118 (one of the nine projects was approved in 1999). It was great news to encourage and promote the activity of Chinese soil scientists. Altogether there were more than 310 colleagues from 14 institutions from all over China, such as Soil Science, Applied Ecology and Ecological Research Center of the Chinese Academy of Sciences, the Agricultural University of China, the Chinese Academy of Agricultural Sciences, Zhejiang University, Hong Kong Baptist University etc.

As the chief scientist of this 973 project, Cao put all of his energy into guiding the whole progress of the project and headed a subproject research of the effect on soil –water interaction on soil quality and environment with emphasis of non point pollution from agriculture sector. Two International workshops were organized: one in Suzhou, Jiangsu Province, 2003 and Yingtan, Jiangxi Province, 2004.



International Workshop in Suzhou, China 2002.



Rice field is an artificial wetland system. Irrigated rice field system is an environmental friendly, ecologically safe and sustainable land use type.

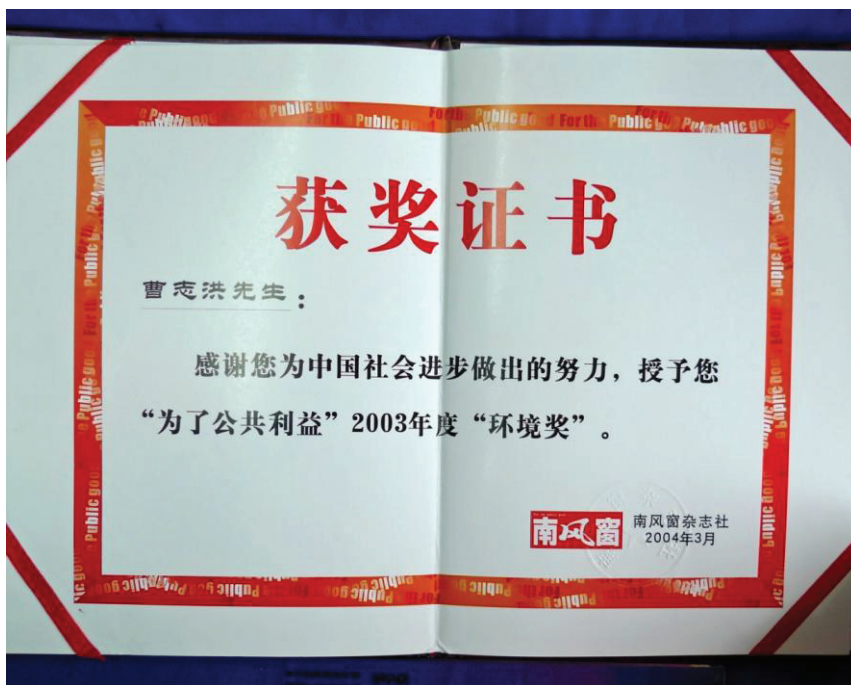
Scientific definition of the Chinese soil quality was set up via this research: soil quality is an integrated measure for soil fertility quality – capability to provide plant nutrients for food, fiber and energy production, soil environmental quality – capability to ensure surrounding water and air clear enough and soil health quality – capability of accommodate and clear up inorganic and organic pollutants and supply with necessary health-maintaining micro-elements in safe quantity for animal and human beings. Other points of results as follows.

It revealed the soil quality evolution mechanisms and processes, remediation of degenerated soil, and directed soil quality cultivation. The research enable to establish soil quality index, minimum soil quality data set, and soil quality evaluation system etc.

It showed the status of soil fertility and the evolution pattern of paddy soil, red earth, loess soil and black calcareous soil those five main arable soils in China and set up a 1:1 million platform of Chinese soil data base.

It advanced the theory of sustainable use for paddy soil. Cao's team published the first warning value of available phosphate in paddy soils for Taihu Lake region.

It indicated that irrigated rice field ecosystem, as an artificial wetland ecosystem, posses all advantages or functions of natural wetland system for environment protection and sustainable ecosystem. Irrigated rice field itself is a model land use type for sustainable agriculture. So that in the area with enough rainfall, and experience in rice culture, irrigated rice field should be protected with priority in particular in lower reaches of Yangtze River Delta and similar areas in China. Cao made suggestion to the Provincial and Central Governments and received a wide support from government officers and the public opinion in 2003.



Public Environment Award from the Journal “Nan Feng Chuang”, 2003.

In total the team published 409 papers in scientific journals in China and abroad, 4 treatises about the whole project. Cao wrote and edited 2 treatises entitled ‘Soil Quality of China’ and ‘Material Exchange Inter-Soil-Water of Taihu Lake Region and its Effect on Water Environment Quality’ as well as more than 30 papers in China and abroad.

That project received the First Class Science and Technology Advance Award from the Jiangsu Provincial Government in 2006. Also it was recommended by CAS to apply for the State Award in 2007 and 2008. Unfortunately due to unclear reasons it was not successful.



Soil Quality Research receiving the 1st Class Award from the Jiangsu Provincial Government, 2005.

Study on Prehistoric Paddy Soils and the Chronosequence Paddy Soils (2004-2011)

Rice culture can be dated back to more than 7000 years ago in China. Up to the beginning of the 21 century more than 110 archaeological sites have discovered carbonized rice grains and remained rice phytolith etc. However, it has not been explained yet if the rice was actually cultivated with irrigated field and if any place had already developed paddy soil. Therefore there exists an urgent need to study where paddy soil originates from and how soil fertility of prehistoric and ancient paddy soils developed in China.

Under the financial support of the Natural Science Foundation of China (with granted key project: DO115-40335047, during 2005 - 2008) and Sino-German Science Center (Beijing) granted project (GZ-518, during 2009 ~ 2012) as well as the grant from the Natural Science Foundation of Germany (DFG: 995 during 2007 - 2010) the research was introduced. Professor Ingrid Koegl-Knabner of Munich Technical University was the coordinator of the German team which consisted of 7 Universities and Institutions in Germany. Cao headed a Chinese group of scientists in soil, archaeology, agronomy and geography disciplines to

study on the geochemistry characteristics and the development of prehistoric paddy soils as well as on the chronosequence of (0-2000years) paddy soils. Sino – Germany Symposium on the Study of Ancient Paddy Soils at Kunshan Suzhou China, in 2005 hosted by ISSAS. In addition, Professor Cao was the coordinator of Sino-German research project “Geochemistry study on Paddy Soil Evolution”, Cao guided and organized soil sampling for the



Left: workshop on ancient paddy soils at Kunshan; from left to right: Prof. I. Kogel Knabner, Prof. L.S. Chen and Cao. Right: experts visiting Chuodun relic site; from left to right: Cao being introduced to Prof. M. Grottos, Prof. W. Amelung, and Prof. I. Kogel-Knabner, 2005.

chronosequences of 0 - 2000yrs paddy soils and 0 - 700yrs upland soils under the same parent materials, similar crop rotation system, within the same climate region located at the south bank of Hangzhou bay, Zhejiang Province China. Cao organized Sino-German workshop on “Reviewing Progress of Prehistoric Paddy Soil Research”, Kunshan, China, in 2005 and Germany side hosted two meetings in München, 2007 and in Halle-Wittenberg, 2011. Five Chinese Ph.D. students and postdoctoral fellows were trained and worked in German laboratories for half a year in 2008. This project was encouraged by Prof. Z.T. Gong of ISSAS, Prof. D.N. Xiao of the Institute of Applied Ecology CAS, Prof. C.Y. Huang of Zhejiang University etc.

Until today Chinese scientists have published 18 papers in Chinese and 9 papers in English on prehistoric paddy soil research; 14 papers in Chinese and 6 papers in English for the chronosequence paddy soils research. German team

has published 1 paper for prehistoric paddy soil study and 10 papers for the chronosequence paddy soils research.

Main academic progress of this study is outlined as follows. The identification criterion of the prehistoric irrigated rice field was set up. A number of evidence indicated that irrigated rice field originated from Yangtze River Delta at Chuodun Suzhou, China; it can be dated back to 6000a BP. Irrigated rice production might have occurred more than

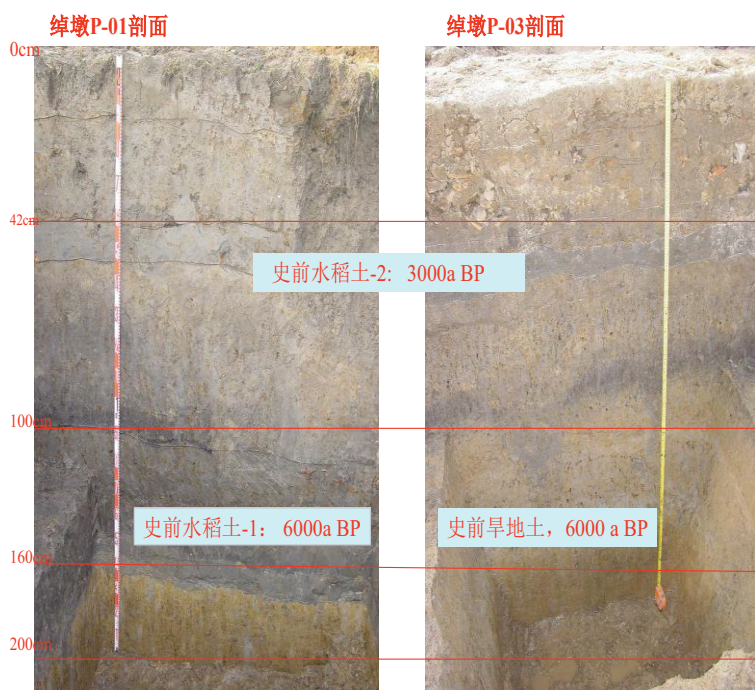


Left: Prehistoric irrigated rice fields at Chuodun relic site: 1 (white colour) - rice fields with various size and shape; 2 (blue colour) - water ponds and canals; 3 (red colour) - two remained skeletons of prehistoric humans. Right: 51 carbonized rice grains discovered at Chuodun relic site;

900 year before a large scale flooding disaster buried the fields, so that paddy soil was developed there within approximately 1000 years. The first real paddy soil originated from this region. Prehistoric irrigated rice field of other places which followed Majiabang culture was also found in Chenghu relic site, Suzhou, which dated back to 5500-5000a BP of Songze culture and at Maoshan relic site, Linping dated back to 4500-4000a BP of Liangzhu culture.

Two typical profiles taken from Chuodun relic site were studied in detail. P-01 is a profile containing two buried prehistoric paddy soils, lowest one dates back to 6000a BP and middle one dates back to 3300a BP, and the top 47 cm is the modern paddy soil; P-03 is just located 15 m north east, it contains one

buried paddy soil of 3300a BP, the lowest prehistoric paddy soil does not exist but upland soil, top layer is the modern paddy soil the same as in P-01. Research on fertility, chemical and physical properties, phytolith, particle consist; microbes' activities and heavy metal, PAHs pollutants were examined and published, respectively.



Two typical profiles P-01(left) and P-03(right) taken from Chuodun relic site P-01(L):
 0-47cm Modern paddy soil, 47-100cm Buried ancient paddy soil of 3000a BP, and
 100-185cm Buried prehistoric paddy soil of 6000a BP; P-03(R): 0-47cm Modern paddy
 soil, 47-100cm Buried ancient paddy soil of 3000a BP, and 100-185cm Buried
 prehistoric upland soil of 6000a BP.

An Exhibition Room entitled “The Origin of Irrigated Rice Field and Paddy Soils of China” was set up at Soil Museum in ISSAS, academic and Professor Yongxiang Lu visited that exhibition room and gave his encouragement and praise to this work.



Professor Yongxiang Lu visiting the Ancient Paddy Soil's exhibition room in ISSAS, Nanjing, 2009.



Cao and Prof. J.R. Fu taking the soil profile of 500 years, 2007.

Chronosequence of 0-2000 years paddy soils was identified by chorography and construction record of the sea bank, as well as recollections of the local farmers older than 70 in the south coast of Hang Zhou bay.

Under the anaerobic condition and the large amount usage of organic manure at the beginning stage of rice cultivation caused a great increase of SOM accumulation in the plowing layer of paddy soil and a large sink of carbon in terrestrial ecosystem functions, the same with natural wetland.

Methane emission is higher in younger paddy soils than in matured paddy soils. It was due to oxidation and reduction conditions that gradually turn to stabilizing and activating of methane oxidizing bacteria along with the chronosequence, which was also gradually increased.

Study on Forest Soil & Environment and Carbon Sequestration by Agricultural and Forest Soil (2005-2013)

Cao retired from ISSAS, as a specially invited professor by Zhejiang Agriculture and Forestry University (ZAFU) since 2005. Supported by ISSAS, he recommended and set up a Joint Laboratory of Forest Soil and Environment Research in ZAFU. On the one hand, in order to develop forest soil research in ISSAS, and on the other hand to improve education and research on soil and environment science in ZAFU.

Cao and Prof. Franz Maxsiom organized the Sino-German workshop on the study of Eurasian Forest as the Pool of Carbon Dioxide in 2007 at Hangzhou. Participants were interested in the results of CO₂ sequestration by bamboo forest done at ZAFU. Cao guided them to visit bamboo forest fields during the workshop. Cao, Professor M.H. Wong as well as Prof. G.M. Zhou, as the guest editors, organized a special issue with 16 papers related to C fixation by



Sino-German Workshop on the study of Eurasian Forest as a Pool of Carbon Dioxide, Hangzhou 2007.



国际学术论坛办进临安竹林

Cao guiding participants visiting Bamboo forest, Hangzhou, 2007.

bamboo forest ecosystem and published in the journal “Botanic Review” in 2011, which reflected the research achievements on C sequestration by bamboo forest in ZAFU, China.

In the year 2012, Cao, Professor M.H. Wong, and others organized the 1st International Conference on Contaminated Land Ecological Assessment and Remediation (CLEAR), which was hosted by ZAFU, Hangzhou, 2012. It gathered more than 140 experts; half of them were from 17 foreign countries. The second CLEAR will be hosted by the Korean colleagues in 2014.



Cao and Professor Zhengmiao Xie attending the first conference on Contaminated Land Ecological Assessment and Remediation (1st CLEAR), Hangzhou, China, 2012.

Academic Administration and International Activities:

Assistant Director and Deputy Director of ISSAS in 1990-1994

Cao returned to ISSAS after he had completed the postdoctoral research at NCSU of USA in 1989, he was appointed an assistant director during 1990-1991.

He assisted the GD of ISSAS, Prof. Q.G. Zhao, in meeting foreign friends who participated in the International Symposium on Paddy Soil hosted by ISSAS in Nanjing, China and presented a paper at the conference theater, 1992.

As a project reviewer of the International Foundation for Science (IFS), under the financial support of IFS, NSFC, and CAS, he assisted Prof. Q.G. Zhao in organizing an IFS workshop on the Improvement of Soil Fertility in April, 1993. More than 40 delegates from African, American Asian, Australian, and European countries, who received a grant from IFS, attended the meeting. Cao edited and published the proceeding.

Assigned by Prof. Q.G. Zhao, Cao accompanied academic Prof. G.Z. Zhou and his group (including Mr. Yutai Zhang, Madam Yulin Li, et al.) during their visit to the red soil region of Jiangxi Province in 1994. Cao learned a lot from the professor and his team members about administration and management of the Institute within a 4-day visit.



From left to right: Madam Yunlin Li, Cao, academic Professor Guangzhou. Zhou, Mr. Yutai Zhang, et al., visiting the red soil region, Jiangxi, China, 1994.

To implement an open policy, Cao gave green light to all of the young scientists or students in ISSAS, who were interested in going abroad for further study, once he or she had the financial support. Cao also encouraged them to come back to serve ISSAS after completing his or her program abroad.

According to the policy of CAS, and advised by Prof. Guangzhao Zhou, some 8-9 young scientists of ISSAS were promoted to Research Professors with a special channel; but it did not affect other people to be promoted with the normal channel.

Cao advised Professor Weiming Shi and helped him to set up the Youth Laboratory for research on soil-plant biological engineering and breeding of crop variety with higher efficiency of potassium and phosphorus absorption from soils. This Laboratory was headed by Prof. W. M. Shi and consisted of a group of young people. They closely collaborated with the Plant Nutrition Laboratory of Tokyo University, Japan.

General Director of ISSAS and the Chair of the Soil Science Society of China (SSSC) during 1995 -1999

Before the 8th National Congress of the Soil Science Society of China (SSSC), Prof. Q.K. Li and Prof. Q.G. Zhao advised Cao to invite foreign soil scientists from the USA to participate in the congress. It was the first open forum for soil scientists of both sides of Taiwan Straits in September, 1995 at Zhejiang University, Hangzhou, China. Cao headed a delegation of soil scientists from various provinces that attended the 2nd Symposium hosted by the Taiwan colleagues at Zhongxing University, Taizhong. It is now a serialized and regularly organized event, it is held once every two years.

As the Chair of SSSC, Cao suggested and established a Foundation of SSSC which is used for the Best Paper Award for young soil scientists. He supported an academic symposium organized by different committees of SSSC and invited some respected guests from his homeland and abroad to participate in the events organized by SSSC.



Cao attending the 2nd “Two Sides Symposium on Soil and Fertilizer Research” hosted by Zhongxing U. at Taizhong, 1998.



From left to right: Prof. Z.X. Chen, Cao and Prof. Y. Shen from Taiwan U, at Chengdu, 2012.



Cao hosting the 3rd Council Meeting and decided to set up the SSSC Foundation, Nanjing, 1996.

Under the supervision of Prof. Q.K. Li, Cao and a group of Japanese scientists organized Sino-Japan New Fertilizer Development Center in ISSAS, and the collaboration between the two sides was repeated in 3-4 years.

Cao assisted Prof. Q.G. Zhao in organizing the International Symposium on “Soil, Human, and Environment Interaction” hosted in Nanjing, 1997. Cao presented a paper and edited the proceedings. He met, for the first time, Professor A. Ruellan, and Professor W.E.H. Blum from the International Union of Soil Science (IUSS).



Prof. Li meeting with friends of Sino-Japan New Fertilizer Development Center in Nanjing, 1997.



Cao presenting a paper at Soil-Hum-Environment Interaction Symposium, Nanjing, 1997.

Cao met with Professor M.H. Wong from Hong Kong Baptist University (HKBU) during the conference at Nanjing in 1996, wishing to establish a Joint Laboratory for Soil and Environment research. This idea was supported by both CAS and HKBU. And it was announced in Hong Kong on August, 1998 by News Xinhua, Da Gong Bao etc. Professor Zhiwei. Xie, the president of HKBU, visited Nanjing twice; and attended the unveiling ceremony. At the end of 1998, in order to promote this Joint Laboratory, Professor Xie got a subsidy of 5 million Hong Kong dollars from Mrs. Biru Liu Cha and Dr. Jimen Cha. It was used to construct a new laboratory building for the Joint Laboratory Additional financial grants were also from CAS, Beijing and the Jiangsu Provincial Government at Nanjing.

The modern “Huilian Building” and a comfortable guest house were built at the campus of ISSAS at 2001. The name of “Huilian”, given to the building, was to remember its donator Madam B.R. Liu and Dr. J.M. Cha. Cao wrote an inscription on a memorial inside the building for bearing in mind.



Prof. Zhiwei Xie (HKBU) and Madam Li (Jiangsu Provincial Government) opening the Joint Laboratory.



The celebration of 80th birthday of Madam Biru Liu Cha; from left to right: Cao Prof. T.L. Zhang and Prof. Y.M. Luo with Cha's Family members.

Cao met with Professor Dr. D. Andriano (USA) at three symposiums on remediation of polluted soils held in Australia, USA and Austria respectively, during 1995-1997. They discussed setting up a Global Soil Remediation Net Work (GSRNW). Prof. D. Andriano visited Beijing and Nanjing, to finalize the suitable institution for Asia center of the GSRNW. During the summer of 1998 he decided that the centre of GSRNW should be at ISSAS, Nanjing. With the support from the society officers and scientists from Japan, Korea, Philippines,

Indonesia, Thailand and Australia, the Asia Center for Global Soil Remediation Net Work was announced to begin functioning during a workshop hosted by HKBU in September, 1998. Cao was elected as the Chair, Prof. Yongming Luo of ISSAS and Prof. I.S. Zhao from Korea were elected as the general and vice secretaries respectively. It was soon acknowledged by IUSS and International Society for Trace Element Biogeochemistry (ISTEB).



Cao and Prof. D. Andriano meeting in Austria, 1997.



Global Soil Remediation Net, Asia Center, 1998. From left to right: Prof. T.L. Zhang, W.I. Blume, Cao, M.H. Wong and N. Naidu.

During the Nitrogen Workshop hosted by Professor Z.L. Zhu at Nanjing, 1998, Cao met Prof. J. Freney, a world known nitrogen scientist. It was the 4th time they have met. The first time was in 1981 when he visited field experiments and laboratory in IRRI, Manila Philippines. And then they met at Nanjing during the Paddy Soil Conference in 1992. The 3rd meeting was during Cao's visit to Australia in 1996. Then professor invited Cao to lodge at his home, not in a hotel. Later, Cao invited him to ZAFU in 2009 during his monthly stay in ISSAS. Then they met in Brisbane, AU again when the 19th IUSS Congress was held in 2010. They shared a mutual interest in N use efficiency in various crops.

Cao headed a delegation visited the Institute of Agrophysics, Polish Academy of Sciences (PAS) at Lublin, Poland and further strengthened the collaboration between the two Institutions. It began in early 1980 by Prof. Xianliang Yao at the Department of Soil Physics in ISSAS. The general director of that institute, Academic of PAS, Prof J. Glinski and his colleagues such as Prof. Witold Stepniowski et al. visited Nanjing several times, exchanging scholars, using TDR instruments in field and jointly organizing international workshops etc. Our foreign colleagues also visited the Institute of Agrophysics PAS at Lublin Poland several times and since 1995 this close relationship between the Chinese and Polish scientists extended to the Lublin University of Technology.



Prof. J Freney and Cao meeting again in Nanjing, 1998.



Prof. J. Gliniski hosting a welcome banquet for Prof. Cao and his group, 1995.

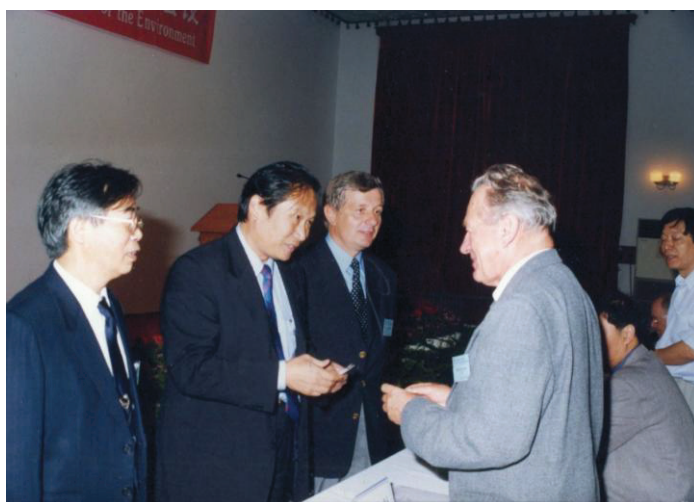


From left to right: Prof. J. Jezowiecki, Prof. L. Pawlowski, Prof. T. Winnicki, Cao, Prof. W. Stepniewski at the academic committee meeting, 2012.

Supervised by Prof. Q.K. Li, and Prof. Q.G. Zhao, Cao recommended and awarded Honorary Professor of ISSAS to Professor Lucjan Pawlowski and some other foreign scientists from the USA, and Germany, as well as some local Professors such as Professor Zongqing, Jin of River and Ocean University, and Professor Qihong Lin of Yangzhou University et al. who was also working at the Jiangsu Provincial Government.



The Ceremony for Honorary Professor L. Pawlowski, Nanjing, 1997.



Prof. Z.Q. Jin, the vice Governor of Jiangsu Province meeting with Prof. Pawlowski and Prof. Gilinski in 1999.

As a tutor for MS and Ph.D. students, Cao had a total of 20 students (8 masters and 12 doctors), in addition, 6 postdoctoral coworkers. They are now working at various institutions /or universities in China or abroad. Some of them are working in companies at the positions related to agricultural production. Cao encouraged his students to obtain the capability of oral English skills to make presentations or discussions with foreign guests and motivated them to have their own, independent ideas for research. He also helped the students to find a job related to their education and experience. Some of them made an outstanding contribution to science and distinguished achievements in the field. They organized a ceremony for Cao's 70th birthday at Nanjing and at Xiamen, China in 2010.



Colleagues organizing a party for Cao's 70th birthday at Nanjing, 2010. From left to right:
L. Cai, J.B. Zhang, L.Z. Yang, F.A. Xu, X.G. Lin,, Cao, W.M. Shi, Z.G. Li, R.F. Shen,
Z.C. Cai, and X.Z. Shi.



Colleagues organizing a party for Cao's 70th birthday at Xiamen, 2010. From left to right: ZhY.Hu, M.H. Wong, Cao, Li, Z.H. Xu, J.Z. He (1st Low) and Y.G. Zhu (center 2nd Low) et al.

Member of the Editorial Boards of Domestic and International Scientific Journals

Professor Cao is the member of editor board for the following four journals:

- *Acta of Plant Nutrition and Fertilizer* (in Chinese)
- *Acta of Tobacco Science* (in Chinese)
- *Journal of Plant Nutrition* (USA)
- *Archives of Environment Protection* (in English, Polish Academy of Sciences)

Also Cao use to be the editor in chief of the *International Journal of Pedosphere* (in English), published in China as well as the member of the editor board of the *International Journal of Agrophysics* in English published in Poland).

An Academic Activist Invited by the International Organizations

As a representative of SSSC, Cao was invited to join the council meeting of IUSS during 1999 to 2003, which played an essential role for soil scientists in China and Asia. He made efforts and hoped to organize a IUSS Congress in China. Cao was elected as a vice Chair for Soil Physics Working Group at 16th Congress in Montpellier, France, 1998. Cao also attended the 15th Congress in Acapulco Mexico 1994, the 17th Congresses in Bangkok, Thailand, 2002 and the 19th Congresses in Brisbane, Australia, 2010.



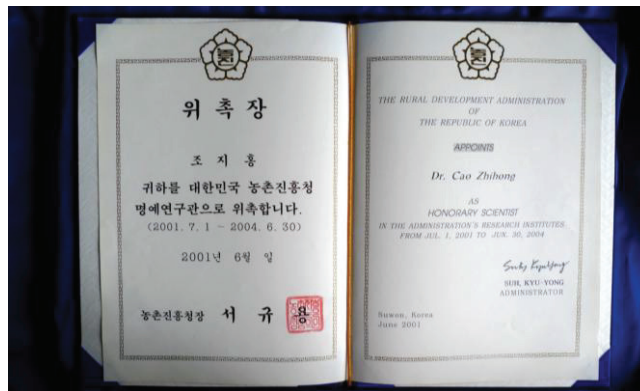
At the Council meeting of the 16th Congress of IUSS, France, 1998.



From left to right: Professor Z.H. Xu, Ms. J.P. Weng meeting with friends, who visited ISSAS at the 16th IUSS Congress, Monperel, France 1998.

Recommended by the Korea Soil and Fertilizer Society, Cao was one of the two foreign scientists who were awarded Honorary Scientists for Rural Development Administration of Korea from Jul. 01, 2001-- Jun. 30, 2004. He established a close relationship between ISSAS and his Korean Colleagues. Consequently, he visited Korea more than 5 times for lectures and regular academic meetings of the Rural Development Administration.

Invited by International Foundation for Science (IFS) -- an International organization located in Stockholm, Sweden. Cao was the reviewer for an interational project granted by IFS (1993-2003). That is why, he organized a workshop and published a proceeding for IFS.



Cao being awarded as the Honorary Scientist (2001-2004) by RDA, Korea, 2001.



Cao attending the International Symposium on Soil and Water Management hosted by RDA, Korea, 2001.

Cao was invited by Professor L. Pawlowski to the Lublin University of Technology at Lublin, Poland and also authorized by the University of Southern Australia at Adelaide, Australia to review the dissertations of some Ph.D. students. Cao attended the thesis defence of Dr. Xiaoping Zhu (1996) and Dr. Yucheng Cao (2012), at the Lublin University of Technology, Poland.



Cao as a reviewer for IFS granted projects.



From left to right: X.P. Zhu, Cao, Mr. B. Liu after Dr. Zhu's thesis defence in Lublin, Poland, 1996.



From left to right: Prof. Z.H. Cao, Ms. Justyna Stefaniak and Dr. Y.C. Cao at their office after Yucheng Cao's thesis defence in Lublin, Poland, June 2012.

Organizing International Symposiums / Workshops / Conferences

1. International Workshop on Rational Fertilization on Flue-cured Tobacco Zhengzhou, Henan Province China (1)1985
2. International Workshop on Rational Fertilization on Flue-cured Tobacco Zhengyi, Guizhou Province China (1)1986
3. IFS International Symposium on the Improvement of Soil Fertility. Nanjing, China 1993
4. International Workshop on S Fertilizer Use and Strategy for the Future in China (1), Nanjing, China 1995
5. International Workshop on S Fertilizer Use and Strategy for the Future in China (3), Putian, Fujian Province China 1997
6. International Symposium on Green House Production. Suzhou, Jiangsu Province, China 1998
7. 12th International Conference of Chemistry for Environment Protection. Nanjing China, 1999
8. International Symposium on Soil-Water Interaction and Environment Quality, Suzhou Jiangsu Province China 2002
9. Sino-German Symposium on Ancient Paddy Soil Research and Future Strategy Kunshan, Jiangsu Province China 2005
10. Sino- Germany Workshop on Carbon Sequestration by Eurasians Forestry, Hangzhou China, 2007

11. 1st International Conference on Contaminated Land Ecological Assessment and Remediation (CLEAR), at Hangzhou China, 2012

**An Academic Committee Member, Adviser and Honorary Professor in
China**

1. Cao was an Academic Committee member for the Chinese Academy of Agricultural Sciences (CAAS), Beijing 1995-1999.
2. Cao was a member of the State Science and Technology Committee for National Tobacco Bureau, Beijing 1994-1999.
3. Cao was a member of National Fertilizer Evaluation and Judge Committee for Ministry of Agriculture Beijing, 1993-1996.
4. Cao was the Science and Technology Adviser for Flue-cured Tobacco Production in Henan, Shandong, Anhui, Jiangsu, Shanghai, Yunnan and Guizhou Provinces in various years from 1987 to 2013.
5. Cao was appointed the Honorary Professor of Zhejiang University, Yangzhou University, Anhui Agricultural University, and Zhejiang Agricultural and Forestry University in various years.
6. Cao was the member of the 5th National Commission for National Science and Technology Association during 1995-2000.

Awards from the Chinese Government and the Public

Due to Cao's contributions to science and environmental protection for public; he received numerous awards from the Government and the public:

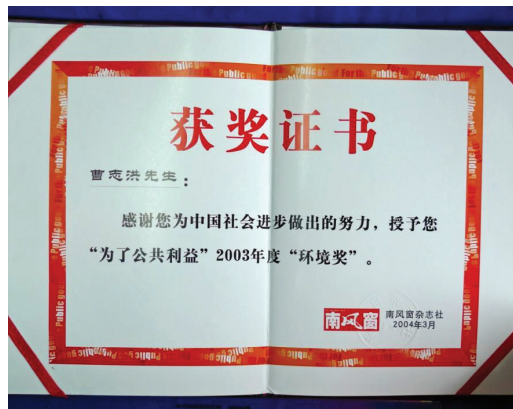
1. National Outstanding Contributions Young Scientists *by Ministry of personnel, Beijing* 1992.
2. "Provincial Model Worker" award *by Provincial Government of Jiangsu*, 1995.
3. "Public Environment Award of 2003" *by J. of Wind from Southern China*, 2003



NDYS Award.



Model Worker Award of Jiangsu.



Public Environment Award.

PUBLICATIONS

In total, Cao himself or in cooperation with his colleagues has published 156 papers in Chinese, 85 papers in English.

One chapter published in English: “Origin of Paddy Fields and Functions for Environmental Remediation in the Urbanized Area of Yangtze River Delta”. The 18th Chapter, pages 393-416 in the book “Environmental Contamination - Health and Ecological Restoration”. Edited by; M.H. Wong, published by CRC Press Taylor & Francis Group, Boca Raton, London, New York, 2012

In addition Cao made oral presentation of 32 papers (in English) at the International symposiums, congresses and workshops (not included in the following list). Also Cao in cooperation with his colleagues published 5 books in Chinese; edited 3 proceedings in English, 3 proceedings in Chinese; and in cooperation with Prof. M.H. Wong et al., organized 3 special issues published by International Journals.

Some important papers are listed below:

Selected Papers Published in Chinese

1. 课题组合著 碳酸氢铵粒肥的肥效和机械造粒. **土壤** 3: 91-96, 1974
2. 课题组合著 长效性碳酸氢铵的研制. **土壤** 3: 97-102, 1974
3. 课题组合著 碳酸氢和长效性碳酸氢铵的研制. **化学通报** 1: 21-25, 1976
4. 课题组合著 几种 ¹⁵N 标记的氮肥对稻麦不同施用方法的比较研究. **土壤** 6: 213-217, 1978
5. 曹志洪等 长效性碳酸氢铵的研究. **土壤学报** 17(2):143-154, 1980
6. 曹志洪等 深施氮肥 (¹⁵N 标记尿素) 对水稻水层化学性质的影响及水稻对深施氮肥的回收率. **土壤学报** 20(3): 253-261, 1983
7. 曹志洪 国际水稻所的土壤科学研究. **土壤** 15: 160-161, 1983
8. 曹志洪, 论碳铵粒肥深施的肥效及机械成型. **中国土壤的合理利用和培肥 (中)**:109-114, 1983 中国土壤学会
9. 曹志洪等 石灰性土壤上氮肥施用方法对春小麦氮素利用率的影响. **土壤** 16: 134-137, 1984
10. 曹志洪等 碳铵粒肥深施的经济效益分析. **土壤** 16: 180-183, 1984

11. 曹志洪 当前世界化肥供求和粮食生产概况. **土壤** 17: 107—110, 1985
12. 曹志洪等 不同前茬对小麦氮素利用率影响的研究. **黄淮海平原治理与开发研究文集** : 4—10, 1986 科学出版社
13. 曹志洪等 1983 年—1985 年在封丘县推广碳铵粒肥深施技术的总结. **黄淮海平原治理与开发研究文集**: 61—64, 1986 科学出版社
14. 曹志洪等 不同粒径碳铵粒肥在夏玉米深施的效应. **黄淮海平原治理与开发研究文集**: 27—31, 1986 科学出版社
15. 曹志洪等 天然文岩渠流域次生黄土的理化性质及磷素养分之研究. **黄淮海平原治理与开发研究文集**: 54—57, 1986 科学出版社
16. 曹志洪等 黄淮海平原土壤肥力状况和合理施肥. **土壤** 18:289—295, 1986
17. 曹志洪等 讲究科学施肥, 提高烟叶质量. **云南烟草科技** 2: 24—28, 1986
18. 曹志洪等 发展混合型卷烟要与香料生产同步进行. **中国烟草科技** (5): 18—19, 1986
19. 徐志红, 曹志洪, 李庆逵 尿素粒肥在石灰性砂壤土上对夏玉米效应及氮去向的研究. **土壤学报** 24(1): 51—58, 1987
20. 曹志洪、李庆逵 磷肥肥粒对周围微域 pH 的影响. **土壤学报** 24(3) 226—231, 1987
21. 曹志洪等 论我国优质烟基地的土壤环境. **中国烟草** 4: 34—44, 1987
22. 曹志洪等 烤烟对智利硝酸盐肥料的效应. **智利硝酸盐肥料与烤烟生产技术交流会议资料集** (1): 18—30, 1987
23. 曹志洪等 优质烟土壤与施肥考察团赴巴西, 智利, 美国的考察报告. **智利硝酸盐肥与 优质烤烟生产技术交流会议资料集** (2): 1—17, 1987
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33. 曹志洪等 烤烟生产中的钾素营养. **江苏烟草会刊** (4): 34—38, 1991
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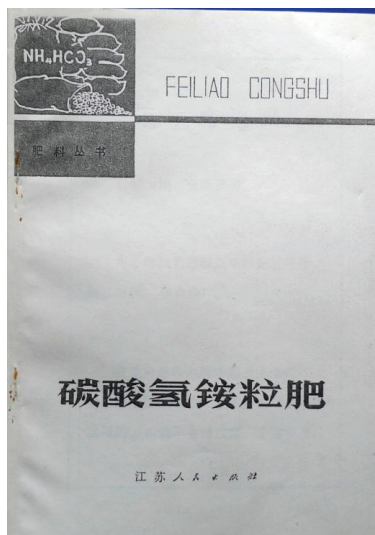
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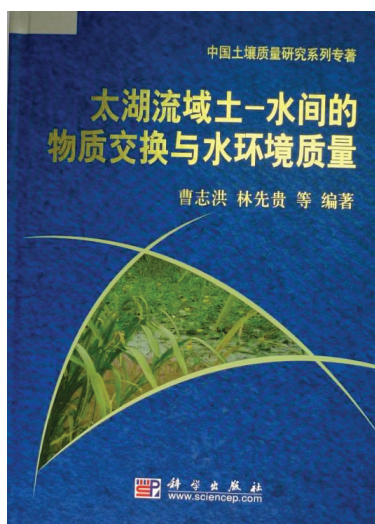
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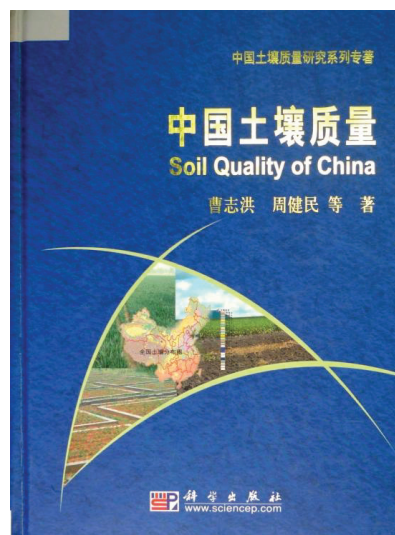
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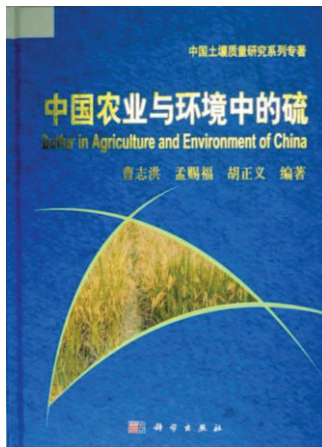
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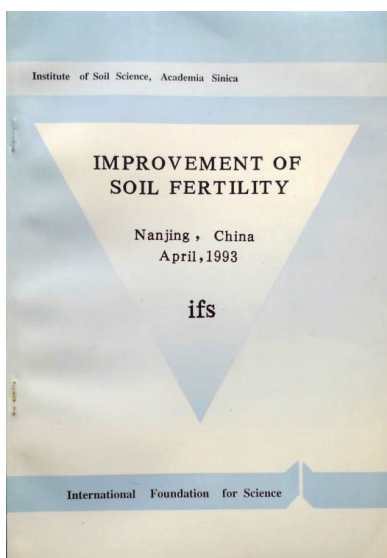
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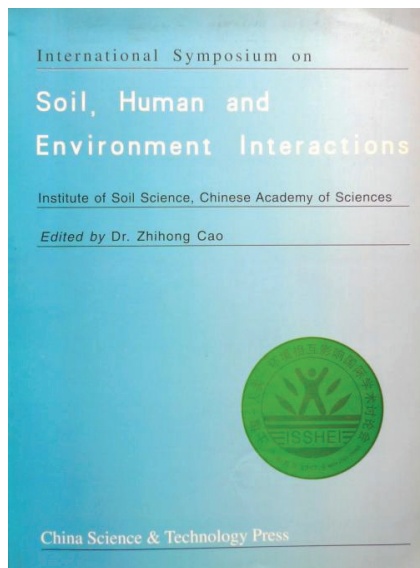
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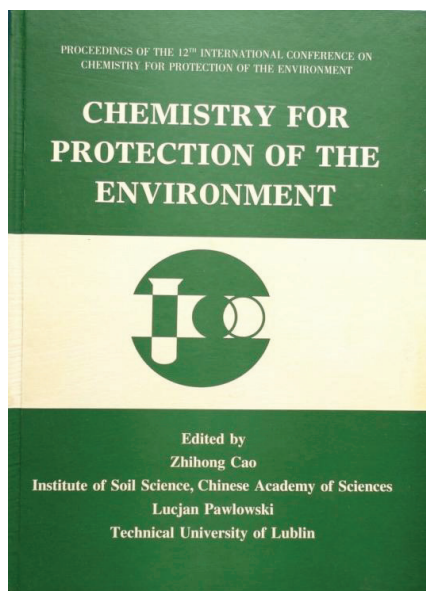
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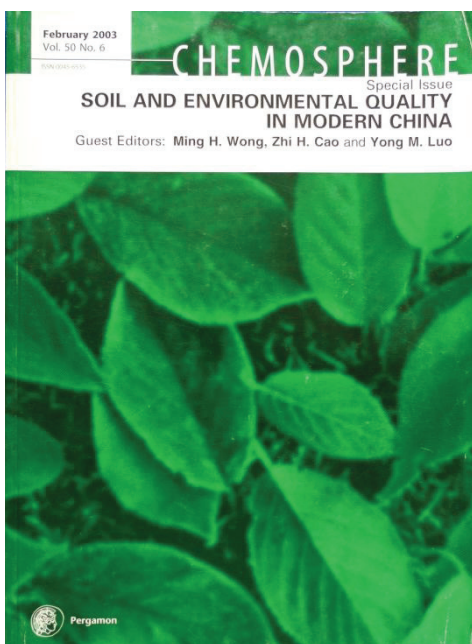
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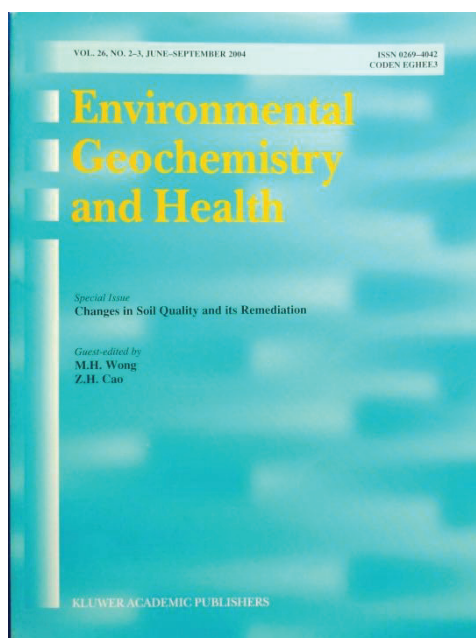
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2. "Changes in Soil Quality and Remediation" published by *Environmental Geochemistry and Health* Vol. 26, No. 2-3 June–September 2004. Guest Edited by M.H. Wong and Z.H. Cao.
3. "Bamboo and Climate Change in China" published by *Botanical Review* Vol.77, No. 3, September 15, 2011. Guest Editors were GM. Zhou, ZH. Cao, MH. Wong.



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"Changes in Soil Quality and Remediation" published by *Environmental Geochemistry and Health* Vol. 26, No. 2-3, 2004.

GROWING UP AND FAMILY LIFE

Parents and Hometown

Zhihong Cao was born in a family of rice farmers on November 5th, 1941 in Yuyao County, Zhejiang Province, China. It was a difficult time because of the Second World War. That is why the lack of sufficient amount of food and an unstable situation caused Cao's family to lead an abnormal life. His father Mr. Rongfu Cao was a master in a tuck shop and made cakes and pastry with a very low wage, which was not enough to support his family. His mother, Madam Guiying Hua was a beautiful and kindhearted woman. She led her two elder boys and two middle daughters to planting rice, oil rapeseed and vegetable crops in a paddy fields about 6 km away from her hometown, Yuyao Town. Cao remembered that all family members (excluding his farther, since, he worked in a shop), farm tools and manures were put together in a boat, which sculled by his brothers to the countryside for farm work. Cao and his younger sister also came along because there was no one to look after them. They were playing under a big tree, while the elders were working in fields. Cao and his younger sister used to fall asleep on the road when they got tired. Although the whole family was working hard, it was only enough for some food and the rental payment, but no extra money to support his elder brothers and sisters to study at schools. Cao's childhood certainly was not easy. He and his younger sister were not to study until the age of 9. They learned a lot from their parents and elder siblings: one, living in world, must work hard and never lose hope.



Cao and his father in Beijing,
1968. Cao's Father (1902– 1976)-
an industrious and
a simple man.



Cao, his mother and his sister's daughter in Nanjing 1971, Cao's mother (1901-1991) – a kindhearted and virtuous woman; his niece --Miss Lijuan Sun helped to take care of Hui Cao and Qing Cao her little brother and sister in law during 1970-1973.

His parents knew how to guide their children to be resourceful, thrifty, loyal and friendly people, although, they had not enough money to provide their children with education in the appropriate time. They taught their offspring to be bright with the capability of independent thinking and the awareness to set an example by their own actions. The parents also advised them to be grateful, respectful and never make harm to others. His parents were very traditional and ordinary Chinese people in the street but with good will.

That was why, during the so called “cultural revolution” period (1965-1975) in China, Cao's father called him several times and ordered him not to follow the “Red Guard”, because they harm other people and damage properties. He also reminded Cao that he should do his best to protect the elder experts in these difficult times. Cao strictly followed his father's instructions and strived to protect Professors, Officers when they were in trouble and the colleagues with different openings in ISSAS and communities. He had never hurt anyone but had stopped others hurting the elder scientists. It brought him luck, because those people thought that Cao was not suitable for “revolution” but might be accurate for research and production. He was soon assigned to leave the tense situation for a research task in spring, 1967.

Cao's hometown --Yuyao County is a beautiful place located at the south bank of Hangzhou Bay which belongs to Ningbo – Shaoxing flat area of East Zhejiang Province. Flat and fertile plane coast connected with green Siming Mountains in the south and abundant water nets with clean streams. It is suitable for rice, fruits, vegetables and fish production that's why Yuyao is called as 'Fish and Rice Country'. Hemudu relic site is popular in the world for rice production, which dates back to 7000 BC, and also for its high level construction skills of prehistoric settlements and tools which is located 20km away from the town.



Fertile coast plain is good for rice and fish production, Yuyao China.



Hemudu relic site is one of the earliest rice grow places in the world, Yuyao, China.

Yuyao is also named “the Country of Literature” since Ming Dynasty; some great philosophers and writers were born ther, in particular Mr. Yangming. Wang (1472~1529) an ideologist known by all the Chinese. It does not matter if one is rich or poor, people in this area traditionally put emphasis on education and reading. Moreover, the beautiful landscape of the region is a tourist attraction.

Education at Primary, Middle and High Schools

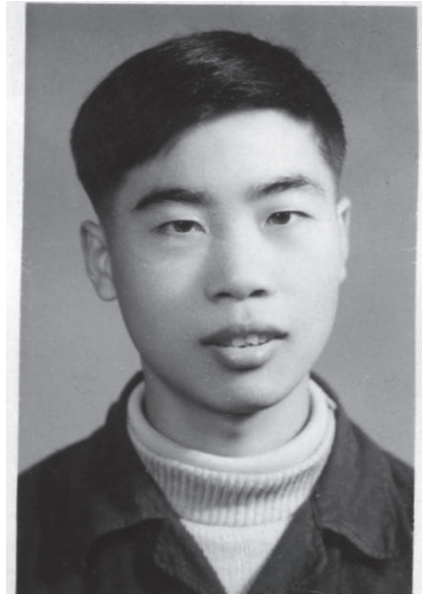
The conditions of life changed in 1949, Cao and his younger sister began to study in a primary school with free of charge tuition. Their father, introduced by his friend, got a better job in Beijing. Then his siblings also found a job and left Yuyao for Beijing. Their life was gradually becoming better.

Cao graduated from the Third Primary School of Yuyao in 1953 and then he entered the First Middle School of Yuyao and graduated with good marks in 1960.



Cao and his primary schoolmates, 1953.

During the high school period, he was fond of scientific experiments. The results of making maltose from the starch of sweet potatoes and the further preparation of dessert were displayed at an exhibition of science for youth. He also assembled a hand driven rice seedling transplant machine. He had a dream of creating a new variety of rice with higher yield and drought resistance by cross breeding of rice and grain sorghum. He was fond of swimming in rivers and solo or group singing though he knew he is not a good at singer.



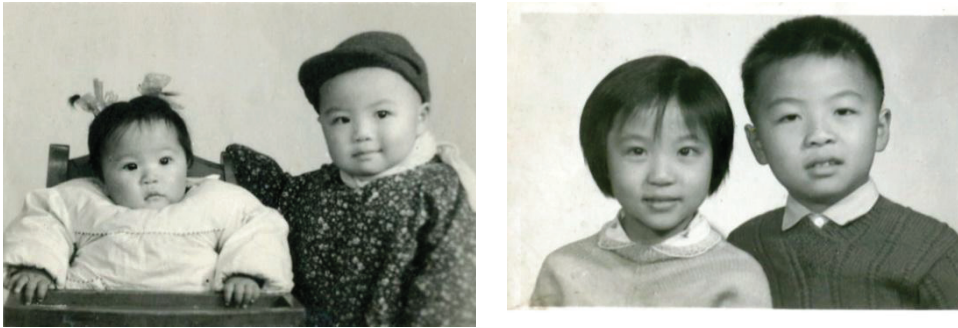
Cao at his middle school period, 1959.



Cao graduating from high School, in1960.

Marriage and Children

Cao married Miss Dongmei Li – a pretty and kindhearted lady in 1968 at Nanjing after 4 years of working in ISSAS. Li was a good wife to Cao; she undertook all of the household duties while she also had to work in an electric instrument company. They got their first boy -- Cao Hui in September, 1969. She understood and supported her husband's career. Even after 3 days after the birth of their son she allowed her husband to go to Beijing to work



Left: Hui and Qing spent about 2 years in Yuyao Right: They returned to Nanjing for kindergarten, in 1972.

Their daughter – Cao Qing – was born in spring, 1971. Both of the parents had to work and could not look after their children, they had to send them to Yuyao and ask their grandmother and their relatives to look after the children for 2 years. They returned to Nanjing when they were to attend kindergarten.

Cao was too busy to help with housework and had to leave all responsibilities of education and daily life of children to his wife, while she worked a three-shift system in the factory. She became extremely tired and that led to her decline in health. Cao always felt sorry for the turn of events and knew that he owed her a lot.

For instance, when Cao studied and conducted research in IRRI/UPLB during 1979 ~ 1982, for about 3 years; he was ordered not to return home by the policy of China at that time. Dongmei was left alone and needed to take all the responsibilities at home in Nanjing. She had a difficult time working at factory during the day and looking after the children's education and parenting etc. during the evening. The only manner of communication was a letter sent once a month, describing how much they missed each other. When Professor S.K. De

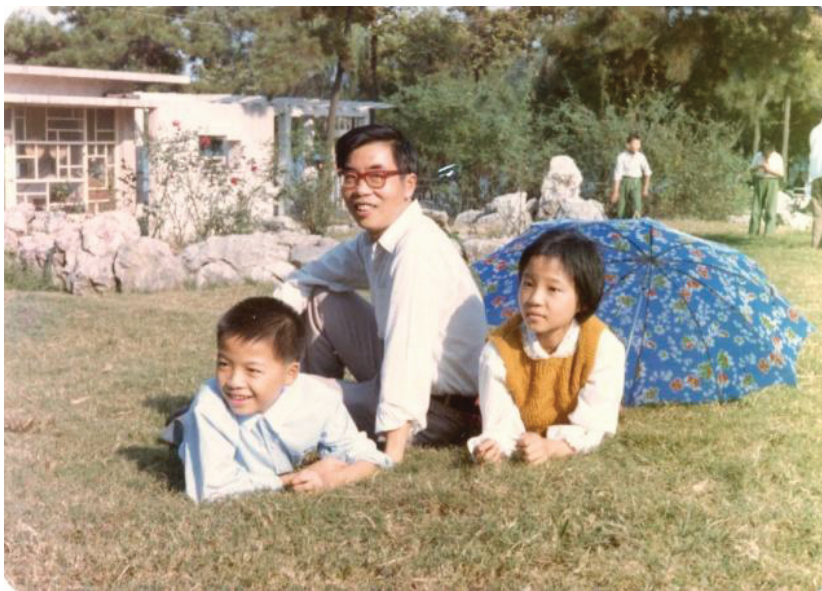
Datta, Cao's supervisor in IRRI, attended the international symposium on paddy soils, which was hosted by ISSAS at 1981, Dongmei and children met with him and knew that Cao had perfectly accomplished his task. They were all in good health and felt happy.



Prof. S.K. De Datta meeting with Cao' family at ISSAS, 1981.

After Cao returned home from Philippines in April, 1982, he often took his kids to the Public Park in Xuanwu Lake near their house and wanted to make up for the lost time.

Chinese reforms and open policies increased the economic development and improved people's living standards. Profits gained from a more open policy of the government were that Cao Hui and Cao Qing had opportunities to go abroad for advanced study one after another. They also had a photo taken in front of the Primary School of East Beijing Rd. and also took one at the family union in Jiuhua hill, the backyard of ISSAS and their house.



Cao and his children, in Xuanwuhu Park, 1983.



Hui and Qing and their primary school, 1991.



Family union, at the Jiuhua Hill, 1991.

Grandchildren and a Happy Future

Hui Cao completed his two MS degrees in the USA and Qing Cao had one MS degree in Chile and another in the USA. Both of them found an occupation there and invited their parents to visit from time to time. Hui got married in 1998 and Qing in 2000. Cao and Li have two granddaughters at present, Christine Ruichen Cao at the age of 6, in 2005 and Kathy Shuxin Shao at the age of 5, in 2009.



Cao and Li in USA, 1994.



At Qing's wedding Party in USA, 2004.



Cao, Li and their granddaughter, 2009.



Grandmother sending Christine to School, 2005.



Kathy, a pretty and lively girl, 2009.

Cao and Li had made many friends at home and abroad. They visited Australia, Chile, France, Japan, Philippines, Singapore, Spain, and USA once or several times and visited many places in China. They thought that all the people in the world are brothers and sisters. All of people are living in the same home, Earth. Therefore, we should do our best to protect the environment and keep the sustainable development forever. The last photo shows the three generations praying for health and a peaceful world.



Cao's family praying for health and a peaceful world, 2010.

PROFESSOR CAO FROM THE POLISH PERSPECTIVE

Professor Lucjan Pawłowski
Deputy Chairman of the Board of Trustees
4th Faculty of Technical Sciences
Polish Academy of Science

**30 years of friendly and fruitful cooperation with distinguished scholar,
Professor Zhihong Cao**

For the first time I met Professor Zhihong Cao in 1993 in Nanjing, where he was the Director of China Academy of Soil Science Institute.

It was a very pleasant and fruitful meeting which resulted in long-lasting cooperation in the area of environmental chemistry. First of all, in 1996 Professor Zhihong Cao reviewed a doctoral dissertation of my first student from China Xiaoping Zhu who is currently a Professor at the University in New York. Since that time, Professor Zhihong Cao has been recommending another doctoral students.

In 1997, I was awarded honorary professor on the initiative of our friend Professor Zhihong Cao former Director of the Chinese Academy of Science.

The organisation of the XII International Conference in Nanjing entitled *Chemistry for Protection of the Environment* in 1999 was one of our biggest projects. The primary objectives of this conference were to: improve technology transfer and scientific dialogue thereby leading to a better comprehension of, and solutions, a broad spectrum of environmental issues. It was the first CPE meeting in Asia. Over 80 delegates from Asia countries, such as: China, Japan, Korea, Thailand, Hong Kong and India etc.; more than 30 from European countries, Poland, Austria, UK, France, Germany, Slovakia etc. from Oceania, were both Australia and New Zealand; delegate from the USA of Northern America and Chile from Southern America, and from M

orocco of African continent attended this conference.

Last year we were honoured to host Professor Zhihong Cao at our University. He was a lecturer and worked with the students from the Erasmus Programme.

Professor Zhihong Cao has substantially contributed to the development of research in our team. He contributed also to the increase of cooperation with scholars from China, where he has been promoting our scientific publications, increasing their number of quotations in China.

Chinese scholars and doctoral students sent to Lublin by Professor Zhihong Cao constitute an important link of effective scientific cooperation. My co-workers liked them due to their hard work and kindness, what gave our mutual cooperation a new dimension, constantly promoted by the Professor Zhihong Cao.

Awarding our friend Professor Zhihong Cao the title of Honorary Professor of the Lublin University of Technology we would like to express our acknowledgement for cooperation and our recognition for his personal scientific achievements.

Professor Jan Glinski
Institute of Agrophysics
Polish Academy of Sciences

Dear Prof. Cao,

As the director of the Institute of Agrophysics of the Polish Academy of Sciences in Lublin in the years 1982-2002, I recall with pleasure my scientific and friendly contacts with Professor Cao zhihong, the contemporary director of the Institute of Soil Science of the Academia Sinica in Nanjing. I found him both a clever man and a very good organizer of science.

Very intensive and fruitful cooperation of Prof. Cao and his Institute with the Institute of Agrophysics in Lublin was carried out in years 1996-2002 in the frame of the agreement between the Polish and Chinese Academies of Sciences.

The cooperation was related to the application of physics in the solution of problems of soil degradation and environment protection which are, although in different scales, similar in both countries. It concerned such projects as:

1. Agrophysics – measuring methods and instrumentation, combination of theory with its practical applications in agricultural and environmental protection.
2. Modelling and monitoring of time and spatial variability of chosen physical parameters in soil environment.
3. Control and remediation of agricultural surface pollution.
4. The use of TDR technique in the monitoring of agro-ecosystems and the environment.

The cooperation consisted also in:

- exchange of scientists for short visits and longer trainings,
- joint publications,
- participation in conferences organised in Lublin and Nanjing.

I would like to mention that I personally and my co-workers visiting the Institute under the direction of Prof. Cao, stressed valuable scientific aspects of investigations carried out there, and the dynamic development of China as a country.

I am happy that Prof. Cao continues his contacts with scientists in Lublin, especially with the Lublin University of Technology, but his is always welcome at the Institute of Agrophysics.

My hearty congratulations on the occasion of his award of an Honorary professorship of the Lublin University of Technology, and I hope to meet him in Lublin soon.

Prof. Jan Gliński

Professor Marzenna R. Dudzińska
Vice-rector for Scientific Affairs
Lublin University of Technology

Dear Professor Cao,

On the occasion of honouring you as the honouree professor of Lublin University of Technology, I would like to express my deep appreciation and congratulations.

But first of all I would like to remind you and myself –the history of our friendship, which has been of benefit for me, and I hope for you as well.

I do not exactly remember our first meeting, but it was in Poland in 1995, when the first agreement of cooperation between the Institute of Environmental Protection Engineering, Lublin University of Technology, the Institute of Agrophysics of Polish Academy of Science, Lublin and the Institute of Soil Science Academia Sinica, Nanjing was signed. The Institute of Environmental Protection Engineering had just been established on the basis of the Department of Water and Wastewater Technology and we tried to extend our research interests to new areas. You have visited Poland and I was involved in managing the programme for our guests.

I was only partially involved in our first common project on alumina in the environment, but I have cooperated with colleagues working on alumina complexation with chelating ligands. So I kept in touch with our first Chinese doctoral candidate – Zhu Xiaoping. But you visited Poland on different occasions and besides the scientific discussions, we had the opportunity to see marvellous places around Lublin together.

And of course we met when you participated in the X Chemistry for Protection of the Environment Conference in Lublin in 1995.

We had a large group of Chinese participants that time –both from Taiwan and Mainland China. We did not mind any differences among scientists – and it was the good side of being a researcher, sharing experience with others and ignoring policies.



The delegates from China and Taiwan at the banquet of the X International Conference on “Chemistry for Protection of the Environment” held in Lublin, Poland.

In 1998 Zhu defended his thesis and got the first doctoral degree in environmental engineering from our Faculty – you as one of his reviewers visited Lublin.

And in 1999 you invited scientists from all over the world to Nanjing, to participate in the XII International CPE conference. It was a remarkable event for me because – it was the first possibility to visit China and the first occasion to present a plenary lecture, as you had been so kind to ask me to talk about my research during the opening session.



The participants of the XII International Conference on “Chemistry for Protection of the Environment” held in Nanjing, China, 1999.

We remain in contact, although great changes have appeared in both China and Poland since those days. And, as it naturally happens, the official agreement of collaboration expired.

But you were a true friend of Poland - as you re-established the cooperation when you had changed the university and moved to Linan City. So, being the vice dean for scientific affairs, I had another occasion to witness the signing of the scientific collaboration agreement between our institutions: Lublin University of Technology, Poland and Zhejiang Forest University, China.

Then another doctoral student from China conducted research at our Faculty and you had yet another opportunity to visit Lublin, as you were his co-tutor.

And today I am the vice rector for scientific affairs and since I have been holding the office I hosted three high level Chinese delegations and I was proud to inform them that the history of our cooperation with China is long and fruitful. We had doctoral students from China who successfully defended their theses (with honours), we also hosted numerous exchange students and Erasmus Mundus students.

The ceremony of honouring you with the title of an honorary professor will be held in June – on the 15th anniversary of the first doctor in environmental engineering we have promoted, it was a Chinese researcher – now an active scientist in the USA. And it will be a great and memorable event for us - and I hope for you as well.

Congratulations and all the best

CONGATULATION LETTERS

21th April 2013

Professor Cao Zihong
Institute of Soil Science
Chinese Academy of Sciences,
No 71 East Beijing Road, Nanjing,
China 210008.

Dear Professor Cao,
Congratulations on your award of an Honorary Professorship from the Lublin University of Technology, Lublin, Poland.

You deserve this honour because of your outstanding research in the field of soil science, and your substantial contributions to fertilizer nitrogen efficiency. Your research has significantly extended the discipline, and resulted in new research concepts which have had a significant impact world wide. You have been exceptionally productive in your work which covers a remarkable range of important areas, have provided a focus and inspiration for research, and are distinguished academically in an international environment.

You are held in high regard by your peers and recognized worldwide as an excellent scientist and are truly deserving of this honour. Congratulations.

Yours sincerely,

A handwritten signature in cursive script, reading 'J.R. Freney'.

J.R. Freney FTSE, B.Sc, M.Sc, PhD,
Fellow of the Australian Academy of Technological Sciences and Engineering
Senior Fellow, School of Resource Management, The University of Melbourne, Victoria.
Research Fellow, Formerly Chief Research Scientist, CSIRO Plant Industry,

Canberra, A.C.T.

Adjunct Professor, Centre for Forestry and Horticultural Research, Griffith University, Queensland.



Professor Zhihong Xu
Director – Environmental Futures Centre
Griffith University
Nathan, QLD 4111, Australia
E-mail: zhihong.xu@griffith.edu.au

16 April 2013

Professor Zhihong Cao
Institute of Soil Science
Chinese Academy of Science (CAS)
71 Beijing East Road
Nanjing 210008
People's Republic of China
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School of Biomolecular and
Physical Sciences

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Australia

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www.griffith.edu.au

Dear Professor Cao,

Warmest Congratulations on Your Award of Honorary Professorship of the Lublin University of Technology (Politechnika Lubelska)

I have been very pleased to learn that you have been granted the Honorary Professorship by the Lublin University of Technology in Poland. This is indeed an excellent acknowledgement and recognition of your outstanding research achievement and reputation in the relevant fields.

I would like to take this opportunity to express my warmest congratulations on your award of the Honorary Professorship of the Lublin University of Technology.

With very best wishes,

Yours sincerely

A handwritten signature in black ink, appearing to be "Zhihong Xu", written over a horizontal line.

Zhihong Xu



**WYDZIAŁ INŻYNIERII ŚRODOWISKA
POLITECHNIKA LUBELSKA**

**FACULTY OF ENVIRONMENTAL ENGINEERING
LUBLIN UNIVERSITY OF TECHNOLOGY**



Prof. Dr. Zhihong CAO
Institute of Soil Science
Chinese Academy of Sciences (CAS)
71 Beijing East Road, Nanjing 210008
Peoples Republic of China
e-mail: zhcao@issas.ac.cn

Dear Professor Cao,

Please accept my Warmest Congratulation on Your Award of an Honorary Professorship of the Lublin University of Technology (Politechnika Lubelska).

As a former employee of the Institute of Agrophysics of the Polish Academy of Sciences I had a pleasure to meet you during my first visit to Nanjing in 1891. These contacts were maintained and developed during subsequent years. It was my personal satisfaction to participate in the preparation process of this event. I am deeply convinced that this is indeed an excellent acknowledgement and recognition of your outstanding research achievement and reputation in the field of soil science.

With very best wishes,

Yours sincerely

Prof. Witold Stępniewski

ul. Nadbystrzycka 40 B, 20-618 Lublin, Polska

tel. +48 81 538 47 88, fax +48 81 538 19 97, e-mail: wis@wis.pollub.pl



The JOHN PAUL CATHOLIC UNIVERSITY of LUBLIN

Department of Biotechnology and Environmental Sciences

Faculty of BIOCHEMISTRY and ENVIRONMENTAL CHEMISTRY

Professor Zofia Stepniewska

Ul.Konstantynów 11,

✉ 20-708 Lublin (Poland), ☎ 0048-81-475 94 56

May 06,2013

Dr.Z.H.Cao

ISSAS

Nanjing, China

Dear Dr. Cao:

My best congratulations upon your selection as the Honorary Professor of the Lublin University of Technology in our city!

This is a very high honor underlining your international scientific contribution. During your stay in Poland we had an opportunity to build effective personal relationships and a nice scientific interest between our Universities.

On a personal note, we will always remember a very friendly trip to China with visiting nice places and cordial stay in Nanjing during the International Conference on Integrative Strategy for the Understanding of Ecological Processes and Functions in Soils in 2006.

With my heartiest congratulations and warmest regards,

Zofia Stepniewska

Universität Bonn - Bodenwissenschaften - 53012 Bonn

Prof. Dr. Zhihong Cao
ISSAS
Nanjing, China

Prof. Dr. Wulf Amelung

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Tel.: 0228/73-2780
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Sekretariat:
Birgit zelt
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www.boden.uni-bonn.de

Bonn, 12.04.2013

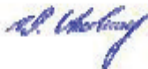
Congratulations

Dear Prof. Cao,

We have recently learned that you have been awarded to become Honorary of the Lublin University of Technology (Politechnika Lubelska). This is a great honour. We sincerely congratulate you to this award, and we are happy to continue our fruitful collaboration with you in the future.

With best wishes

Yours sincerely,



(Wulf Amelung)



Technische Universität München

Technische Universität München
Lehrstuhl für Bodenkunde, 85350 Freising, Germany

Professor Dr. Zhihong Cao
Institute of Soil Science
Chinese Academy of Sciences
71 East Beijing Rd.
Nanjing, 210008
P.R. China

Freising, 16. April 2013



Wissenschaftszentrum
Weihenstephan

Department
für Ökologie und
Ökosystemmanagement



Lehrstuhl für Bodenkunde

Prof. Dr. Ingrid Kögel-Knabner

Emil-Ramann-Straße 2
85354 Freising-Weihenstephan
Germany

Tel. +49.8161.71.5174
Fax. +49.8161.71.4466

koegel@wzw.tum.de
<http://www.soil-science.com>

Dear Professor Cao,

It is a great pleasure for us to hear that you will obtain a Honorary Professor title from Lublin University.

This great honour reflects your outstanding efforts to support current topics of soil science not only at a national, but most notably also at an international level. In the frame of the German Research Unit "Biogeochemistry of Paddy Soil Evolution", your huge effort allows to initiate a fruitful collaboration between German and Chinese soil scientists at a 2000 years chronosequence of paddy soil evolution. With a lot of energy, you organised sampling campaigns and the transport of large amounts of sample material, you collected and provided a lot of background information on the sampling sites, and discussed the data rigorously. All this resulted in numerous collaborative publications in internationally accepted high-ranking scientific journals.

With regard to all your excellent activities, we would like to send you our honest congratulations to this well-deserved award. It would be a pleasure for us to have further successful cooperation in the future.

Sincerely yours

Prof. Dr. I. Kögel-Knabner



광주과학기술원

Gwangju Institute of Science and Technology

Office of International and Public Affairs

123 Cheomdan-gwagiro, Buk-gu, Gwangju 500-712, Korea

Tel. +82-62-715-2442 Fax. +82-62-715-2434 E-mail. kwkim@gist.ac.kr



15 April, 2013

To whom it may concern;

It is my pleasure to write a letter of congratulation for my colleague, Professor Zhihong Cao at Institute of Soil Science, Chinese Academy of Sciences. I have known him more than 15 years since he was a professor at Institute of Soil Science, Chinese Academy of Sciences. He was a pioneer in the field of applied geochemistry in China and has got many publications in internationally recognized journals. These papers are still cited by many scholars in our field.

He is a capable and very hard worker, and working in a very high impact field of science. He knows his field very well, is a good speaker and writer, and I am confident he made strong contribution to soil science.

I would like to congratulate on his honorary professors title at the University of Lublin.

Sincerely yours,

Professor Kyoung-Woong Kim
(Environmental Geochemistry)
Dean, International and Public Affairs
Gwangju Institute of Science and Technology,
Gwangju 500-712, South Korea



축하서한

I heartily congratulate Dr. ZH Cao on his appointment as an Honorary Professor of Lublin University, Poland. I know this prestigious University which Dr. G. Jo'zefaciuk graduated from and worked in the institute of Agrophysics. I had a pleasure of researching with Dr. G. Jo'zefaciuk one year in mid 90's in my institute.

Dr. Cao, with his brilliant background and long record of fine achievements, has collaborated on many projects with my institute. One of such projects was soil fertilization program, in which he contributed enormously on the solution of polder reclamation and early maturity of Korean west coastal area. He also attended several international conferences held in Korea. Especially through International Symposium on Sulphur in Agricultural Soils (1996) under my chairmanship, his research results on transformation, migration and availability of sulphur had a significant impact on recognition of sulphur in agriculture of both Korea and China.

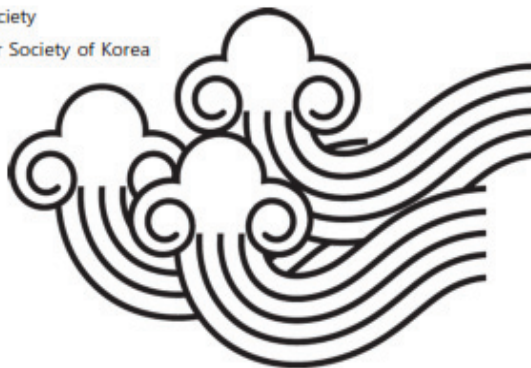
He also hosted many international conferences as DG of Institute or president of CSSS. My wife and I still talk about our fond memory from a spouse program in soil remediation conference on his organization in Hangzhou (2000), where Dr Cao escorted us to some of the most memorable places we have ever been to. I believe Dr. Cao's academic experience and expertise and his dedication to helping others will ensure success in his new role at the Lublin University.

Jae Sung Shin

Former Head of Soil Institute

Former President of Mineralogical Society

Former President of Soil and Fertilizer Society of Korea



Maurice G. Cook, Ph. D.
Certified Professional Soil Scientist
Professor Emeritus, North Carolina State University
3458 Leonard Street
Raleigh, NC 27607

Tel. (919) 787-3021 Fax (919) 787-7946 e-mail: mauricegcook@att.net

April 13, 2013

Dr. Z. H. Cao
ISSAS
Nanjing, China

Dear Dr. Cao:

Congratulations upon your selection as Honorary Professor of Lublin University! This is a very high honor and I am delighted to see you receive it.

This distinguished recognition speaks highly of your international scientific contributions. You certainly were a valuable asset to North Carolina State University during your tenure with us. You opened new opportunities for partnership between our university and international institutions such as the ISSAS. You established many effective personal relationships while you were in Raleigh. My wife, Nancy, and I are very pleased to be included among the beneficiaries of your friendship.

On a personal note, we will always be grateful to your for arranging a trip to China for us in 1989. We were able to visit many places in China that we likely would have missed had it not been for your preparatory efforts in our behalf. I especially appreciate your invitation to present a paper at the International Conference on Greenhouse Agriculture in 1998 at Suzhou.

Nancy and I are thankful also for the opportunity to meet and know your fine family. We will always cherish your friendship.

Again, my heartiest congratulations to your on this well-deserved honor you are receiving from Lublin University.

Warmest personal regards,

Maurice G. Cook

Dr. Guy L. Jones
3435 Blue Ridge Road
Raleigh, NC 27612-8014
Phone 919 787 4564
Email guylj@aol.com

Dr. Cao Zhihong
Institute of Soil Science Chinese Academy of Sciences, Nanjing.
71 # East Beijing Road
NANJING, CHINA 210008

April 11, 2013

Dear Dr. Cao:

It is an honor to write a letter about our personal and professional activities beginning in 1985 when I first visited China and your Institute. As a Professor in the Department of Crop Science I served as a Consultant to SQM Chile, a producer of Nitrate Nitrogen. My research specialty was in the production of tobacco specializing in fertilization and quality tobacco.

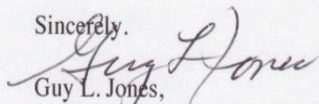
I visited China and planned a research project with you and your Institute to study sources of nitrogen and their effect on yield and quality on flue-cured tobacco. The tests were statistically designed utilizing replications and locations. The tobaccos were evaluated for yield, chemical qualities, smoke quality and manufacturing. United States as well as other International Tobacco Companies cooperated in the evaluation of the cured leaf. The studies over seven years showed the superiority of Nitrate Nitrogen in the production of high yields of high quality tobacco for use in manufacturing cigarettes.

The SQM COMPANY sponsored Dr. Cao for two years during 1988 to 1990 as a Visiting Professor in the Department of Soil Science at NCSU, Raleigh, NC, where he did greenhouse and laboratory studies in support of our research in China.

I made at least 15 trips to China to work with Dr. Cao. His wife joined him at NCSU. Later his son, Cao Hui, came to NCSU to complete his BS in Computer Science and to get an MS degree in Wood and Paper Technology. He joined a major US paper company and is back in China as a leader with this company. Dr. Cao is an International Scientist. China has benefited from his and his families experiences.

We are personal friends and have benefited from the international cooperation. Dr. Cao is a credit to his Institute, China and the advancement of Soil Science..

Sincerely,



Guy L. Jones,
Professor Emeritus, Department of Crop Science NCSU

中国科学院地质与地球物理研究所
Institute of Geology and Geophysics, Chinese Academy of Sciences

北京市朝阳区北土城西路 19 号 邮 编:100029 电 话: 010-82998001 传 真: 010-62010846

April 15, 2013

Dear Zhihong:

I just learned you are one of the recipients of the Honorary Professor from Lublin University, Poland. This award recognizes that your contributions and innovative ideas in soil sciences attach importance to the scientific community not only at home in China but also in the world. Congratulation!

It has been more than 50 years since we know each other in the 50's last century during our middle school times. Your brave and wise deeply impressed in my mind. You are a good swimmer and nice singer. I shall never forget your slight figure swimming in the rapid natural stream and your singing voice. The later was one of the most welcomed items in our party. Your award is also remind me of the story dealing with your innovative idea that made you to be a "junior scientist" in the newspaper of our hometown because you dreamed to breed new rice variant with both high yield and drought resistant characteristic by hybridized rice with sorghum. You also have many other ideas and activities such as changing starch of sweet potato into maltose and dessert by systemic biological reactions and assembling a hand driving rice transplantor. All these clearly indicated your innovative thinking and maybe that makes you an outstanding scientist later on.

I spread the news to all of our schoolmates here in Beijing. They are ever happier that it was you. We look forward to meet you in Beijing on your way back to Nanjing after the ceremony and let us to share your joys.

Best wishes

Sincerely

韩家懋

Jiamao Han

Retired Professor
Beijing



中国科学院大学

University of Chinese Academy of Sciences

Congratulation Letter From Professor Zheng-yi Hu

2013-04-18

To Prof. Zhihong CAO

I would like to contribute my version of congratulation on the honorary Professor you have received from Lublin University of Technology, Poland. It is an achievement you can be well proud of, in view of the fact that you made great contributions in the outstanding research of soil science. My career began with the recognition of soil chemistry and plant nutrition of sulfur by supervision from you, and subsequent extending to environmental chemistry of soil sulfur in collaboration with experts of home and abroad that resulted in opening of the research field of sulfur in agriculture and environment in China, also including sulfur- induced control of heavy metal uptake by rice, sulfur – induced degradation of organic chlorine etc.. For sure, that is an important filed of endeavor in situ control of pollutants. Recall on the parallelism of my scientific endeavor with the development of scientific and technological ramifications, I recognize the important contribution of your guide on successfully introducing the sulfur research in agricultural and environmental science. Further more, today sulfur fertilizer is considered as an important for the development of approaches to remediation of contaminated soil.

I take pride in your achievements and I want to aware myself of this opportunity to extend to you my best wishes for your success and happiness.

Very sincerely yours,

Prof. Dr. Zhengyi Hu

Zhengyi Hu
Executive Dean of Sino-Danish College

Vice Dean of Resources and Environment College

University of Chinese Academy of Sciences

Vice-President in the International Scientific Center For Fertilizer (CIEC)

Tel. 0086-10-88256542

E-mail: zhyhu@ucas.ac.cn

地址：北京市玉泉路19号（甲） 邮编：100049



中国农业大学资源与环境学院

COLLEGE OF RESOURCES AND ENVIRONMENTAL SCIENCES, CHINA AGRICULTURAL UNIVERSITY

Dear Prof. Dr. Cao

I am greatly delighted to learn that you have been conferred Honorary Professor by Lublin University of Technology, Poland, which is one of the most respectable and coveted honors for scientists in Poland and even in the world. Your untiring industry, dedicated perseverance and devotion and immense service to Soil, Fertilizer and Environment Sciences have won this honour.

As the Dean of College of Resources and Environment, China Agricultural University in past 15 year, and deputy chairman of Natural Resource Society of China, Soil Science Society of China, and Plant Nutrition and Fertilizer Society of China in past 8 years, I am so impressed by your great contributions to the career of soil and fertilizer sciences, as well as environmental health in China as well as in the world. I have never forgotten your achievement in soil and environmental quality, soil rehabilitation and other fields related to soil science. You exhibited an outstanding talent or ability to develop an effective collaboration platform with trans-disciplinary scientists from different Institutes or Universities from South to North in China, and also push forward international collaboration in many fields. These achievements set an important milestone in the historical advances of soil sciences in China, which promote a rapid development in soil and fertilizer, and environmental sciences of China. Your generous encouragement to young scientists has deeply impressed my mind, and I think you have set a good example for better education to the new generation, which is very important for the sustainable development in our discipline.

Please accept my best wishes and heartiest congratulations.

Yours sincerely,

Fusuo Zhang
Director of Resource, Environment and Food Security
College of Resource and Environmental Sciences
China Agricultural University
Beijing 100193
P.R. China
Phone: +86-10-62732499
Fax: +86-10-62731016

地址: 北京市海淀区圆明园西路2号
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College of Resources and Environmental Sciences
China Agricultural University, Beijing 100094
P.R. China
Fax: +86 10 62731016
<http://www.cau.cn/zlzx>

中国科学院半导体研究所
Institute of Semiconductors, Chinese Academy of Sciences

Dear Zhihong,

April 16, 2013

I am very pleased to know that you were awarded an honorary professor title from Lublin University, Poland. Congratulations!

Although we are working in different research fields, I noted your academic achievement and your significant contribution to soil science in China throughout your whole academic career. As a longtime friend and alumni I feel really proud of your success.

I remember you already showed your strong interest in nature science more than half a century ago in our high-school years. I was particularly impressed by your amazing exploration spirit in biology and botany.

Sincerely yours,

Zhongying Xu

A handwritten signature in black ink, reading 'Zhongying Xu' in a cursive style.



浙江农林大学

ZHEJIANG A & F UNIVERSITY

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Address: Zhejiang A & F University

No. 38 North Huanheng Road

Lin'an, Hangzhou, Zhejiang

CHINA, 311300

Professor Zhihong Cao
Institute of Soil Science
Chinese Academy of Sciences,
No 71 East Beijing Road, Nanjing,
China 210008.

April 22, 2013

Dear Professor Cao,

I am writing with great joy to congratulate you on your selection as Honorary Professor of Lublin University of Technology, Poland.

There is no doubt your academic achievements in the field of soil science, as well as the contributions you made to international academic communication, have been recognized not only by national scientific communities, but also by international scientific communities.

As an outcome of your long-term efforts on academic cooperation between Poland and China, I got the opportunity of studying at the Lublin University of Technology and received my Ph.D from the university in 2012.

Please, again, accept my heartiest congratulations to you.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Yuhong Cao'.

PhD,

Associate Professor

School of Environment and Resource Sciences, Zhejiang A&F University, China



浙江省农业科学院
Zhejiang Academy of Agricultural Sciences

Prof. Jianrong Fu

Zhejiang Academy of Agricultural Sciences

Hangzhou 310021

April 12, 2013

Prof. Zhihong Cao

Institute of Soil Science, Chinese Academy of Sciences

Nanjing 210008

Dear Prof. Cao,

I would like to congratulate you on being awarded as an honorary professor in Lublin University of Technology (Politechnika Lubelska), Poland. As a distinguished scientist in soil science society, you have done excellent and landmark work. You have contributed a lot to soil science and agricultural sustainable development in China. I am very happy that it has been acknowledged by a Polish University. As your friend, I feel greatly honored and very proud of you.

I hope that you enjoy the occasion.

Sincerely yours,

Fu Jianrong (傅建荣)

Director

Institute of Environment, Resource, Soil and Fertilizer

Zhejiang Academy of Agricultural Sciences

■ 地址: 杭州市石桥路 198 号 Add: 198 Shiqiao Road, Hangzhou, Zhejiang, P.R.China

■ 邮编 (Post code): 310021

网址(web): www.zaas.ac.cn



浙江省农业科学院
Zhejiang Academy of Agricultural Sciences

Prof. Cifu Meng

Zhejiang Academy of Agricultural Sciences

Hangzhou 310021

April 12, 2013

Dear Professor Cao,

I am very glad to congratulate you on your having grating a honorary professor of the Lublin University of Technology, Polish. I know this has meant your of preeminent work on environmental science, soil quality, plant nutrition, and ancient paddy soil, and it is an achievements your can well proud of.

My very best wishers to your

Sincerely yours

Prof. Cifu Meng

Institute of Environment , Resources, Soil and Fertilizers, Zhejiang Academy of Agricultural Sciences ,

Shiqiao Road 148 , Hangzhou 310021

Tel: +86 0571 86402903

E-mail: cifu@21cn.com

■ 地址: 杭州市石桥路 198 号 Add: 198 Shiqiao Road, Hangzhou, Zhejiang, P.R.China

■ 邮编 (Post code) : 310021 网址(web): www.zaas.ac.cn



Institute of Tea Science
Zhejiang University
866 Yuhangtang Road
Hangzhou
April 12, 2013

Prof. Cao Zhihong
Institute of Soil Science,
China Academy of Sciences
Nanjing
China

Dear Prof. Cao

I am very pleasure to hear that you have been awarded to an honorary professor by Politechnika Lubelska, Poland. It should be one of the best gifts for your coming 80th birthday (7 years later) and an award for your academic achievements in soil science and environment science. For the past 40 years, you have done many international cooperation and academic exchanges, so the title of Honorary Professor from abroad is also a certification for what you have contributed to international society.

As a pre-staff of ISSAS and subordinate, I am very proud of you and feel very lucky to have the opportunity to work directly under your advice for more than ten years. The experience in your group is very beneficial to my life and academic career. Here, I must express my faithful congratulations and best wishes to you again.

Finally, hope you will have a wonderful trip to Poland.

Yours respectfully

A handwritten signature in black ink, appearing to read 'Xiaochang Wang'.

Xiaochang Wang
Dr, Prof.



浙江农林大学
ZHEJIANG A & F UNIVERSITY

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Lin'an, Hangzhou, Zhejiang
CHINA, 311300

Professor Zhihong Cao
School of Environmental and Resource Sciences, Zhejiang A&F University and Institute
of Science, Chinese Academy of Science

April 26, 2013

Dear Prof Cao,

Honorary Professor, Lublin University of Technology, Poland.

I am writing to congratulate you on the award of Honorary Professor of Lublin University of Technology, Poland. The award is highly appropriate to mark your excellent academic achievements and leadership you have contributed as Director and Professor of the Institute of Soil Science, and later on as Professor of School of Environment and Resource Sciences of Zhejiang A&F University.

I have had the chance to work with you closely, when you served as the Director of Institute of Soil Science, and our partnership has led to the establishment of the Open Joint Laboratory of Soil and Environment in 1996 (with Croucher Institute for Environmental Sciences, Hong Kong Baptist University), under the sponsorship of Chinese Academy of Science and Croucher Foundation in Hong Kong. I was delighted to hear that you became Professor of the School of Environment and Resource Sciences, at Zhejiang A&F University, and was grateful that you have recommended me to be the Dean of the School, which has allowed us to work even closer for the past two/three years.

Throughout the past years, we have joint application of research projects, organizing international conferences, exchanging staff members, supervising of post-graduate students. These led to joint publications, which included SCI papers and special issues of various journals, including Chemosphere, Environmental Geochemistry and Health, and Botanic Review. You also contributed significantly to both the teaching and research programs, especially those related to soil science of Zhejiang A&F University. In fact, you have elevated the standard of Zhejiang A&F University and put it on the

global map.

This award has recognized your contribution to Lublin University of Technology, Poland. I firmly believe that you will continuously serve as an important link between the Lublin University Technology, and both Zhejiang A&F University and the Institute of Soil Science, and in fact, between the scientific communities of Poland and China, as a whole.

Please accept my wholehearted congratulations to you.

A handwritten signature in black ink, appearing to read 'mhw', with a long, sweeping horizontal stroke extending to the right.

Ming-Hung Wong, PhD, DSc (Durham); MBA, DSc (Strathclyde)
Honorary Dean and Professor, School of Environment and Resource Sciences, Zhejiang
A&F University
Chair Professor and Honorary Director, Croucher Institute for Environmental Sciences,
Hong Kong Baptist University
Editor-in-Chief, Environmental Geochemistry and Health



浙江农林大学
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April 23, 2013

Dear Prof. Cao,

I learn that you've been recognized as an honorary professor of Lublin University of Technology, Poland.

As a distinguished professor, you have been working in our university almost for 10 years. During these years, you have made lots of contributions to the academic field of Soil Science in our university. You have greatly improved the academic influences of our university at home and internationally; you have expanded research area in the interdisciplinary of Soil Science and Forestry Science, as well as in the area of Soil Carbon Sequestration. Meanwhile, you have also trained quite a few younger teachers in these areas for our university.

As a friend and colleague, I am just proud of you. Here please accept my warmest congratulations on your splendid success!



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CHINA, 311300

I know how hard you have worked to attain the achievements in your research field. No one could have been more deserving. I wish you still further success in your future career!

Sincerely yours,

Zhou Guomo

President of Zhejiang A&F University

Professor, ph-D

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海洋污染国家重点实验室
State Key Laboratory in Marine Pollution



香港城市大學
City University
of Hong Kong

香港九龍灣之濱
Tat Chee Avenue, Kowloon,
Hong Kong

Prof Zhihong CAO
Institute of Soil Science, Chinese Academy of Sciences
Nanjing, PR China

April 18, 2013

Dear Prof Cao,

Congratulations! I am so delightful to hear that you have been granted with the Honorary Professor of Lublin University of Technology, Poland.

As a matter of fact, I think this title is just one of international recognitions of your academic contributions. You do deserve this honor due to your unreserved dedication to the development of soil sciences in the past decades. All of your friends and students are proud of so many remarkable achievements in both fundamental and applied research. More than 200 papers and 7 professional books you have published in the plant nutrition and soil chemistry have facilitated to consolidate the basis of the modern soil science in China. These outstanding academic outcomes also inspire our young generations to dedicate ourselves to the scientific research. Your contribution in developing compound fertilizer successfully promotes the concept of ecological agriculture in China in an attempt to optimize the usage of fertilizers and minimize the risk of the loss of the nutrients to ambient environments. In addition, the amazing discovery of the ancient rice by your team is a brilliant milestone in Chinese agriculture history, providing the undeniable evidence to elucidate that rice planting is sourced from China.

I cannot wait to share this good news with all your friends and students at Hong Kong. Everyone here must feel joyful with this big event.

With my best wishes for your further success

Sincerely yours,

Dr Shengchun Wu
Research Fellow
State Key Laboratory in Marine Pollution
City University of Hong Kong



中国科学院南京土壤研究所

INSTITUTE OF SOIL SCIENCE, CHINESE ACADEMY OF SCIENCES

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E-mail: hychu@issas.ac.cn

Congratulation Letter

Dear Prof. Cao:

I am very glad to hear that you have been selected as an Honorary Professor in a famous University in Poland. You are a well-known soil scientist in China and around the world. You have been working on soil science and plant nutrition for so many years and got a great achievement with more than 200 publications. As a Director General (1991-1999) of the Institute of Soil Science, Chinese Academy of Sciences, you have greatly improved the development of soil science in China.

As the supervisor of my Ph.D thesis, you have imparted knowledge to me and encouraged me to explore soil science. We learned a lot by your expertise and dedication to soil science. You are so kind and respected by your students, colleagues, friends and all of us.

Sincere congratulations to you.

Best wishes,

Haiyan Chu

April 16, 2013

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Dear Prof. Dr. Cao,

I am very pleased to hear that you are selected to be an honorary professor of the Lublin University of Technology (Politechnika Lubelska), Poland. You have worked in the field of soil science over 50 years. You're winning the honor shows that your outstanding achievements are recognized by all world people.

Congratulations on your success and May you enjoy good health and long life !

Sincerely Yours

沈宏

Hong Shen
Professor, Dr,
Director of Lab of Root Layer Control
College of Resources and Environment, South China Agricultural University
Guangzhou,
Post Code :510642
P.R. China.
Tel: 86 20 28980056,
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April 22, 2013

Dear Prof. Cao Zhihong:

We are so delighted to hear that, the Lublin University of Technology has conferred on you the title of Honorary Professor. This is not only the compliment on your years of academic achievements, but also the acknowledgment to the Chinese scientists of soil science.

You are fully dedicated to your career as a soil scientist, for a lifetime continuously seeking the truth, contributing your wisdom and always productive in your research. The unique research style you created and the distinct academic thoughts, coming up on you own from long-term scientific practices, have played the role as a leading force in academia.

As one of your friends, I would like to extend my heartiest congratulations and good wishes as well.

I wish you good health and bigger accomplishments.

Yours sincerely,

Prof. Zhang Yulong *Zhang yulong*

Shenyang Agricultural University



**Institute of Urban Environment
Chinese Academy of Sciences**

1799 Jimei Road, Xiamen 361021, China

<http://www.iue.cas.cn>

April 11, 2013
Professor Zhihong Cao
Ex-Director General
Institute of Soil Science
Chinese Academy of Sciences
Nanjing, China

Dear Professor Cao:

I am most happy to learn that you have been awarded a title of Honorary professor of the Lublin University of Technology, Poland. This award reflects not only your outstanding contribution towards soil science research, but also your role in promoting collaboration between China and Poland in soil and environmental science research. I also would like to take this opportunity to thank you for your guidance over the years in my career development, you have inspired me a lot over the years, and I am sure you will continue to inspire me in years to come.

I have admired you so much, not only your scientific achievements, your pioneer work in prompting researches on molecular biology of plant nutrition and paddy soils in China, but also your excellent personality. I believe that your dedication to science, your determination to conduct novel research, your enthusiasm towards technology transfer to benefit the society, and your passion towards international collaboration, will continue to influence young scientists in China and around the world. You are an excellent role model for younger generations of scientists in China and beyond.

Wish you good health.

Yours sincerely,

Yong-Guan Zhu

Professor Yong-Guan ZHU, PhD (London)
Director General
Associate editor, Environment International (Elsevier)
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中国科学院烟台海岸带研究所
Yantai Institute of Coastal Zone Research
Chinese Academy of Sciences

April 15, 2013

Prof. Zhihong CAO
Institute of Soil Science, Chinese Academy of Sciences
71 East Beijing Road,
Nanjing, 210008

Dear Professor CAO,

On behalf of YICCAS, I would like to express my sincere congratulations to you for being awarded the title of Honorary Professor of the Lublin University of Technology (Politechnika Lubelska), Poland.

As a world famous professor in the field of soil science, you deserve the reward for your conscientious and untiring efforts in the domestic and overseas. I would also like to take this opportunity to thank you for your years of guidance and help.

Again, congratulations and may the years ahead of you be filled with good health and fortune!

Yours sincerely

Prof. Dr. Yongming LUO

Deputy Director,
Yantai Institute of Coastal Zone Research (YICR),
Chinese Academy of Sciences (CAS)

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Congratulation Letter

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As the supervisor of my Ph.D thesis, you have imparted knowledge to me and encouraged me to explore soil science. We learned a lot by your expertise and dedication to soil science. You are so kind and respected by your students, colleagues, friends and all of us.

Sincere congratulations to you.

Best wishes,

Haiyan Chu

April 16, 2013

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Congratulation Letter

2013.4.12

Dear Professor, Dr. Cao

I'm very happy to hear the wonderful news that you have been awarded the honorary professor of Lublin University of Technology, Poland. Congratulations! I know of no one who deserves it than you. We feel proud of you. It's my great honor to be your student. Wish you a greater success in the future!

Congratulations again!

Yours,

Qin Liu

Prof. Dr.

Institute of Soil Science

Chinese Academy of Scie

nces

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LETTER OF CONGRATULATION FOR Professor Dr. Zhihong CAO

April 14th, 2013

Dear Prof. Lucjan Pawłowski,

I am very pleased to hear of Professor Zhihong Cao has been awarded the honorary Professor of the Lublin University of Technology, Poland. As his one of former students and close friends, I offer my warmest congratulations on this great honor. No one could have been more deserving from Chinese soil scientists.

I have known Professor Cao since 1982 when I entered the Department of Soil-Plant Nutrition and Fertilizer Science, Institute of Soil Science, Chinese Academy of Science (CAS) as a graduate student for master degree and then Ph.D. degree at the same institute. After obtaining Ph.D degree, I then joined in same the department as Professor Cao in the Institute of Soil Science, CAS and worked together for more than 30 years. In 1992, he established a new laboratory “Youth Laboratory” in our institute as the first example in CAS, with group leader and scientists are all young scientists as a distinguished character, since then I worked under his direct guidance.

He deserves this great honor since he is an international distinguished professor in the field of soil science and plant nutrition. He contributed lots of new ideas and smart thinking on soil biotechnology research when we worked together, some of ideas and thoughts has become the typically research design example in our institute graduate lectures. Professor Cao always emphasizes international cooperation importance for scientific research and friendship between different countries. He is also a very nice gentleman. I learn a lot from him and am very grateful to him, which are very important for my own scientific career success.

With best wishes

Yours Sincerely,

Weiming Shi, Ph.D.

Professor of Plant Nutrition

Head of Department of Soil-Plant Nutrition and Fertilizer Science
Institute of Soil Science, Chinese Academy of Sciences
Nanjing 210008, China

Former Vice President of Chinese Society of Plant Nutrition and Fertilizer
Former President of Jiangsu Provincial Society of Plant Physiologist
Email: wmshi@issas.ac.cn

April 14th, 2013

Dear Professor Cao,

I am writing to offer my sincerest congratulations on your winning the honor of becoming the honorary Professor of the Lublin University of Technology, Poland. As your student and colleagues, I just want you to know how lucky I am to be able to share your pride and how pleased I am at your award. In my view, you work hard and besides that, you are a great scientist with a keen insight, no one could have been more deserving among Chinese soil scientists. You always emphasize international cooperation importance for scientific research and friendship between different countries. Through your effort, the agricultural scientific research cooperation between China and Poland on common interest topic is greatly improved in our institute. This award is also a reward that you richly deserve. I am sure, you will obtain even greater achievement and with your efforts scientific cooperation and friendship between China and Poland will develop deeply and fruitfully.

Best wishes

Yours Sincerely,

Weiming Shi, Ph.D.

Professor of Plant Nutrition

Head of Department of Soil-Plant Nutrition and Fertilizer Science

Institute of Soil Science, Chinese Academy of Sciences

Nanjing 210008, China

Former Vice President of Chinese Society of Plant Nutrition and Fertilizer

Former President of Jiangsu Provincial Society of Plant Physiologist

Email: wmsi@issas.ac.cn

April 14th, 2013

Dear Prof. Lucjan Pawłowski,

I am very delighted to know that Professor Zhihong Cao has been titled the honorary Professor of the world famous university - Lublin University of Technology, Poland. As one of the pioneer soil scientists in China, Professor Cao certainly deserves this honor.

Profess Cao and I have known each other since early 1980s. In 1982, he was studying for a doctor's degree in the Department of Soil-Plant Nutrition and Fertilizer Science, Institute of Soil Science, Chinese Academy of Science (CAS). Even in that period, his insight in soil science had impressed me deeply. After his graduation as an excellent Ph.D. from CAS, we had been working together for a long time. And in 1997, Professor Cao was the head of Institute of Soil Science, CAS. As an assistant partner, I was honored to have the chance to join Professor Cao's group to apply a Chinese "973" Project on soil quality. At that time, it was very difficult to succeed in gaining such a big project considering the environment of Chinese soil science. Facing such a hard situation, Professor Cao showed his brilliant academic insight. He pointed out that the improvement of soil quality would play very important role in China's food security, as the cropland area would decrease and the population would become larger. At the same time, he guided us to the right direction and set us a good example of a diligent and hardworking scientist, and a group leader as well. After a 2-year hard work, the "973" Project was awarded the first class of "Scientific Advancement Awards of Jiangsu Province, China". As the group leader, Professor Cao was undoubtedly a real hero in this project.

As a good colleague Professor Cao enlightened me a lot, and will always be my example. Thus, I think it is definitely a right choice of yours to award Professor Cao the honorary Professor of your university. And I know that Professor Cao will act well in his brand new role, and continue to make contributions in spreading knowledge and prompting international scientific communication. Please allow me to thank you all!

Best regards!

Yours sincerely

Xuezheng Shi

Congratulatory letter to Professor Dr. Zhihong Cao

April 15th, 2013

Dear Professor Cao,

Please allow me to convey my truly congratulations on your award of the title of Honorary Professor of the Lublin University of Technology (Politechnika Lubelska) Poland. I am delighted that many years hard work you have done in the soil science academic field is now recognized and appreciated by the world famous university.

My sincerest wishes are with you. May you enjoy the title and hope your steps in spreading knowledge will continue, and be appreciated by larger and larger audience!

Yours sincerely

Xuezheng Shi

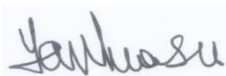
April 16, 2013

Dear Professor Cao,

I would like to add my warmest congratulations to the many you must be receiving on your honorary professorship of Lublin University of Technology, Poland. As one of your former students, you must know how I felt about this. I admire your consistent contribution to China's soil science and plant nutrition research during the past 40 years; and as a known scientist in this field, you established and dedicated in developing close collaboration network with the world, including Poland. I appreciate many of your foresighted advices that are of great help in my scientific career. Finally, I would like to appreciate the Polish University for the recognition of your scientific achievements and realization of your contribution in promoting Sino-Polish collaboration in soil science research.

Again, please allow me to send my most sincere congratulations and best wishes to such a great honor!

Truly,

A handwritten signature in blue ink, appearing to read 'Yanhua Su', is shown within a light blue rectangular box.

Yanhua Su

Professor in molecular plant nutrition

Institute of Soil Science, Chinese Academy of Sciences

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