

CLUB *OF* BOLOGNA



THE 25 YEARS OF THE CLUB OF BOLOGNA
EVOLUTION AND PROSPECTS OF AGRICULTURAL MECHANIZATION IN THE WORLD

Editors:
Luigi Bodria and Marco Fiala

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CHAPTER 1

THE CLUB OF BOLOGNA

BY **LUIGI BODRIA** (ITALY), **MARCO FIALA** (ITALY), **KARL T. RENIUS** (GERMANY)

ORIGINS

The idea to create the *Club of Bologna* arose on the wave of the high interest inspired in the '70s by the Club of Rome's report *The Limits to Growth* (1972) and the friendship between Giuseppe Pellizzi and Umberto Colombo, member of the Club of Rome and co-author of the Club of Rome's fourth report, *Beyond the age of waste*, published in 1978.

The Club of Rome was only very little engaged in the role and global importance of agricultural mechanization so that first ideas arose that the agricultural machinery and mechanization sector, being so central to human development, could also benefit from a free and open exchange of ideas between leading personalities in its community. Pellizzi launched the proposal at the end of the international symposium on "*Research and Information-Spreading on Innovations for Agriculture and Industry in the Year 2000*", organised at the EIMA (International Exhibition of Agricultural Machinery Industries) in 1987 under the auspices of the Italian Agricultural Machinery Manufacturers' Federation, then known as UNACOMA.

During the closing session, attended by a large number of foreign researchers, the proposal took shape for a regular forum for discussion amongst experts from the various countries on the state of the art in the development of agricultural mechanization, from the technology development as well as from operational and scientific points of view.

The idea was discussed more in detail by a small group of directors and high level representatives from the leading international research centres (**Figure 1**) and received a very favourable reception from UNACOMA, which offered to sponsor the organisation and management costs of the project.



Figure 1 - Representatives of leading research centers discuss the proposal of Club of Bologna:
(from the left) K.T. Renius, Technical University of Munich (D); J. Lucas, CEMAGREF (now IRSTEA) (F);
L. Lisa, National Research Council (I); E. Manfredi, University of Bologna (I); J. Matthews, NIAE, Silsoe (UK);
G. Ambrogi, director of UNACOMA; G. Pellizzi, University of Milan (I); L. Brega, Unacoma Press Office

This led, in November 1988, to the foundation of the *Club of Bologna*, an independent, non-profit, scientific and cultural organisation intended to provide a permanent centre for the study and analysis of the evolution and characteristics of agricultural mechanization at international level, in order to discuss and define the most appropriate development strategies according to individual countries' specific characteristics and possible future international scenarios.

An organizing committee was appointed with representatives from the top research centres in France, Germany, Italy, the United Kingdom, Japan and the United States, who also provided the first Management Committee, comprising:

- G. Pellizzi, head of Agricultural Engineering Institute, University of Milan (I);
- G. Ambrogi, director of UNACOMA (I);
- R. Hegg, head of Agricultural and Biological Engineering Department, Clemson University, North Carolina (USA);
- O. Kitani, chairman of Dept. of Agricultural Engineering, University of Tokyo (Japan);
- L. Lisa, head of Agricultural Mechanization Institute of the National Research Council (I);
- J. Lucas, head of agricultural machinery division of CEMAGREF (now IRSTEA) (F);
- E. Manfredi, head of Agricultural Machinery Institute, University of Bologna (I);
- J. Matthews, head of AFRC (former NIAE) Silsoe Research Institute (UK);
- K.T. Renius, head of Agricultural Machinery Dept., Technical University of Munich (D).

The newly formed Management Committee, in agreement with UNACOMA, elected Giuseppe Pellizzi as President.

In its internal rules, the *Club of Bologna* defines its mission as

"the study and definition of strategies for the development of agricultural mechanization worldwide, taking into consideration technical, economic and social advances and changes in agriculture on an international level"

These aims are pursued

"through exchanges, discussions and sharing of experience and knowledge of scientists, researchers, technicians, managers, agricultural machinery manufacturers and farmers who are concerned with the fundamental problems in this field, on the basis of collected pertinent information, specific and general studies and analyses, and on the refinement and development of logical concepts of a scientific and political nature"

Membership of the Club is open to leading professionals holding senior positions in the various countries and in the various areas of agricultural machinery and mechanization, who undertake to attend the Club's meetings and contribute the weight of their experience to its proceedings.

Membership applications are subject to the Management Committee's approval and members are required to meet their own travelling expenses for attendance at Club meetings, while UNACOMA covers organisational and hosting costs at the meeting location.

The fast growth and success of the *Club of Bologna* was to a large extent a result of the wide spread visions, engagements and nets of its originator and first President, Giuseppe Pellizzi. It is his merit to create a friendly and fruitful atmosphere enabling investigations and discussions free of influences of all political borders. He worked enthusiastically building up an outstanding group of leading personalities from both industrialised and developing countries, combining professional expertise with personal friendship and running the Club like a single large family.

The first Members' Meeting of the *Club of Bologna* was held on November 8 and 9, 1989, together with the EIMA's twentieth anniversary celebration, with the following topics:

- *Agriculture and Mechanization after the Year 2000 (presentation of preliminary analyses)*, with report by Management Committee members: O. Kitani, J. Matthews, J. Lucas and G. Pellizzi covering the situations in their respective countries, together with Oleg Marchenko of the All Union Research Institute for Mechanization in Agriculture, Moscow, for the USSR and Hua Guozhu of the Chinese Academy of Agricultural Mechanization Sciences, for the People's Republic of China;
- *Process and Production Innovation in Agricultural Mechanization*, with reports again by two members of the Management Committee, K.T. Renius and J. Lucas, and a contribution from Dario Casati, an economist of the Agriculture Faculty of the University of Milan.

Since then, the *Club of Bologna* has met annually on a fairly regular basis, mainly at Bologna during EIMA until this became a biennial event alternating with AGRITECHNICA, Hanover. After this change in 2008, an agreement was reached with the DLG (German Agricultural Society).

The DLG, respecting the Club's work, kindly offered, to host meetings within the AGRITECHNICA show. Therefore, since then the Club has met at EIMA in Bologna in even years and at AGRITECHNICA in Hanover in odd years, making Germany the Club's second key centre of reference.

From the very first meeting, the importance was appreciated of extending the Club's area of interest to focus more strongly on the problems related to appropriate mechanization in developing countries. A close working relationship was therefore formally established with the FAO and UNIDO, which delegated two member experts to the Club. The high importance of developing countries was also one reason to invite Yoshisuke Kishida, President of Shin-Norinsha Co. Ltd. and chief editor of the well known Japanese journal AMA – Agricultural Mechanization in Asia, Africa and Latin America, to become a Club member.

In the following years the *Club of Bologna* continued to grow and develop for seventeen years under the enlightened leadership of its promoter and first President, Giuseppe Pellizzi, and subsequently thanks to the commitment and strong enthusiasm of the succeeding Presidents, Ettore Gasparetto from 2004 to 2008 and the current President, Luigi Bodria, both contributing to a continuing recognition of the Club. An important role in this process has been played by the Club's General Secretary, Marco Fiala, who has been the driving force of its organisation over so many years.

The *Club of Bologna* currently has almost a hundred members, representing 37 different countries, from worldwide research centres, universities, international organisations, manufacturers and industry associations.

The current Management Committee comprises 17 members from 10 different countries, including three representatives of industry associations, another one from an important corporation and one from the press (Table 1).

Table 1 - Current composition of the Management Committee

<i>President</i>	Luigi BODRIA	Dept. of Agricultural and Environmental Sciences, University of Milano	Italy
<i>General Secretary</i>	Marco FIALA	Dept. of Agricultural and Environmental Sciences, University of Milano	Italy
<i>Member</i>	Marco PEZZINI	FederUnacoma Delegate	Italy
<i>Member</i>	Ulrich ADAM	CEMA Delegate	Germany
<i>Member</i>	Paolo BALSARI	Dept. of Agricultural, Forestry and Environmental Economics and Engineering, University of Torino	Italy
<i>Member</i>	El Houssine BARTALI	Hassan II Inst. of Agronomy and Veterinary Sciences (IAV), Rabat	Morocco
<i>Member</i>	Yoshisuke KISHIDA	AMA, Agricultural Mechanization in Asia, Africa, and Latin America, President of Shin-Norinsha Co. Ltd	Japan
<i>Member</i>	Oleg MARCHENKO	VIM - All-Russia Research Inst. Mechanization in Agriculture.	Russia
<i>Member</i>	Luis MARQUEZ	Dept. of Agricultural Engineering, Polytechnic University of Madrid	Spain
<i>Member</i>	Axel MUNACK	Inst. of Agricultural Technology and Biosystems Engineering, Federal Research Institute for Rural Areas, Forestry and Fisheries	Germany
<i>Member</i>	John POSSELIUS	CNH Industrial	USA
<i>Member</i>	Karl RENIUS	Inst. of Agricultural Machinery, Technical University of Munich	Germany
<i>Member</i>	Alain SAVARY	AGRIEVOLUTION Delegate	France
<i>Member</i>	John SCHUELLER	Mechanical and Aerospace Engineering Dept., University of Florida	USA
<i>Member</i>	Gajendra SINGH	Doon University, Dehradun	India
<i>Member</i>	Bassam SNOBAR	Dept. of Agricultural Mechanization, Jordan University of Science and Technology	Jordan
<i>Past President</i>	Ettore GASPARETTO	Dept. of Agricultural and Environmental Sciences, University of Milano	Italy

This board is responsible of organising the Club's meetings, selecting topics of interest for the development of agricultural mechanization at worldwide level, mandating its members and, if appropriate, looking for external experts for invited key-note reports on the selected subjects.

Presentation of the key-note reports is followed by in-depth discussion, in which the Club members are invited to contribute meaningfully on the basis of their specific experience and professional expertise, leading to drawing-up the Club's conclusions and recommendations for distribution to political bodies, industry organisations, researchers, manufacturers, etc.

The Proceedings of Club meetings, initially printed in volumes, are now available to everyone as e-documents at www.clubofbologna.com.

TOPICS COVERED

Over the last twenty-five years, the working sessions at the Club's members' meetings have discussed a large number of widely varying topics, addressing the most important technical, functional and organisational aspects of the evolution and development of agricultural mechanization worldwide (Figure 2).

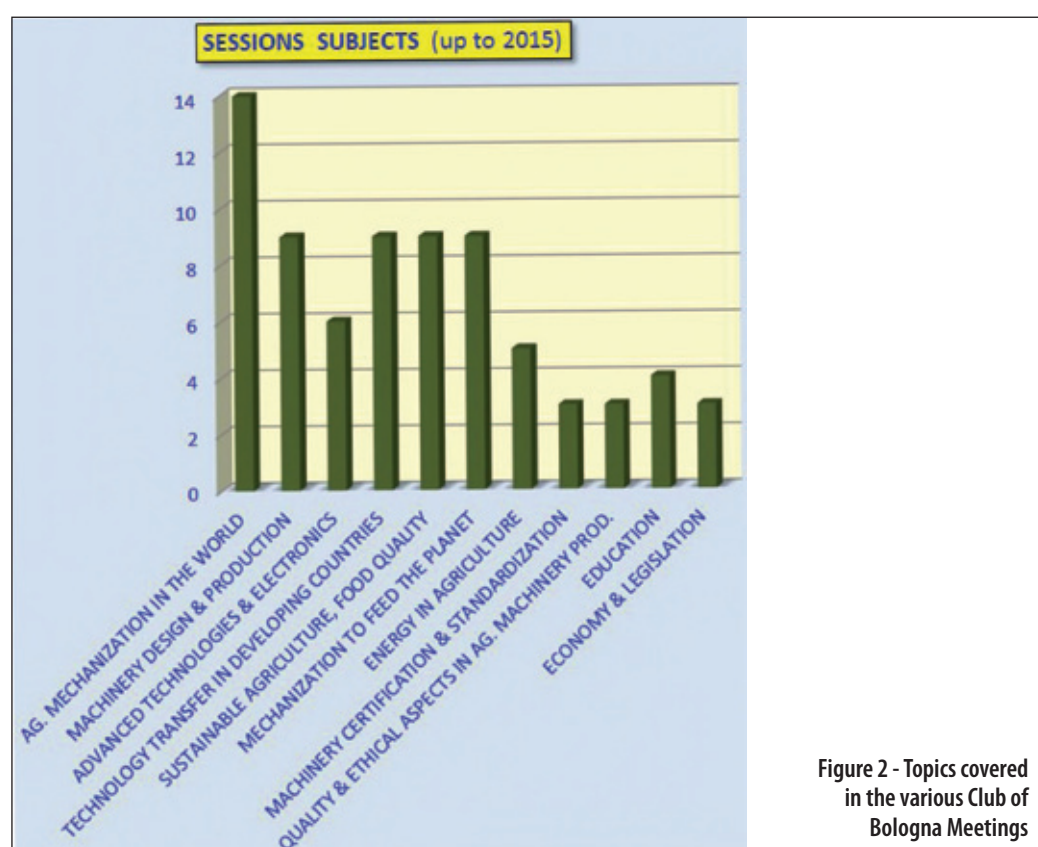


Figure 2 - Topics covered in the various Club of Bologna Meetings

The most addressed subjects have been those being closely related to the specific issues of *mechanization*, the *design and production of agricultural machinery* as well as the application of emerging, *advanced technologies*, to which a total of 25 working sessions have been dedicated.

The strategic role of *agricultural mechanization* in countries' development has received a great deal of attention, highlighting the close relationship between the reduction in the numbers employed in agriculture generated by progress in agricultural engineering and overall improvement of the socio-economic conditions of the country.

Since the first meeting in 1989, the members have returned to this topic repeatedly over time, emphasising the great complexity of the situations in the various countries and the importance of the latest in-



Figure 3 - Meeting 2009 in Hanover (Agritechnica)

formation technologies in defining models of mechanization appropriate to conditions in different regions. Several sessions have also addressed technological developments in the main operations in the field, concentrating in particular on the machines of fundamental importance in functional and environmental terms, discussing processes such as soil preparation, the application of chemical and organic inputs and irrigation.

In two working sessions the role of contractors was analysed underlining their growing contribution in farming operations, both in industrialized and developing countries, in order to reduce costs and allow the utilization of most appropriate equipment.

Another topic to receive considerable attention has been the *design and production of agricultural machinery*, which over time has become highly sophisticated, requiring suitable criteria for the control and optimisation of the industrial production process. To achieve this, several working sessions have discussed both the need for close cooperation between research institutions and industry, and coordinated management criteria of design and production (i.e. “simultaneous engineering” and “platform principle”) in order to reduce total first costs.

In line with its mission to define and disseminate scientific principles for the design of agricultural machinery, the Club decided to publish the “*CIGR Handbook of Agricultural Engineering*” in association with the CIGR

(Commission International de Genie Rural), edited in 1999 by Osamu Kitani, then President of the CIGR and a respected member of the *Club of Bologna*. This was a joint project undertaken by more than 150 international experts, the majority of them members of the Club.

This six-volume handbook covered all fields of agricultural engineering, providing a comprehensive collection of the basic principles and new technologies in the discipline. Published in the USA by the American Society of Agricultural and Biological Engineers (ASABE), it is now also available in an e-version. In order to enlarge its technology transfer impact, volume III of the Handbook has been translated into Chinese in 2005 with the help of the Chinese Academy of Agricultural Mechanization Sciences (CAAMS) and the Chinese Society for Agricultural Machinery (CSAM).

Information and automation technologies have so dramatically been developed over the past decades, that they became not only a key subject within the *Club of Bologna*, but also a volume VI of the CIGR Handbook on "Information Technology", edited by a *Club of Bologna* member and published in 2006 (also by ASABE). This was meanwhile translated to Turkish in 2015.

Summarising this, the CIGR Handbook can be called to be an outstanding example for the global networking within the *Club of Bologna* in favour of the whole international community.

Other topics widely studied by the Club's experts include *technology transfer to developing countries*, *environmental sustainability and product safety*.

With regard to *technology transfer*, several sessions have analysed mechanization systems appropriate to the small farms of developing countries and possible strategies to encourage the development of mechanization in these areas, underlining the fundamental importance of technology transfer in a context of close cooperation between private players and local governments.

Concerning *environmental sustainability*, the Club had already addressed environmental protection issues as early as in the 1990's as a key factor in the future development of agricultural mechanization and machinery. A number of meetings addressed over the years the subject of sustainability together with that of food safety and traceability, since environmental and consumer safety are considered essential strategic factors of future farming technologies.

All the topics mentioned so far were recently combined and coordinated as part of the large general head line "Mechanization to Feed the Planet", addressed at the two last Members' Meetings and finally presented at the EXPO Milan 2015 International Exposition.

Energy in agriculture is another subject to which a great deal of attention has been paid due to its implications for the reduction of energy dependence on fossil fuels and the introduction of high-return production chains into the farming sector. This topic was discussed in several meeting since 1992, including the possibility of using liquid and gas bio fuels for internal combustion engines. These meeting's highlighted both, the possibilities of designing modified or new engines, and the questions of improvements in growing methods for energy crops and their general role in farming systems. The potential offered by the use of vegetable oils from oilseed crops has early been recognised by the Club and has contributed to developing reliable technical solutions.



Figure 4 - Meeting 1996 in Bologna (Eima international): (from the left) K.T. Renius, member of the Management Committee; A. Celli, President Unacoma; G. Pellizzi, President Club of Bologna; O. Kitani, member of the Management Committee

In 2011 the whole meeting was dedicated to energy, examining aspects of the biomass-to-fuel production chain: the role of the farming sector, analysing the case of Brazil with the growing of sugarcane for bio ethanol; and the contribution of biomass farming and forestry by products for biofuel production, with a particular focus on biogas and wood and a 2nd generation of bio ethanol. As the final link in the chain, tractor manufacturers described their current and future projects in this area.

Regarding the Club's permanent attention to the expectations of agricultural machinery manufacturers and the requirements of the related markets, the topic of *machinery certification and standardisation* was another subject of analysis, discussion and recommendations. It was tackled in general terms first in 1998, considering on the one hand the need to harmonise the methods used for testing machine performances, and on the other the importance of reliable certifications.

The global support of standards was and still is a typical strategy of the *Club of Bologna* as it makes a lot of sense to move standard developments more and more from a national to an international level. The benefits are obvious: harmonised interfaces, globally accepted test procedures, human relations, safety, emissions, communication systems, sustainability, recycling and others; and as a "by product" knowledge transfers to developing countries as well. The Club returned to this subject at the Hanover meeting in 2013, dedicating a whole Members' Meeting to it, including presentations of the viewpoints of the leading international organisations working in this sector.



Figure 5 - Meeting 2014 in Bologna (ELMA International)

This will remain a very important strategic issue also for the coming years to reduce the remaining gaps between industrialised countries and to support technology transfer to developing countries.

Some fascinating topics addressed the production process for agricultural machinery under the innovative *total quality* approach and the definition of a *code of ethics* for its manufacture, underlining the requirement for harmonised, documented rules to ensure the manufacture of machines that meet farmers' expectations in terms of durability, performance, safety, reliability and environmental sustainability.

The *Club of Bologna* was also working on curricula of agricultural engineering *education* analysing the related educational programs of the main European universities being active in this field and looking for reasonable harmonisations.

Regarding the competitiveness of the agricultural machinery industry within the European Union, several meetings of the Club addressed the implications of *economy and legislation*. It was and still is the aim, to support a fruitful development and harmonisation with a realistic sense of proportion and practical realization.

THE CLUB TODAY

In view of the growing importance of agricultural mechanization in delivering progress in farming and environmental protection, and with the aim of developing positive partnerships, the *Club of Bologna* has signed a Protocol of Understanding with the *Accademia dei Georgofili*, an historical Italian institution founded more than 250 years ago, which works to promote scientific progress in agriculture and rural development. The protocol aims to encourage joint activities and the realisation of initiatives related to enhancement of scientific and technical innovation of interest to farming, and for the training of young farmers.

As part of this programme, in order to promote young people's interest for research on the issues of agricultural mechanization, the *Club of Bologna* and the Academy of Georgofili announce every two years the Giuseppe Pellizzi Prize, kindly sponsored by the Italian FederUnacoma.

The competition is open to young people who have received a PhD in the previous two years, and prizes are awarded to the three best theses on the subject of agricultural machinery and mechanization. The winners



Figure 6 - Award ceremony of the first edition of the Giuseppe Pellizzi Prize (Bologna 2012) awarded to: Eva Maria Báguena Universidad Politécnica de Madrid, Spain; Sven Peets, Harper Adams University, United Kingdom; Parish Nalavade, Asian Institute of Technology, Thailand

receive a cash prize and are also invited to attend the Club's Members' Meeting, where they get the chance to present the results of their research to the whole Club.

During the last two years, the *Club of Bologna* has dedicated its attention to the topic put forward by the *Expo 2015 International Exposition* being prepared in Milan, which, with its motto "*Feed the Planet, Energy for Life*", focused the scientific and political debate on future food security and the right of a growing world population to sufficient, safe food.

The relationship between mechanization and food production was obviously a very exciting subject for the *Club of Bologna*, and so the XXV Members' Meeting, held in Bologna in 2014, was entitled "*Agricultural Mechanization: the Engine of Energy for Life*" and set out to assess and discuss the role and lines of development of agricultural mechanization in relation to the absolute imperative so clearly stated by the Expo motto.

The reports of the 2014 meeting have been presented by leading personalities from research (Bodria, Renius, Schueller, Singh, De Baerdemaeker, Oberti), important organisations like VDMA (German Mechanical Engineering Industry), UNIDO, FAO and CEMA (European Agricultural Machinery Industry) and individual representatives from the industry (Lely, CNH). The presentations highlighted the close links between socio economic development and agricultural mechanization and pointed out strategic development lines which agricultural

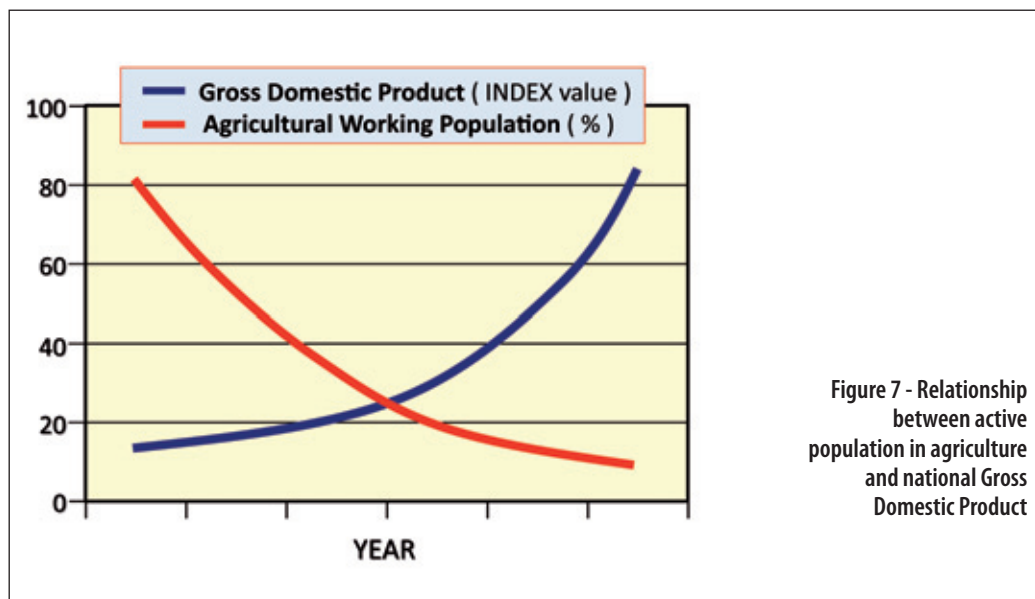


Figure 7 - Relationship between active population in agriculture and national Gross Domestic Product

mechanization should follow to face the food security challenges of the coming decades and to help developing nations rising their prosperity and welfare.

It was reminded that it was the birth of agriculture that started the long process of human evolution and that all the phases in the progress of humanity have been closely linked to developments in farming. Agricultural mechanization has played a key role in this process by improving yields, delivering higher quality levels and, above all, dramatically increasing the productivity of human labour to the point that the number of people employed in farming has now fallen in the developed countries to only 1,5-4% of all working people compared to 70-75% in the early nineteenth century.

The social economic advantages are not only an increased food production, better food quality and lower food prices, but also a general increased standard of living: agricultural mechanization reduces the number of working people in agriculture making it possible that they can become productive in other areas of the national economy creating additional GDP (**Figure 7**). This leads finally to a generally increased prosperity and social welfare, as several investigations of *Club of Bologna* members could confirm.

After discussing the tasks that mechanization has successfully fulfilled in past years, the presentations highlighted that *environmental sustainability* and *appropriate mechanization for developing countries* are the two major future lines along which agricultural engineering must develop. To face the challenge of the Expo motto "*Feed the Planet, Energy for Life*" and considering that the food need is forecast to rise by more than 60% in the next twenty-five years, agricultural mechanization must be able to:

- combine the high levels of productivity now possible in highly mechanized countries with environmental sustainability;
- help to increase food production in areas where poverty and hunger persist.

With regard to the first topic, the amazing development of automation and electronics have brought outstanding machinery and machinery system improvements in terms of availability, functions, costs, reliability and sustainability, confirming predictions made fifteen years ago by Club members Auernhammer and Schueller in the CIGR Handbook Vol. III.

The integration of GPS in agricultural machinery capable of providing the machine's position to within a few centimetres, sensors capable of "reading" environmental and crop conditions, and more and more sophisticated automation and information processing systems have led to the development of what is known as Precision Farming, an integrated system for the optimisation of machines' operations in the field on the basis of local characteristics, local positions and crops' real requirements.

Therefore, agricultural machines are gradually being transformed from "mechanical equipment" that increase the capacity and quality of human labour into "smart systems" that can automatically adapt to the real needs of field locations, offering the basis for a major step forward towards the environmental sustainability of agricultural production systems.

The possibility to tailor in a site-specific way chemical and fertilizer application using prescription maps together with advanced systems of automatic machine guidance and operative control may reduce the amount of fertilizers and pesticides distribution by 10% to 50%, depending on crop and local conditions, from which important savings have already been realised. High accuracy automatic guidance systems avoid overlaps between passes and increase the working speed, thus reducing by 5-10% both fuel consumption and chemical application.

Therefore it is widely acknowledged that the total application of chemical fertilizers and fuel consumption per hectare could already be reduced in the highly mechanized farming systems within the recent decade.

One limited resource of the future is seen in the availability of fresh water. Smart irrigation technologies and management systems following real soil and crop needs can allow important water saving of 15% to 40%. On the second topic, the reports revealed the importance of the development of appropriate agricultural mechanization reducing malnutrition and poverty. The experience of countries that have succeeded in reducing hunger and malnutrition shows that economic growth originating in agriculture is the first important step of improving also the general standard of life from poverty to prosperity and welfare.

This means that research, industry and international organisations must all commit strongly to facilitating the development of agricultural mechanization appropriate to the conditions of the most underdeveloped areas, allowing:

- increases in the efficiency and productivity of farming operations;
- reduction of losses after harvesting;
- easier transport to market systems;
- improve quality control systems.



Figure 8 - Open Meeting of Club of Bologna “Farm Machinery to Feed The World” held in Expo Milan 2015: (from the left) M. Pezzini, FederUnacoma; P. Pickel, John Deere; L. Bodria, President Club of Bologna; D. Caccioni, Chairman; P. De Castro, EU Parliament; A. Olliver, CNH Industrial; D. Scanavino, President Italian Farmers Confederation

In the light of the above, the *Club of Bologna* decided, in partnership with the *Accademia dei Georgofili*, to hold a public Open Meeting at the **Expo Milan 2015 Universal Exposition** entitled “*Farm Machinery to Feed the World*” in order to contribute with the fundamental strategic role of agricultural mechanization to the Expo 2015 motto, “Feed the Planet, Energy for Life”.

After an introductory report by Club President Luigi Bodria, underlining the way in which the major innovations in agricultural mechanization during the last few years took place combining agricultural production and environmental sustainability, the Deputy President of the *Accademia dei Georgofili*, Michele Stanca, explained the huge opportunities offered by agricultural genetics, with the latest studies. It was amazing to hear the long term forecast that the genetic potential of basic crops may allow future yield duplication in tons per hectare. After this, Karl Renius and John Schueller introduced the latest developments and innovations of tractors and agricultural machinery which improve efficiency, sustainability and global industrial product planning processes, while Josef Kienzle and Gajendra Singh discussed the big improvements made by mechanization in Asian countries and the need to facilitate a similar process in African states.

The conclusions and recommendations at the end of the meeting were brought into the document “*Milan Charter for Mechanization*” which has been approved by the Expo Scientific Committee and included among the 120 official contributions to the “*Milan Charter*”. This is the official legacy of Expo 2015 and was delivered to Secretary-General of the United Nations, Ban Ki-moon by the Italian Minister for Agriculture, Food and Forestry Policies, Maurizio Martina, on World Food Day, held in Milan on October 16 2015.

The “*Milan Charter for Mechanization*” strongly stresses the need of:

- the central role of agricultural production and related technologies in order to guarantee everyone the availability of adequate and safe food supply;
- research in the area of agricultural machinery and mechanization, and more generally, of agro-food technologies;
- appropriate measures assessing environmental aspects of agricultural mechanization including criteria of sustainability and traceability in co-operation with national and international authorities;
- the development of an appropriate agricultural mechanization consistent with the local socio-economic conditions to promote agricultural production and rural development in developing countries and to enable at the same time the first step to get poor nations economies up to national prosperity and welfare;
- much higher political priority and attention paid to research, education, extension, personal networking, information supply and international co-operation in agricultural mechanization regarding the huge importance of this discipline for future mankind.