

**International Scientific Centre of Fertilizers
Centre International des Engrais Chimiques
(CIEC)**

80 years dedicated to enhancing soil fertility and crop productivity

Cristian HERA*

As Honorary President and Past President of the International Scientific Centre of Fertilizers (CIEC), on the request of CIEC President, Prof. Ewald Schnug and CIEC Presidium members, on 28th of August, 2013, at Helsinki CIEC Presidium meeting, I have the privilege and pleasure to highlight some historical events of CIEC since its foundation in 1932 – 1933. This review is dedicated to the 80th anniversary of this prestigious organization,.

From the beginning I would like to render respects to the outstanding minds of our remarkable predecessors who understood the ultimate significance of fertilizers and fertilization for food production, in the world in which **food security and safety, environmental preservation** and **climatic changes** becomes the highest priority concern of future for mankind.

It is a great satisfaction for both the steadfast members of CIEC, as well as the more recent attendants, that this period of almost general economic and financial crises, we can contribute to the continuity of CIEC's long life with promising expectation for its future existence.

After about a half century since the birth of the international fertilizer industry, many problems **called for solutions through research on soil fertility, plant nutrition, fertilizer application and production**, these being the reason for organizing the First International Conferences on chemical fertilizers (Rome – Italy, 1932, Amsterdam – the Netherlands, 1933).

Delegates from 29 countries (Australia, Belgium, Brazil, British India, Canada, Czechoslovakia, Denmark, The Dutch East Indies, Egypt, Finland, France, Germany, Great Britain, Greece, Holland, Hungary, Italy, Latvia, Morocco, Norway, Peru, Poland, Puerto Rico, Romania, Sweden, Switzerland, Republic of South Africa, United States of America and Yugoslavia) decided to settle an association dealing with the scientific and technical aspects of fertilizers under the name: Centre International des Engrais Chimique – CIEC with headquarters in Rome (Technical Director) and in Zürich (President and Secretary General).

For me as a Romanian soil scientist it is a matter of pride to remember the active participation in the CIEC foundation in 1933, and the role of two Romanian prestigious, world renowned Researchers and Professors, Gheorghe Ionescu-Șișești and Teodor Saidel in CIEC activities. The first, Gheorghe Ionescu-Șișești is author of the rule of nutrient harmonic proportions and Teodor Saidel – who conceived the potentiometric determination method of soil pH, successfully used since 1913 up to date, both being the promoters of soil science and the needs of fertilizer utilization. One year later (1934), the 3rd International Conference had been organized in Berne.

*) Honorary President of CIEC since 2010. CIEC President 1996 – 2010

From the start **CIEC has been conceived as a non-profit and non-governmental international scientific society bringing together scientists, scientific institutions, fertilizer industries and trade companies, agricultural consulting and other fertilizer-minded institutions or persons.** During the 80 years of its existence, CIEC has accomplished to become ***one of the oldest scientific organizations which promote the transformation of academic knowledge concerning plant-fertilizer-water-soil system into production.***

The first World Fertilizer Congress of the newly founded CIEC was held in 1938 in Rome, under the patronage of the International Federation of Agronomists (CITA). The program conceived by the Scientific Committee of CIEC enlisted 20 questions debated in four sessions covering all important fields of activity: science, economics, agriculture and production, distribution and fertilizers consumption.

The most famous authorities in the world presented their contributions to these subjects, testifying to the value of international collaboration between all those interested in the theory and practice of fertilizer production and use. Special efforts were made in those early days of CIEC's activities by the first Secretary General, Prof. Franco Angelini, from the University of Naples and Secretary General of CITA and by CIEC's first President, Dr. Ernest Feisst, Minister of the Swiss government in Berne, the person who suggested the formation of CIEC. They both deserve a pious homage for giving life to a long lasting and valuable association which CIEC turned to be.

After an interruption due to World War II for a few years, thanks to the initiatives of Prof. Angelini and Dr. Feisst, the 2nd World Congress of CIEC was organized in Rome, in 1951, after preparatory character meetings, held in Zürich (1949) and Paris (1949-1950). This Congress infused CIEC with a new momentum in the research of the effects of fertilizers on soil, human and animal health, the exploration of various methods of fertilizer application and the problems of fertilizer production and manufacturing.

Apart from regular conferences, a special meeting of CIEC (the 3rd General Assembly) was organized in 1953 in Darmstadt, aiming to render homage to Justus von Liebig on the occasion of the 150th anniversary of his birth. The ceremonial speech was entrusted to Dr. Feisst, at that time, President of CIEC.

The **3rd World Congress held at Heidelberg in 1957** turned out to be a **spectacular meeting with a considerable public echo**, developed under the patronage of the minister of the German Federal Ministry of Nutrition, Agriculture and Forestry, Dr.h.c. H. Lübke. Congress President was Prof.Dr. Ludwig Schmitt, long standing President of VDLUFA (Association of the German Agricultural Experiment and Research Stations).

The main tasks of this Congress were to summarize the results of the first century of modern fertilizing measures. 28 leading experts from almost all parts of the world commented upon the problems concerning the increase of soil fertility and its maintenance, the effects of macro and microelements on plant life and the quality of yield and the economic effects of agricultural and garden products and of modern fertilizing measures.

Two special mentions are noteworthy: the **participation of the Nobel Prize winner, Prof. A. I. Virtanen (Helsinki) with a plenary paper entitled "Our system of manuring in the light of modern nutritional research"**. The second important event at the Congress was the award

ceremony of the "Sprengel-Liebing Medal" in gold to the President of CIEC, the Minister Dr. E. Feisst, for outstanding merits in agricultural chemistry.

The 4th Congress that took place at Opatija in 1961, pointed out new problems and the high value of the collaboration between basic and applied sciences. The use of radioactive tracers brought about rapid answers to many fertilizer problems. For me, *this Congress has a great significance, being my first acquaintance with CIEC's vision*, thanks to the generous invitation of Prof. Gh. Ionescu-Șișești, founding member of CIEC, to attend with him the 4th World Fertilizer Congress.

It was then that *I became faithful to CIEC's remarkable organization and I have remained a devoted member till present days.*

The 5th Congress organized at Zürich, in 1964, made further advances in fertilizer science and technology and stressed the beneficial value of international cooperations.

The 6th World Fertilizer Congress at Lisbon, Portugal, in 1966, was organized under the new CIEC President, Eng. agronomist Rafael Montjardino, elected at the 9th General Assembly in 1964 in Zürich for one term of office after Minister Dr. E. Feisst announced his retirement. This Congress was also a great success and the valuable results debated there had remarkable repercussions in the fields of agriculture, industry and the fertilizer market.

In 1969, in Geneva, the 11th General Assembly, at the precious recommendation of CIEC's General Committee to ensure, as possible, a permanence of the essential functions, decided to elect well-inspired Prof. Dj. Jelenic as President of CIEC and Prof. Dr. Erwin Welte, from the University of Goettingen, Vice-President in charge of publishing, research programming and conference planning. I think that this is a perfect moment to pay a warm tribute to Prof. Dr. E. Welte who was a hard working, devoted and remarkable scientist. He guaranteed CIEC's continual existence and success, even in difficult times.

The 7th World Fertilizer Congress organized exemplary with the participation of Prof. Dr. A. Zeller, from the Agricultural University of Vienna, in 1972, brought together 300 attendants from 29 countries. The subject of the Congress was entitled "Fertilization in the face of abundance and dearth" aiming to treat the fertilizer problems in the high-developed and developing countries. Moreover, in this Congress water pollution and eutrophication problems caused by inadequate application of fertilizers and over fertilization were intensively debated.

These problems were resumed on a higher scale at the 8th CIEC World Congress held in 1976 in Moscow, with the theme "Fertilizer-Harvest-Nature".

The 8th Congress of CIEC was one of the largest meetings of experts in the field of agriculture, agricultural science and industrial chemistry, namely 1500 delegates from every continent. ***For the first time representatives from developing countries in Asia, Africa and Latin America attended a CIEC Congress***, enriching the sphere of interests with their own contributions.

The Congress was subdivided into 8 sections, dealing with contemporary problems in the production and use of fertilizers as means of securing consistently high yields of good quality and improving soil fertility while preserving a healthy environment.

The Vice-President of CIEC, Prof. Dr. E. Welte succeeded to publish all 296 presented papers, as abstracts in English. His personal contribution was represented by an exceptional summary of the main conclusions and recommendation of the 8th Congress, ending with a call on world governments, international organizations and institutions, scientists and agronomists

to unite in their efforts to promote scientific and technical progress in the production and usage of fertilizers and to assure the steady development of means to produce food for the world. This Congress exerted a great influence on the United Nations World Food Conference, where the contribution of fertilizers to world food production was recognized.

Another milestone deserved to be mentioned in the history of CIEC was the 50th anniversary of the CIEC's foundation organized in Budapest, in 1984 as the 9th World Fertilizer Congress. Scientists from 35 countries contributed with new results and ideas to the Congress subject "The Conquest of Hunger through the Better Provision of the Nutrient Needs of Plants". Welcoming speeches of representatives of FAO, UNEP and the International Soil Science Society underlined the highly-qualified presentations of this successful CIEC Congress and the fact that during its 50 years existence, CIEC has not ceased to work in order to increase yield and improve crop quality, through the rational use of fertilizers.

With increasing industrialization in Europe a severe problem came up, namely the pollution of waters and water resources, in which the attained high level of fertilizers use, especially commercial nitrogen fertilizers, was mainly incriminated.

Later on, after intensive studies of this phenomenon, additional pollutants of industrial and urban origin were recognized to be a decisive cause for the pollution of waters, as well as the atmosphere and soil.

As an unavoidable consequence of this development and because of other problems lying in the economic structure of the international trade, the fertilizer industries in Europe declined and with them the activities of CIEC, as these were dependent on the contributions of its members.

Despite this negative tendency, CIEC succeeded to organize the 10th World Congress in 1990, in Nicosia, with a co-operant support given by Agricultural Research Institute of the Ministry of Agriculture and Natural Resources of Cyprus. President of the Congress was Dr. C. S. Serghiu and Secretary General Dr. I. Papadopoulos. About 350 delegates from 51 countries attended, presenting 125 papers as oral or poster contributions, focused on the Congress theme "Efficient fertilization, manuring and irrigation for improving yield, food quality and renewable resources". The Congress was once again a memorable success.

A very unfavorable period followed for CIEC, due to the sudden death of CIEC's long standing President - Prof. Dr. Dj Jelenic (1991), replaced by Prof. E. Welte as President interim, the outbreak of the civil war in Yugoslavia (1992) and the confiscation of the general Secretariat's bank accounts by the official government of former Yugoslavia in Belgrade.

The organization has entered under more favorable auspices at the **19th General Assembly, held in Vienna, on June 1996**, where *the author of this presentation dedicated to 80 years CIEC history, was elected as the new CIEC President. Prof. E. Welte was elected as Honorary President* and 28 new scientists and professional staff, as members of the CIEC Presidium.

CIEC has launched its new objectives, mainly the achievement of a well-balanced plant nutrition and soil fertility improvement, under the new concept of sustainable development. In view of the challenge caused by the growing world demand for more food, required by an increasing population and by the hunger and malnutrition in some developing countries, "Fertilizer Science" becomes again a fundamental field to work out suitable and adequate measure for both optimum plant nutrition and a compensation of nutrient mining from the soil.

Such a challenge required a new protocol of CIEC, part of which has been built not only on a staff renewal, but also on infrastructural changes, as those created at the 19th General Assembly in Vienna.

Despite a long depression period (1990-1996), CIEC organized several international meetings, as the 7th Symposium on "Agroforestry and Land Use Change in Industrialized Nations", Berlin, 1994 and the 8th Symposium "Fertilizers and Environment", Salamanca, Spain, 1995, with about 200 participants from 28 countries.

The 9th Symposium "Soil Fertility and Fertilizer Management, Bridge between Science, Industry and Practice", held in Kusadasi, Turkey, also in 1995, put together attendants from 12 countries that were mainly concerned on the special problems of the Near East regions.

Due to the scientific responsibility of a small but highly-motivated international scientists, operating on a voluntary base, a tremendous work load involved in the organization of all these symposia and conferences and in the publishing of their corresponding proceedings was successfully accomplished, even in that depression period. Once again the persevering endeavour of Prof. E. Welte has to be stressed and appreciated.

After the election of the new CIEC President and the new CIEC Presidium members, a number of CIEC World Fertilizer Congresses and Symposia were successfully organized.

On December 1996, in Braunschweig, Germany, the 10th Symposium was jointly organized by CIEC and the Institute of Plant Nutrition and Soil Science of the German Federal Agricultural Research Centre (FAL), with Prof. Ewald Schnug, Director of the Institute and Deputy CIEC Vice President, together with active participation of Prof. Silvia Haneklaus, having as subject "Recycling of plant nutrients from industrial processes".

CIEC has once more offered a great opportunity to engage itself in overcoming the worldwide problems of hunger and malnutrition and to struggle for multiplying the agricultural scientific findings as efficient means to assure an acceptable social and economic development way over a long term. CIEC has entered in a new phase of preoccupations connected with the development of a sustainable agricultural production through an adequate management of fertilization and the use of diversified fertilizers, as well as the maintenance of soil nutrient equilibrium by the replacement of all nutrients exported with crop yields and lost by non-productive processes as erosion, leaching, volatilization.

These problems were put in debate under a general theme of the "Fertilization for Sustainable Plant Production and Soil Fertility" of the 11th World Congress, held in September 1997 in Gent, Belgium, organized by CIEC in co-operation with the Faculty of Agricultural and Applied Biological Sciences of the University of Gent. The Congress was attended by more than 300 scientists from 67 countries. Prof. Dr. Oswald van Cleemput was the President of the Congress and Prof. Dr. G. Hofman Secretary General, their outstanding scientific and managerial competence ensuring the excellent conditions for this Congress.

Additional to the scientific contributions brought to optimizing fertilization utilization and fertilizer production in the world, the Congress confirmed the election of Prof. Cristian Hera as President of CIEC, Prof. Erwin Welte as Honorary President and five Vice-presidents representing the five regions of the world, proposed by the 19th General Assembly in Vienna. Also, proposal of the New President to settle National CIEC Branches aiming to play a powerful instrumental role in the rational use of fertilizers in the countries they represent, received approval from the Congress. It deserves to be noted another suggestion of the newly elected

members, to develop a more active further cooperation with various international organizations such as FAO, the Fertilizer Industry, the International Fertilizer Association and other institutions involved in fertilizer distribution and consumption, for the benefit of increasing soil fertility and crop productivity by the rational use of all nutrients resources, with less or no environmental risks.

In order to play a more active and professional role in fertilizer utilization, to increase to coefficient of utilization of nutrients and avoid environmental pollution, a CIEC Symposium was organized in Pulawy, Poland, in 1998, with the topic "Codes of Good Agricultural Practice and Balanced Fertilization", highly appreciated by the participants.

In August, 2000, the Romanian CIEC National Branch organized the 12th CIEC Symposium, "Role of Fertilizers in Sustainable Agriculture", in Suceava, Romania. In the resolution of the Symposium were clearly specified that a sustainable and performing agriculture without rational utilization of all types of nutrients, mineral, organic, biologically fixed, can not be achieved.

In the beginning of the new millennium, on August 2001, the 12th World Fertilizer Congress with the theme "Fertilization in the Third Millenium – Fertilizer, Food Security and Environmental Protection" took place in Beijing, China. The Congress, jointly organized by CIEC and the Chinese Academy of Sciences, was a magnificent event, attended by a large international representation (60 countries) and it was the first scientific very important fertilizer event held in Asia. The Congress was honored by the presence of the China's Vice Premier Minister, Wen Jiabao, who addressed in his opening speech a splendid message in favor of the solidarity between scientific community and business makers from around the world, with the aim to promote the health of the humanity as a whole. The President of the Congress was the Vice President of Chinese Academy of Sciences, acad. Yiyn Chen and the Secretary General – Dr. Lanzhu Ji from the Institute of Applied Ecology.

During the Congress, there were presented 8 key-notes lectures, 180 oral papers, 12 sessions and one hundred twenty posters related by the latest findings in the field of fertilizer production, utilization, and influence on soil fertility, crop productivity and environmental impact. At this Congress the concept of sustainable and, in the same time, a performing agriculture has been adopted as a unique viable alternative for economic and social evolution, the only one able to satisfy the needs of the present generations without compromising the capability of future generations to fulfill their own requirements.

An unforgettable event for every participant to the Congress was represented by the visit to the Sino-Arab Chemical Fertilizers Company led by the passionate specialist Mr. Wu Si Hai – the President of the International Fertilizer Association. This visit offered a great opportunity to learn about fertilizer industry in China and the agricultural progress achieved due to fertilizer use.

After Beijing and before the World Fertilizer Congresses in Chiang Mai, four important International Symposia were organized by CIEC.

The 13th Symposium "Fertilizer in Context with Resource Management in Agriculture - I", Tokat, Turkey, 2002, 14th "Fertilizer in Context with Resource Management in Agriculture – II", Debrecen, Hungary, 2003, both Symposia oriented to the efficient utilization of all kind of nutrients resources, according to the local soil and climatic conditions as well as the best agricultural management practices.

In 2004, for the first time in his history, CIEC organized a Symposium in Africa. The Symposium took place at Pretoria University, with the topic "Fertilizers and Fertilization for a sustainable Agriculture - The First World Meet the Third World".

Taking into consideration the different opinions in relation to sustainable agriculture, organic agriculture, conservative agriculture, intensive agriculture, and precision agriculture, the hosts of the 16th CIEC Symposium, Prof's Oswald van Cleemput and Georges Hofman suggested the title of the Gent Symposium "Mineral versus Organic Fertilization. Conflict or Synergism?" title agreed by CIEC Presidium members. The majority of the participants agreed that should be considered a synergetic effect, utilizing in a proper way, specific to local conditions, of all types of nutrients, in order to sustain or increase soil fertility and crop productivity

The 14th CIEC World Fertilizer Congress took place in Chiang Mai, Thailand, in 2006, enjoyed the gracious patronage offered by Her Royal Highness Princess Mara Chakri Sirindhorn.

The Congress, jointly organized by CIEC and the Supporting Organizations from Thailand (Land Development Department, Department of Agriculture Extension, Kasetsart University, Soil and Water Conservation Society of Thailand, Soil and Fertilizer Society of Thailand) was attended by about 700 representatives of 35 countries under the theme "Fertilizers and Fertilization: Stewardship for Food Security, Food Quality, Environment and Nature Conservation". New valuable ideas and solutions were presented, enriching the global experience on the efficient use of all kind of fertilizers for ensuring food security and safety, as well as preserving soil fertility and environmental health.

The 18th CIEC Symposium, held in Rome, in November 2009 with the subject "More sustainability in agriculture: new fertilizers and fertilization management" demonstrated the solid anchorage of CIEC preoccupations in the reality of our time, taking into account the new challenges we are confronted with: global climate change, soil erosion and degradation, water resources diminishing, biodiversity reduction, as well as the necessary legislation regulating consumer's rights and environmental demands.

The topic selected for the 15th World Fertilizer Congress, organized in 2010 in Bucharest, Romania, was *"Meeting the Fertilizer Demand on a Changing Globe: Biofuels, Climatchange and Contaminants"*, with the main objectives to find the rational and efficient way to produce more and better food, fodder, fiber, biofuels, in a environment dominated by global climate changes, as a actual and attractive theme for the scientists from all over the world, working in the area of soil science, agronomy, fertilizer production, marketing, utilization and environmental preservation.

The 15th CIEC World Fertilizer Congress was the last one, organized with me as CIEC President. According to the Rome 2009 CIEC Protocol, were I announced my retiring from the CIEC Presidency, **at the closing ceremony of the Bucharest 15th World Fertilizer Congress, I transferred CIEC Presidency to Prof. Ewald SCHNUG**, who has been Deputy President of CIEC since 1966 and one of the most efficient members of the CIEC Presidium sice his election.



The new President of CIEC, Prof. Ewald Schnug (left) and the outgoing President of CIEC, Prof. Cristian Hera (right) seal a new era with a handshake.

The first action of the new CIEC President was to decorate Prof. Cristian Hera as Honorary President of CIEC. The two allies started a structural adaptation of CIEC to the modern science community and streamlined the portfolio of CIEC with regard to contents to future developments in the field of fertilization. The revitalization of CIEC went along with the election of the CIEC Presidium and appointment of the following scientists as Vice Presidents at the inaugural meeting in May 2011 in Goslar, Germany:

- Prof. Zhengyi Hu (GUCAS, Beijing, China)
- Prof. Francesco Montemurro (CRA-SSC, Metaponto, Italy)
- Prof. Gerold Rahmann (Thünen Institut, Trenthorst, Germany)
- Nils Vagstad (Bioforsk, Aas, Norway)
- Prof. Markku Yli-Halla (Helsinki University, Finland)

In addition, Prof. Silvia Haneklaus (Julius-Kühn Institut, Braunschweig, Germany) and Prof. Bettina Eichler-Löbermann (Rostock University, Germany) were elected as secretary general and deputy secretary general, respectively.

The first symposium organized by the new consortium together with Prof. Elio Jeminiz from Santa Clara University, Cuba was dedicated to “Urban Agriculture”. The symposium took place in Cayo Santa Maria, Cuba in April 2012. Due to rising food demand in the fast growing cities on the one hand side and the decreasing soil fertility and land lost to housing in the surrounding areas on the other hand urban agriculture gained importance. Cuba is one of the leading countries in urban agriculture.

In August 2013, CIEC was organizing partner of the prestigious conference series “A Greener Agriculture for a Bluer Baltic Sea – Visions for Nutrient Management” which took place in Helsinki, Finland. About 250 participants from politics, science and practical farming presented their analyses, perspectives and future visions for agriculture in the Baltic countries, all of them aiming to reduce nutrient loads to the Baltic Sea. Besides individual measures on farm level and the promotion of innovative ideas, scientists emphasized the need for systematic changes in food production. This includes a more efficient recycling of nutrients, reduction of nutrient

losses associated with fertilization, breeding and selection of more nutrient efficient crop varieties and the reduction of meat, egg and dairy consumption.

During its existence, CIEC has organized many symposia, conference and World Fertilizer Congresses with recognized importance and success. Some of them were mentioned above. The proceedings of all symposia were published, testifying that since its foundation, CIEC has enhanced its role and position, becoming a corner stone of extensive interdisciplinary approaches in fundamental and applied agronomic sciences.

I wish to stress once again that during its existence, CIEC operated as a "brain trust" and the main current goals are represented by sustainable nutrient management for food and biomass production, while ensuring all natural resources involved in agriculture at local, regional and global level, as well as food security and safety.

The achievement of a more strengthened connection between these objectives imposes a more intensive development of the science concerning plant nutrition and fertilizer application, a long term monitoring of the soil fertility evolution in relation with new fertilizer recommendations systems. The best analytical instrument to monitor soil fertility evolution while taking care of nutrient mining and the fertility expression in crop fields is represented by the long term field experiments. The field experiments are an unrivalled rich source of scientific information in the agriculture domain, in general, and especially for soil science and moreover for the prognosis of different sustainable crop systems.

Experiments such as that of 170 years old from Rothamsted Experimental Station (1843), UK, or those from Grignon Centre of the National Institute for Agriculture, Paris, France (1875), Göttingen (1873) and Hale/Saale (1878) in Germany, Morrow Plots (1876) and Sanborn (1888) in USA, Dolgopsitnaia Ospitania Stantia (1883), Russia, Sappemeer (1881), Holland, Askov (1894), Denmark and some newer ones, offer ideal opportunities for capitalizing on a well documented history of the site and provide information on soil fertility evolution and environmental impacts of different agricultural practices.

Before finishing, I would like to stress once again that throughout its existence, CIEC proves to be a very valuable example of international co-operation in the benefit of agriculture progress and promise to contribute further to the improvement of life and environment quality all over the world by sharing our knowledge and ideas.

I would like to express my hope that CIEC will be crowned with success, for the benefit of food security and safety, for a clean environment, for social security and for paving the road for the peace in the world!