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C O N F E R E N C E B O O K

FOURTH WORLD CONFERENCE ON
THE FUTURE OF SCIENCE™

Food and Water for Life

VENICE, SEPTEMBER 24-27, 2008

With the Patronage of The President of the Italian Republic

Fondazione Umberto Veronesi
PER IL PROGRESSO DELLE SCIENZE

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Fondazione Giorgio Cini

Island of San Giorgio Maggiore

The Fourth World Conference on the Future of Science, entitled "Food and Water for Life", has set itself the task of examining the concrete solutions proposed by science to resolve the pressing global problems of food and water scarcity - problems that require resolution if humanity is to have a positive future.

Major challenges are to improve both the quantity and quality of the food we produce, in an environmentally sustainable way and with acceptable social and economic costs, and to reduce the diseases arising from malnutrition, unhealthy eating and over-consumption.

Extirpation of hunger, reduction of infant mortality, provision of water for agriculture, and provision clean water for drinking, are all aims of the Future of Science Program as embodied in the Venice Charter of 2005. This charter, endorsed by scientists, economists, philosophers, theologians, men of letters, jurists and politicians from all over the world, calls for scientific endeavour to place itself at the service of humanity.

The Future of Science Conferences are then an expression of the humanistic face of science - science for progress, science that prioritises human life and dignity, science that safeguards the equilibria of the planet.

As with previous Congresses, a concluding document summarizing the views and recommendations of the participants will be produced. This document will be submitted to governments and supranational agencies who will be urged to place the priorities of "Food and Water for Life" high on their agendas for action.

Umberto Veronesi
President

Chiara Tonelli
Secretary General

FOURTH WORLD CONFERENCE ON
THE FUTURE OF SCIENCE™

Food and Water for Life

VENICE, SEPTEMBER 24-27, 2008

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Kathleen Kennedy Townsend.

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COMMUNICATION
Donata Francese.

Daily program

Opening Ceremony.

h. 6.00 p.m.

OPENING MESSAGES

Umberto Veronesi, Conference President

Giovanni Bazoli, President, Giorgio Cini Foundation

Marco Tronchetti Provera, President,
Silvio Tronchetti Provera Foundation

Kathleen Kennedy Townsend, Conference Vice President

Chiara Tonelli, Conference Secretary General

Rita Levi Montalcini, 1986 Nobel Prize for Medicine

Ellen Johnson Sirleaf, President of Liberia

Barbara Burlingame, Nutrition and Consumer
Protection, FAO

Regina Moench Pfanner, The Global Alliance
for Improved Nutrition, Gates Foundation

Luigi Rossi Bernardi, Expo 2015

Giulio Tremonti, Italian Minister
of Economics and Finance

h. 7.30 p.m.

WELCOME COCKTAIL

Proposals to combat Water Scarcity.

Access to safe water is a fundamental human need. Water is a precious and finite resource and population is on the increase. How can we feed an additional 2 billion people and manage water consumption in a sustainable way? Strategies to bring safe water to more people, to develop systems for more sustainable water use by industry and agriculture, and to develop crops that cope water scarcity will be examined.

h. 9.00 a.m. - 1.00 p.m..

Chairs: **Peter Atkins, Regina Moench Pfanner**

Vaclav Smil
Food, Water, Energy: Old Problems, New Opportunities

John Lupien
Food and Hunger Perspectives beyond 2010

Elfatih Eltahir
Climate, Water, and Public Health in Africa

Susan Murcott
Innovations Bringing Safe Drinking Water to 1 Billion People at the Bottom of the Pyramid

Claus Conzelmann
Creating Shared Value - The Food Industry's Commitment to Sustainable Water Use

Isha Ray
Water Prices in Agriculture: Impacts on Efficiency and Equity

h. 2.00 p.m. - 6.00 p.m.

Chairs: **Chicco Testa, Barbara Burlingame**

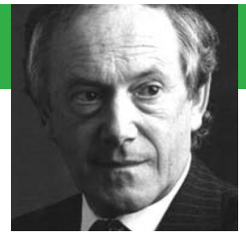
Chiara Tonelli
Crops Coping with Water Scarcity

Mpoko Bokanga
Partnership for Water Use Efficiency in Maize: an Imperative for Africa

Charlie Paton
The Sahara Forest – a New Source of Fresh Water, Food and Energy

David Tilman
Agricultural Expansion and Environmental Sustainability

Round Table on *Water and Food Research*:
Europe and beyond - science, policy and strategy.
Chair: **Paolo Costantino**
Massimiano Bucchi, Timothy Hall, Karin Metzlaff, Pere Puigdomènech



Peter Atkins

Oxford University, UK

Peter Atkins began his academic life as an undergraduate at the University of Leicester, and remained there for his PhD. He then went to UCLA as a Harkness Fellow and returned to Oxford in 1965, as professor of chemistry and Fellow of Lincoln College. His research was in the application of quantum mechanics to chemical problems, but with time he drifted into writing books, which now number over 60. The best known of these is Physical Chemistry, now in its eighth edition. His other textbooks include Inorganic Chemistry, Molecular Quantum Mechanics, and various flavours of General Chemistry. He also writes books on science for the general public, including The Periodic Kingdom, Galileo's Finger, Creation Revisited, and (most recently) Four Laws that Drive the Universe.

In his spare time Professor Atkins is deeply involved in a variety of international activities, including (until 2006) chairing the Committee on Chemistry Education of the International Union of Pure and Applied Chemistry which has the task of improving chemical education worldwide, especially in developing countries, and encouraging and coordinating international efforts towards the public appreciation of chemistry. He is a member of the organizing committee of a series of conferences on chemistry for the Middle East. He has been a member of the Council of the Royal Society of Chemistry; he has also been a member of the council of the Royal Institution. He has a strong interest in eliminating irrational and superstitious attitudes to life, and is a prominent proponent of atheism and a secular society.

Professor Atkins has honorary degrees from the universities of Utrecht and Leicester and is an honorary professor of Mendeleyev University, Moscow. He is a foreign member of the Academia della Scienza of Bologna, received the Meldola Medal of the Royal Society of Chemistry and their Nyholm Lectureship; he is an honorary associate of the Rationalist Press Association. He retired from his Oxford position in 2007, but continues to write, travel, and lecture.

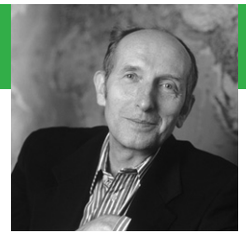
Regina Moench Pfanner

The Global Alliance for Improved Nutrition, Gates Foundation

Throughout my career, my focus has been on nutrition and health programming both in development and emergencies and on micronutrients and poverty alleviation programs. have spent more than twenty years working in the field of relief assistance and international development.

I am a Fullbright Scholar and hold a Doctorate in International Nutrition from the University of Bonn, Germany, and a Masters of Science from Michigan State University, USA. I have published and contributed to several publications.

Prior to joining GAIN in 2005 I served as Regional Coordinator for Helen Keller International (HKI) in the Asia Pacific overseeing the development, implementation and quality management of HKI's programs in public health and eye health. I began my career with the International Federation of the Red Cross and Red Crescent Societies (IFRC) and worked throughout Africa and Europe. I went on to become Head of Mission for the IFRC in Chad before moving on to provide technical consultancies in food and nutrition programs for a number of international organizations, including the World Health Organization (WHO), the United Nations High Commission for Refugees (UNHCR), and the World Food Programme (WFP). Besides Africa and the Asia Pacific, my experience also includes work in the Middle East, South America, and Europe.



Vaclav Smil
Faculty of Environment, University of Manitoba, Canada

Vaclav Smil is distinguished professor at the Faculty of Environment of the University of Manitoba, Canada.

He was born in Pilsen, Bohemia, in 1943, followed an interdisciplinary program at the Faculty of Natural Sciences of Carolinum University in Prague and obtained a Doctor of natural sciences degree. He obtained his PhD from the College of Earth and Mineral Sciences at Penn State University, US.
Professor Smil is distinguished primarily as a thinker about energy problems and as a prolific and clear-sighted writer on global energy issues. He has 25 books to his credit and has published more than 300 papers. His research interests are interdisciplinary, encompassing the environment, energy, food, population, and economic and public policy. He is particularly interested in the quantification and modelling of global biogeochemical cycles and long-range appraisals of energy and environmental options. Since the early 1970s he has applied these approaches to energy, food, and environmental affairs of China.

He fellow of the Royal Society of Canada, was the first non-American to receive the American Association for the Advancement of Science's Award for Public Understanding of Science and Technology, and has been an invited speaker to over 180 conferences and workshops across the world. He has given invited lectures at many universities around the world, and briefings and testimonies to the White House, US House of Representatives, Office of Technology Assessment of the US Congress, US State Department, and Canadian Department of Foreign Affairs. He has also acted as consultant to the American Academy of Arts and Sciences, Center for Futures Research, East-West Center, International Research and Development Center, Rockefeller Foundation, US Agency for International Development, US National Academy of Sciences, World Bank, and World Resources Institute.

Abstract

Food, Water, Energy: Old Problems, New Opportunities

Today's specific circumstances that have combined to create high food and energy prices and an increasing anxiety about the future availability of oil and water are unprecedented -- but human affairs are cyclical and none of these concerns is new. And all of them share an important common denominator: enormous inefficiencies of production and/or use of these essential resources. Not only have been these irrational production practices and uses ignored or tolerated for decades, new forms of highly inefficient resource use and new wasteful consuming habits are constantly introduced and encouraged in affluent economies even as basic systemic inefficiencies affect energy and water use in agricultures of low-income countries. An indefensible choice of using food crops for production of automotive ethanol and continued gross food overproduction are perfect examples in the first category, Africa's continent-sized insufficiencies and imbalances in fertilizer applications and very low efficiencies of nitrogen use throughout Asia are unfortunate examples of the second class of common wasteful phenomena. At the same time, our research, management and efforts have been overwhelmingly aimed at further increases of supply and consumption. I will address all of these problems by focusing on key irrationalities of today's food production and associated challenges in water and energy uses and suggest some long-overdue remedies.

John Lupien
Nutrition Department, College of Health and Human Development,
Pennsylvania State University, USA

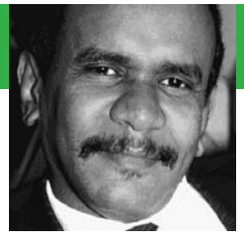
1999-present: Adjunct Associate Professor in the Nutrition Department, College of Health and Human Development, Pennsylvania State University, USA.
1998-present: Adjunct Professor of Food Science at the University of Massachusetts, USA.
2007-present: Guest Professor, Zhejiang University, Hangzhou, China.
Food and Nutrition Division, Food and Agriculture Organization of the U.N. (FAO)
1990-November 1999: Director of the FAO Food and Nutrition Division.
1986-1990: Chief, Food Quality and Standards Service within the FAO Food and Nutrition Division, and Secretary, FAO/WHO Codex Alimentarius Commission.
1970-1980: FAO Nutrition Officer (1970-71) and Senior Nutrition Officer (1973-80) in Rome and as an FAO Project Manager in Zambia (1971-73).
U.S. Food and Drug Administration (FDA).
1980-1986: Director, International Affairs Staff, U.S. Food and Drug Administration, Washington, DC.
1960-1970: FDA investigator in San Francisco, California (1960-64); Brownsville, Texas (1964-65); and as an FDA Compliance Officer in Washington, DC (1966-70).
Dr. Lupien carried out his undergraduate and graduate studies at the University of Massachusetts, Amherst, Mass., USA, and holds a doctoral degree From Mahidol University, Bangkok, Thailand and a Masters degree in Public Health from the University of Las Palmas, Spain. He has worked in nutrition, food quality and food safety since 1960.
In his FDA and FAO work Dr. Lupien was involved in extensive food and nutrition-related policy formulation work. He also carried out in-depth nutrition, food quality and food safety surveys and prepared and implemented nutrition-related projects in about 50 countries. As Director of the FAO Food and Nutrition Division he supervised 70 professionals and support staff, oversaw the technical organization of the December 1992 Rome Joint FAO/WHO International Conference on Nutrition, and coordinated FAO's overall nutrition programme. He has extensive experience in national and international food standards setting and implementation work, and has written and spoken extensively on these topics.
At present Dr. Lupien also chairs the Scientific Advisory Committee of the European Food Information Council, represents the International Union of Food Science and Technology in international meetings on food and agriculture, and serves on the Monash University, Melbourne, Australia advisory board on food quality, safety and nutrition.

Abstract

Food and Hunger Perspectives Beyond 2010

This presentation will discuss the current impacts of widespread hunger, malnutrition and related problems in developing and developed countries. Over 800 million people worldwide do not have physical and economic access to adequate supplies of food to enable them to grow to their full genetic potential, or to lead active and productive lives. Lack of access to food and micronutrient deficiency problems, along with poor environmental conditions and lack of education and health care lead to low average life spans for many, including high and preventable morbidity and mortality rates among children of less that 5 years of age. It is estimated that more than 24,000 infants and children of less than 5 years of age die each day due to malnutrition and related diseases and conditions, including diarrhea, infections, and ingestion of unsafe foods and contaminated drinking water.

Information will be provided about current rates of malnutrition through out the world and unfulfilled international and national commitments to address these problems. Information will also be provided on developing countries that have made significant progress in eliminating hunger and malnutrition through setting priorities and effective actions to implement these priorities. Such priorities started with initial emphasis on better food supplies and better agriculture as the motor of overall improvement of nutrition, family and national income, and of national economy. Suggestions will be made for action by all through more effective communication and cooperation of governments, academia, the food and agriculture industry, and health, education and other disciplines needed for effective activities to bring about an end to terrible toll of illness and early death associated with hunger and malnutrition.



Elfatih Eltahir
Civil and environmental Department MIT, USA

Dr. Elfatih Eltahir, professor of civil and environmental engineering at MIT. Dr. Eltahir earned a B.S. in civil engineering from the University of Khartoum in Sudan in 1985; an M.S. in hydrology from the National University of Ireland in 1988; and the S.M. in meteorology and the Sc.D. in hydroclimatology, both from MIT in 1993.
Dr. Eltahir's research focuses on the regional climate and hydrology of tropical regions. He developed a theory for how regional-scale vegetation distribution shapes the dynamics of monsoons, and studied the impact of deforestation on the hydrology and climate of the Amazon and West Africa.
He explored the connections between natural variability in the Nile flow and the El Nino phenomenon, and demonstrated the potential for using such connections to improve predictability of the Nile floods. His recent work focuses on the connections of water and disease in Africa.

Abstract

Climate, Water, and Public Health in Africa

The connections between climate, water, and disease will be explored using the example of malaria transmission in a couple of villages in the Sahel region of West Africa. Field observations provide evidence for a strong relationship between climate variability and malaria transmission in Africa.
A detailed network of observations covering two villages will be reviewed and discussed to illustrate the mechanistic relationship between rainfall occurrence and mosquito population dynamics at the village scale. The role of numerical models as tools for prediction of the impact of climate change on malaria transmission will be discussed.

Susan Murcott
Civil and Environmental Engineering Department, MIT, USA

Senior Lecturer, Civil and Environmental Engineering Department at Massachusetts Institute of Technology.

Susan Murcott's work is dedicated to providing safe water to 1 billion people. For the first decade of her environmental engineering career, her focus was on innovative wastewater treatment for megacities, with projects in Mexico City, Sao Paulo, Rio de Janeiro, Budapest, Beijing and Hong Kong. Since 1997, she has been a leader in the emerging field of household drinking water treatment and safe storage, with projects in Ghana, Nepal, Bangladesh, Cambodia and China.

She and her student teams have won many prizes for their water technology innovations, including a Wall Street Journal Technology Innovation Prize, the World Bank Development Marketplace Competition, St. Andrews Prize for the Environment, Kyoto Water Prize – Top Ten Finalist, the MIT IDEAS Competition and others.

At MIT, Murcott teaches "Water and Sanitation Infrastructure in Developing Countries" and "D-Lab III: Disseminating Innovations for the Common Good." At Cambridge University, she has co-taught two new courses "Sustainable Development for Large Infrastructure Projects" and "Design for Developing Countries" in the Engineering for Sustainable Development Program. She is the author of over 50 professional papers.

Abstract

Innovations Bringing Safe Drinking Water to 1 Billion People at the Bottom of the Pyramid

Food and safe water availability are the highest security priorities for the 1 billion people at the bottom of the global economic pyramid. This presentation will report on household drinking water treatment and safe storage (HWTS) - innovations that are addressing this economic group's urgent need for safe water. HWTS technologies have come into existence since the 1990s and are explicitly designed to remove major contaminants found in unsafe drinking water – infectious pathogens, arsenic, fluoride, and more. These systems have powerful and appealing characteristics. They are engineered to be simple, self-reliant, local, user-friendly and low-cost. They empower users, especially women and children, who bear a disproportionate burden to secure household water. The motivation driving the development of these technologies is the aspiration for a common, social good, not unlike the 20th century search for a polio vaccine or the 21st century search for cures for HIV/AIDS, malaria and TB, and an instatement of a basic human right to water. While HWTS solutions necessitate household-by-household adoption and sustained use, taking these products from pilot scale to widespread commercialization is also essential.

The exciting question is, if commercial products, such as computers, cell phones and Internet can "go exponential," then can these safe water technologies also be taken to scale? If the answer is "Yes," HWTS will be part of the solution that provides safe drinking water in the next several decades to the 1 billion people at the bottom of the pyramid.

Field experience implementing HWTS innovations in Ghana and Nepal will be described: In Ghana, Pure Home Water is a social enterprise established in 2005 to disseminate HWTS products among low-income customers, with its main focus on the promotion and sale of ceramic pot filters, locally known as Kosim filters, currently reaching over 100,000 people.

In Nepal, the widespread adoption of shallow tubewells in Nepal's Terai region over the last 20 years enabled improved in access to water. However, recent national water quality testing has shown that 3% of these sources contain arsenic above the Nepali interim guideline of 50 ›g/L, and up to 60% contain unsafe microbial contamination. To address this challenge, an international team has invented, tested, and then implemented the KanchanTM Arsenic Filter (KAF) through an iterative, learning framework. This household system costs only US$25 and is now serving 65,000 with safe water.

Claus Conzelmann
Safety, Health & Environment, Nestlé Group, Switzerland

Claus Conzelmann has been driving the Nestlé Group's performance in environmental sustainability and workplace health & safety since 2004. His major focus areas have been the significant reduction of work-related accidents, leveraging Nestlé employees as ambassadors for the Group's nutrition, health and wellness strategy and integrating environmental considerations, especially water conservation and governance, into all aspects of the business, from product development, sourcing, manufacturing to marketing.
Since 1991 with Nestlé, Claus held various strategic and operational positions in Switzerland, Germany and Australia, incl. regulatory affairs, biotechnology policy, factory management, and operations improvement.
Claus holds a Ph.D in molecular biology from Manchester University in the UK. He was previously Business Development Manager with Ciba-Geigy Agro (now Syngenta) and worked for several years as science journalist in Germany and the UK.
Nestlé is the world's largest food, nutrition, health and wellness company with sales in excess of $ 80 billion and some 500 manufacturing sites in over 80 countries.

Abstract

Creating Shared Value - The Food Industry's Commitment to Sustainable Water Use

For companies with a long-term perspective, economic development and environmental sustainability are no longer conflicting goals but two sides of the same coin. As groundwater tables are dropping at a frightening rate in many agricultural areas, food companies see the supply of raw materials threatened. In order to protect the basis of their business, these companies work with their supply chains, policy makers, scientists and civil society to find sustainble solutions to the world's water crisis. The presentation will highlight the challenges faced by agriculture and the food business in an increasingly water-stressed environment and present practical examples for the way forward. It will also address the devastating effect on food security and water availability that are a direct consequence of misguided subsidies for food-based agrifuels. The relationship between climate change and water scarcity, including carbon and water footprints, will be discussed in the context of sustainable production and consumption.

Isha Ray

Energy and Resources Group, University of California, Berkeley, USA

Isha Ray is Assistant Professor at the Energy and Resources Group, UC Berkeley. She has a BA in Philosophy, Politics and Economics from Oxford University and a PhD in Applied Economics from Stanford University. Before joining the ERG faculty, she was an analyst on farm economics and institutions at the Turkey office of the International Water Management Institute, and then a Ciriacy-Wantrup Postdoctoral Fellow at UCBs Geography Department. Professor Rays research interests are water and development; technology and development; common property resources; and social science research methods. Her international research projects focus on access to water and sanitation for the rural and urban poor, and on the role of technology in improving livelihoods. Her research in California is focused on methods to elicit public perceptions of energy and climate change policies. She teaches courses on research methods in the social sciences, water and development, and technology and development.

In addition to research and teaching, she has extensive past and ongoing experience in the non-profit sector on international development- and freshwater-related issues.

Abstract

Water prices in agriculture: impacts on efficiency and equity

Access to irrigation has been shown to increase crop yields by 100% - 400% around the world. Irrigation policy is therefore central to agricultural productivity, food security, and smallholder livelihoods in developing countries. It is conventional wisdom, however, that water use in irrigation is inefficient and wasteful. This is especially so when the water is delivered by flooding and furrow systems, as opposed to more advanced pressurized or drip systems. It is also well known that irrigation water is heavily subsidized for farmers, in the developed as well as the developing worlds. One of the tools advanced by economists to reduce irrigation inefficiencies is rational pricing. In the context of current subsidies, this means raising water prices either to cover the cost of its delivery or to reflect its scarcity value. It is also argued that higher water prices, by lowering agricultural demand, will free up water for urban regions or for the environment.

This presentation discusses the role of water prices in irrigation policy, with emphasis on surface water systems. We can distinguish between the impacts of "rational pricing" for cost recovery versus for irrigation efficiency. I examine the assumptions, often implicit, behind the claim that higher water prices will reduce water use, and therefore increase the water productivity of agriculture. These assumptions are often not justified in largely rural developing countries. I also examine the consequences of higher water prices on equity for the farmers who depend on the irrigation systems. Based on case studies from India, Sri Lanka, Turkey, Iran, Egypt and Morocco, I show that while irrigation efficiencies are often (but not always) suboptimal, and though water prices are often too low to reflect its opportunity cost, higher water prices are no guarantee of efficiency and may have negative consequences for equity and for local food security.

Institutional reforms - which are not without their own challenges - may be more effective in sending scarcity signals and in protecting small and downstream farmers.

Chicco Testa

Rothschild, Italy

Chicco Testa was born in Bergamo on January 5th, 1952. He lives in Rome.
At present Chicco Testa is Chairman of the Board of Roma Metropolitane and Managing Director of Rothschild Spa.
Also he is member of the Board of Allianz Spa, Chairman of the Board of Telit Communications PLC and Chairman of the Board of E.V.A.- Energie Valsabbia - a company developing hydropower generation plants.
He has been also Chairman Organising Committee 20th World Energy Congress hold in Rome on November 2007.
From 1994 to 1996 he was Chairman of the Board of ACEA (Rome's Electricity and Water Co.)
From 1996 to 2002 he was Chairman of the Board of Enel Spa, the most important Electrical Italian Company .
From 2002 to 2005 he was Member of the Advisory Board of Carlyle Europe, affiliate of "The Carlyle Group", (Private Equity), Chairman of the Board of Directors of STA Spa (The Mobility Agency of the City of Rome).
From 1980 to 1987 Mr. Testa was National Secretary and then National President at Legambiente.
From 1987 to 1994 for two legislatures, he was elected to the Italian Parliament Chamber of Deputies, Commission for the Environment and the Territory.
Chicco Testa is a journalist and he contributes to some of the most important daily and weekly Italian papers.
He was professor at the LUISS School Management in Rome (MBA Program Economics and Management in Public Utilities) and he was Professor at the Universities of Macerata and Naples in Economic and Environmental subjects.

Chiara Tonelli
Department of Biomolecular Sciences and Biotechnology,
University of Milan, Italy

Chiara Tonelli is Professor of Genetics at University of Milan, Italy, and leader of the Plant Molecular Genetic Group of the Department of Biomolecular Sciences and Biotechnology of the same University. She is an EMBO member, the European Molecular Biology Organisation.

Her scientific interests span from fundamental aspects of plant biology to biotechnological applications. The major focus of her studies is to deciphere the logic of transcriptional control and gene regulation in plant during development and in the interaction with the environment. She contributed to the identification and molecular characterization of regulatory gene families responsible for the coordinate control of flavonoids and anthocyanin metabolic pathways. She discovered an interaction among duplicated genes, termed REED (Reduced Expression of Endogenous Duplications), an epigenetic mechanism of silencing mediated by DNA methylation of their promoter regions. More recently she discovered the first transcription factor specifically regulating stomata movements in the plant; this finding opens new possibilities to improve crop survival and productivity in water scarcity conditions.

She has served on numerous national and international scientific committees and science advisory boards. Currently she is board member of the European Plant Science Organisation (EPSO) and member of the Research and Technological Transfer Committee of the University of Milan. She is reviewer for scientific journals (Molecular Cell, Molecular and Cellular Biology, EMBO Journal, Plant Cell, Plant Journal, Plant Molecular Biology) and for international granting Agency (USDA, EMBO, TWAS, Human Frontier).

Since 2005 she is Secretary General of the "Future of Science Conference", a cycle of international conferences gathering together eminent experts from various disciplines addressing to the different spheres of the society with the aim to bring Science in Society, choosing every year a theme crucial to society, to underline the contribution and implications of scientific progress to everyday life.

Abstract

Crops coping with water scarcity

Despite significant improvements in crop yield potential and yield quality over the last decades, the forecasted global climatic changes are raising great concern about yield safety. In particular, drought represents a major threat to agriculture and food production. Even in the most productive agricultural regions short periods of water deficiency are responsible for considerable reductions in seed and biomass yields every year. Over 70% of the globally available fresh water is used in agriculture to sustain crop production, with only 30% of this returned to the environment. To cope with the detrimental effects of climate changes on crop yield and to fulfil the growing demand for food production it is imperative to develop new crops with higher performance under water scarcity, able to consume less water and to maintain high efficiency.
Plants have evolved two different strategies to resist drought: dehydration avoidance and dehydration tolerance. Dehydration avoidance refers to the plant capacity to maintain high plant water status under the effect of drought. Plant avoid being stressed through mechanisms which enhance the capture of soil moisture (e.g. reaching deep soil moisture with a long root), or reduce water loss by transpiration (e.g. decreasing the aperture of the stomatal pores distributed on the leaf surface). Dehydration tolerance is the ability of the plant to conserve plant function in a dehydrated state.
This strategy is relatively rare in nature and either breeding programs or plant biotechnology approaches have given a preference to dehydration avoidance over dehydration tolerance as the major strategy for plants to cope with drought stress. Multiple complex pathways are involved in controlling this process, and engineering only a single trait in some cases is not a winning strategy. Because transcription factors (TFs) are proteins that naturally act as master regulators of cellular processes, they are excellent candidates for modifying complex traits such as dehydration avoidance in crop plants, and TF-based technologies are likely to be a prominent part of the next generation of successful biotechnology crops.

Some examples of modified transcription factors that improve plant response to drought and salinity stress, a direct consequence of water scarcity, in the model plant Arabidopsis thaliana, will be presented. In one case a transcription factor involved in the control of the

>>

Abstract

opening and closing of stomatal pores, epidermal structures that regulate CO2 uptake for photosynthesis and the loss of water by transpiration, has been identified and engineered to obtain plants that maintain high water status and high productivity also in water stress conditions. In a second example a transcription factor controlling the composition and thickness of cuticle has been studied. Finally an example of a transcription factor that, when over-expressed, enhances plant salt stress tolerance.
The next step is to transfer to crop the technology set up in model plant. The first results of this transfer are very promising.

Mpoko Bokanga
African Agricultural Technology Foundation, Kenya

Mpoko Bokanga is a food scientist who has been involved in agricultural research and development for more than 20 years. Before joining AATF as its first Executive Director in 2004, Bokanga worked as Industrial Development Officer (Agro-industries) with the Regional Industrial Development Centre of the United Nations Industrial Development Organisation (UNIDO) in Abuja, Nigeria.

He also served in the following capacities: as a Research Scientist with the International Institute of Tropical Agriculture (IITA) for 13 years (1989-2002); a visiting Professor of Food Science at the Alabama A & M University in Normal, Alabama; and a Research Associate with Westreco Inc., a Nestlé Research Company based in New Milford, Connecticut, USA. While at IITA, Bokanga developed technologies for processing cassava into new products, which were deployed in over twelve African countries among them Benin, Chad, Ghana, Madagascar, Nigeria, Tanzania and Togo.

He has published several papers on the biochemistry and health implications of cyanogenesis in cassava, and was instrumental in the formation of the Working Group on Cassava Safety (WOCAS) in 1994, a sub-committee of the International Society for Tropical Root Crops (ISTRC). The main function of WOCAS is to monitor progress in the understanding and handling of issues related to cassava safety due to the cyanogenesis of the crop. Bokanga is the current chair of ISTRC-AB, the African branch of the ISTRC. He holds a masters degree from the Massachusetts Institute of Technology (MIT) and a doctorate from Cornell University in the USA. Bokanga is a national of the Democratic Republic of Congo.

Abstract

Partnership for Water Use Efficiency in Maize: An Imperative for Africa

The quasi-totality (95%) of African cropland does not have access to irrigation schemes. Therefore, delays in the startup of the rain season or a dry spell of two weeks or more at critical periods of plant growth can lead to great reduction in yields at harvest time. When farmers fear that the rain will be inadequate, they are less likely to invest in essential crop production technologies such as good quality seeds or fertilizers. As a result of this risk aversion, crop yields remain low even during years of sufficient rainfall. Without higher yields and yield stability in the face of diminishing water availability, Africa's farmers will continue to cultivate every acre of land in a futile struggle to keep up with increasing food demand, driven by expanding populations, higher incomes and new developments such as the use of crops to produce biofuels.

In the absence of opportunities for large scale irrigation, African farmers practice a range of water conservation measures, including cultivation of faster maturing crops, reducing water runoff, water harvesting and surface mulching to reduce the loss of soil water to the atmosphere.

The agricultural research community has responded by developing and promoting farming technologies that reduce the consequences of drought, including low tillage or no-till systems that better capture and store water, and by breeding crops that produce yields over a shorter cropping interval. All these techniques, however, do not reduce the impact of water stress, especially is water shortage occurs at critical stages of plant growth. Although plant breeders have always been searching for traits that would reduce the impact of water stress, the potential for achieving greater drought tolerance through conventional crop breeding has remained rather limited because severe moisture deficit greatly affects plant metabolic functions and coping mechanisms are very complex and are regulated by many genes.

In the face of increasingly erratic rainfall patterns due to climate change and having to respond to greater demand for crop production as a result of population growth and new crop uses such as biofuels, the development of drought tolerant crops has emerged as an imperative for African agriculture.

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Abstract

The African Agricultural Technology Foundation (AATF), an institution devoted to facilitating access to proprietary agricultural technologies that can solve farming constraints of smallholder African farmers, is coordinating a project to harness the potential of molecular marker-assisted breeding and genetic engineering to develop maize varieties with increased resistance to water stress. Funded by the Bill and Melinda Gates Foundation and the Howard G. Buffett Foundation, the project intends to develop drought tolerant maize varieties that will be given to local seed multipliers for wide access by smallholder farmers. It is expected that drought tolerant maize varieties obtained in this project will, under moderate drought conditions, produce at least 20 percent more than current farmers' varieties.

Charlie Paton
Seawater Greenhouse, UK

Charlie Paton studied first at the Guildford School of Art and then at Central School of Art and Design in London. Working his way through College as a lighting electrician - starting his career with ITN as a studio assistant on the Apollo 11 launch (1969) - he went on to become a lighting designer and inventor / maker of special effects, and has designed the lighting for over two hundred productions, primarily in Europe and N America. In 1976 he developed a concept for moving lights by remote control. A patent was granted and Light Works Limited was established in 1979 to manufacture and market the system.
The 'Lightscan' was lanched on the final World tour of the WHO and was subsequently refined to create an entire rig of robotic luminaires and cameras for the musical 'Starlight Express' in 1984. Charlie then licenced the manufacturing and marketing rights to Strand Lighting.
He has since developed a highly regarded track record in innovation, research and development. New product developments representing World firsts in their particular markets include:
High Intensity, Daylight Projectors, for Hasselblad, Kodak and Teatro projectors.
Integrated touch free water heating and sterilising Washstand (Wellcome Trust)
Lighting and Exhibit design for 'Science for Life' A permanent exhibition at the Wellcome Trust headquarters in London.
James Turrell, projector and light installations in some 30 galleries and museums worldwide.
The Seawater Greenhouse.
Charlie's broad understanding of a range of technologies and the intricate mechanism of photosynthesis lead to the concept for the Seawater Greenhouse. He initiated the project and has been actively engaged in it's development. He gained European Commission support for the first R&D and demonstration pilot in Tenerife.
He has designed and supervised the construction of two further Seawater Greenhouses in Abu Dhabi and Oman which are currently undergoing crop trials.
Outside interests include; music, travel, and forestry. He owns and manages a 12 hectare 'Site of Special Scientific Interest' forest of ancient woodland in Sussex.

Abstract

The Sahara Forest Project – a new source of fresh water, food and energy

A proposal for ameliorating the effects and causes of climate change.
The Sahara Forest Project aims to provide a new source of fresh water, food and renewable energy in hot, arid regions, as well as providing conditions that enable re-vegetating areas of desert. The Sahara is used here as a metaphor for any desert that formerly supported vegetation and could do so again, given sufficient water.
The lack of fresh water is the root cause of much suffering and poverty. Present methods of supply in arid regions include; over-abstraction from ground reserves, diverting water from other regions and energy-intensive desalination. None of these are sustainable in the long term and inequitable distribution leads to conflict. Climate change is tending to make dry areas drier and wet areas wetter. Since the 1980's, rainfall has increased in several regions, while drying has been observed in the Sahel, the Mediterranean, southern Africa, Australia and parts of Asia.
The growth in demand for water and increasing shortages are two of the most predictable scenarios of the 21st century. Agriculture is a major pressure point. A shortage of water will also affect the carbon cycle as shrinking forests reduce the rate of carbon capture, and the regulating influence that trees and vegetation have on our climate will be disrupted, exacerbating the situation further. Fortunately, the world is not short of water, it is just in the wrong place and too salty. Converting seawater to fresh water in the right places offers the potential to solve all these problems.

This ambitious proposal combines two established technologies – the Seawater Greenhouse and Concentrated Solar Power – to achieve highly efficient synergies. Both processes work optimally in sunny, arid conditions. Seawater Greenhouses have been built in some of the hottest regions on earth, Abu Dhabi and Oman for example, where they create freshwater from seawater, while providing cooler and more humid growing conditions, enabling the cultivation of crops all year round.
Concentrated solar power is increasingly seen as one of the most promising forms of renewable energy, producing electricity from sunlight at a fraction of the cost of photovoltaics. The process uses mirrors to concentrate sunlight to create heat which is used to drive conventional steam turbines to generate electricity.

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Abstract

Less than 1% of the world's deserts, if covered with concentrating solar power plants, could produce as much electricity as the world now uses. By combining these technologies there is huge commercial potential to restore forests and create a sustainable source of fresh water, food and energy.

The scheme is proposed at a significant scale such that very large quantities of seawater are evaporated. Given that what goes up must come down, every drop of water evaporated will contribute to rainfall - somewhere.
A 10,000 hectare area of Seawater Greenhouses will evaporate a million tonnes of seawater a day. If the scheme were located upwind of higher terrain then the air carrying this 'lost' humidity would be forced to rise and cool, contributing additional water to the mist or cloud.
By using a location that lies below sea level, seawater pumping costs may be eliminated. There are a number of large inland depressions in Egypt, Libya, Tunisia and Eritrea for example. In each case, the prevailing wind direction is from the sea to the mountain areas inland.
Currently there are some 200,000 hectares of conventional greenhouses in Mediterranean region and this area has been growing at around 10% a year. Most of these, if not all, face water quality and availability issues and indeed many contribute to the depletion of ground water. By using greenhouses to create fresh water from seawater, the problem is reversed.

David Tilman

Department of Ecology, Evolution and Behavior, University of Minnesota, USA

David Tilman's research focuses on the causes, consequences and conservation of earth's biodiversity, and on how managed and natural ecosystems can sustainably meet human needs for food, energy and ecosystem services. David Tilman is Regents' Professor and McKnight Presidential Chair in Ecology at the University of Minnesota, and is Director of the University's Cedar Creek Ecosystem Science Reserve. He is an elected member of the American Academy of Arts and Sciences and the National Academy of Sciences, was the Founding Editor of the journal Ecological Issues and has served on editorial boards of nine scholarly journals, including Science. He serves on the Advisory Board for the Max Plank Institute for Biogeochemistry in Jena, Germany. He has been a Member of the Institute for Advanced Study in Princeton and a Fellow of the National Center for Ecological Analysis and Synthesis.

He has received the Ecological Society of America's Cooper Award and its MacArthur Award, the Botanical Society of America's Centennial Award, the Princeton Environmental Prize and was named a J. S. Guggenheim Fellow. He has written two books, edited three books, and published more than 200 papers in the peer-reviewed literature, including more than 30 papers in Science, Nature and the Proceedings of the National Academy of Sciences USA. The Institute for Scientific Information designated him as the world's most highly cited environmental scientist of the decade for 1990-2000 and for 1996-2006.

His multifaceted interests in biodiversity have given his research a broad focus, including

(1) The forces that have allowed numerous competing species to evolve, coexist and persist in natural and managed ecosystems,

(2) The ways that human actions threaten this biodiversity,

(3) The impacts of the loss of biodiversity on ecosystem functioning and on ecosystem services of benefit to society, and

(4) The benefits that the preservation and restoration of biodiversity can provide.

His current research explores ways to use biodiversity as a tool for biofuel production and climate stabilization through carbon sequestration. His work on biodiversity and stability of grassland ecosystems (published in Nature in 1994) challenged the established paradigm and led the discipline to re-examine how diversity affects the productivity, stability and nutrient efficiency of ecosystems. His biodiversity field experiments and related mathematical theory, reported in a series of papers in Science, Nature and other journals, are providing a more rigorous foundation for managing ecosystems to maximize the ecosystem services that can provide to society.

His work on sustainable agriculture and renewable energy has critically examined the full environmental, energetic and economic costs and benefits of grain crops, of current food-based biofuels and of biofuels made from diverse mixtures of prairie grasses and other native plants growing on already-degraded lands. He showed that restored native high-diversity grasslands could provide more energy per hectare than corn grain ethanol or soybean biodiesel, be far better for the environment through carbon sequestration, and prevent competition between food crops and biofuel crops for fertile land. Recent work has shown that biofuel production based on clearing and/or converting old growth forests could become a major global threat to biodiversity, have greater greenhouse gas impact than gasoline, and compromise global food supplies.

David Tilman has also dedicated much of his career to communicating with the public, politicians and the managers of earth's ecosystems so that they might be better informed about environmental science and its relevance to society and to sustaining, for the long-term, the quality of human life on earth.

Abstract

Agricultural Expansion and Environmental Sustainability

Sustainable supplies of food and energy, and a livable, sustainable environment, are essential requisites and rights of humanity. However, unless food and energy production and use patterns undergo dramatic transformations, these three human needs will come into increasingly strong conflict during the next 50 years. Global population and per capita income are on trajectories to increase by 50% and 40%, respectively, within the next 50 years, causing global demand for both food and energy to more than double.

More than 5 billion hectares of land are currently dedicated to crops and pastures. The composition of diets is shifting with increasing incomes in ways that may require more fertile land per capita. Crop yield gains continue to depend on greater inputs of fertilizers and other agrichemicals. Fertile lands are also increasingly used to produce biofuels. If these trends and relationships continue, at least 1 billion hectares, and perhaps as much as 2 billion hectares, of natural ecosystems may be converted to croplands producing food and biofuels. Such land conversion would accelerate climate change through the release of globally significant amounts of greenhouse gasses, and greatly increase the number of species, especially those of tropical ecosystems, that are threatened with extinction.

The increased use of fertilizers and pesticides would degrade freshwater ecosystems, aquifers, and coastal marine ecosystems, increasing the size and number of marine 'dead zones.'

Solutions to these problems must address various aspects of the food-energyenvironment dilemma. If diets shift to favor efficiently-produced protein, global food demand could be moderated over the next 50 years, while still providing nutritionally-sound diets.

Long-term investment in increasing the yields and fertilizer-efficiency of fruit, vegetable and cereal crops could greatly decrease the amount of land converted to agriculture and reduce the impacts of crop production on aquatic resources. Investments made towards increasing the protein efficiency of grain-fed livestock and fish aquaculture would provide similar benefits.

Biofuel production should focus on wastes and perennial, multispecies biomass crops grown on degraded lands of low agricultural utility, and not convert foodstuffs into fuels. Food, energy and environment are now inextricably linked, and global lands must be managed to optimize the total net food, energy and environmental benefits that these systems provide to society.

Paolo Costantino

Department of Genetics and Molecular Biology, University of Roma La Sapienza, Italy

Paolo Costantino is professor of molecular biology at the University La Sapienza in Rome. He is a member of EMBO (European Molecular Biology Organization) and a member of the Accademia Nazionale dei Lincei. He has been granted the Damon Runyon Cancer Research Foundation Award and the Gold Medal for Natural Sciences of the Italian National Academy of Sciences.

After a degree in chemistry at La Sapienza, where he worked on the structure of complexes between DNA and antibiotics, in 1972 he moved to the California Institute of Technology (USA) working on mitochondrial protein synthesis in mammalian cells. Back in Italy in 1975, he was at Eniricerche working on nucleohistone models; since 1979 he coordinates a research group at La Sapienza working initially on Agrobacterium and subsequently on the genetics and molecular biology of several aspects of plant development.

He has been founder and chairman of CNBMP (National University Consortium for Plant Molecular Biology); Head of the Department of Genetics and Molecular Biology of La Sapienza; Member of the Board of EPSO (European Plant Science Organization); Scientific Representative of Italy in ERA-Net Plant Genomics.

Currently, he is Member of the Board of the Institut Pasteur in Rome; Member of the Board and of the Scientific Committee of CNBMP; Member of the Scientific Committee of INRAN (Italian Food and Nutrition Research Insitute); Coordinator of IPGN (Italian Plant Genomics Network); Member of the Steering Committee of the Italian Technology Platform (ITP) "Plants for the Future"; Representative of the Ministry of Research in the ITP "Food for Life"; Italian Delegate in the Programme Committee of Theme 2, Food Agricuture and Biotechnology in the EU Framework Programme 7.

Massimiano Bucchi

Department of Sociology of Science, University of Trento, Italy

Massimiano Bucchi (Ph.D. Social and Political Science, European University Institute, 1997) is Professor of Science in Society at the University of Trento, Italy. He has published seven books, including Science and the media (London and New York, Routledge, 1998), Science in society. An Introduction to Social Studies of Science (London and New York, Routledge, 2004), Handbook of Public Communication of Science and Technology (with B. Trench, 2008) and several essays in international journals such as History and Philosophy of the Life Sciences, Nature, New Genetics and Society, Science and Public Understanding of Science. He chairs the scientific committee of non profit center Observa Science in Society and is a member of the International Scientific Committee for Public Communication of Science and Technology (PCST); he has also served as advisor and evaluator for several research and policy bodies, including the US National Science Foundation, the Royal Society and the European Commission.

He has carried out research and given seminars at several international institutions, such as the Royal Society, University of Basel, ETH Zurich, London School of Economics, University of California Berkeley, Royal Academy of Sciences Sweden, University of Tokyo, American Association for the Advancement of Science and received several recognitions for his work, including the Mullins Prize awarded by the Society for Social Studies of Science (1997) and the Merck-Serono jury award for science books (2007).

Timothy Hall

Biotechnologies, Agriculture and Food Directorate, European Commission, Belgium.

T.J. Hall worked as a research scientist in the UK before joining the Commission services in 1983, becoming Head of Unit for S&T Cooperation with Developing Countries in 1994. He has also headed units in the Quality of Life Directorate under FP5 and in the Health Directorate under FP6.

His current position (since October 2006) is Head of Unit for Agriculture, Forestry, Fisheries and Aquaculture with primary responsibilities for overseeing the management of projects in these areas supported under FP6, and implementing the Activity "Sustainable production and management of biological resources from land, forest and aquatic environments" in the FP7 Theme "Food, Agriculture and Fisheries, and Biotechnology".

Since 1 September 2007, he also holds the position of Acting Director for Biotechnologies, Agriculture and Food.

Karin Metzlaff

European Plant Science Organisation, Belgium

Karin Metzlaff is executive director of the European Plant Science Organisation since its creation in 2000.

She works with the EPSO members and other partners to promote plant research in the European science policy agenda by providing advice and recommendations to politicians at European and national level. In addition she organizes conferences and workshops to bring together top scientists discussing cutting edge science and ideas for future research. Karin is a member of ELSF (European Life Sciences Forum) and ISE (Initiative for Science in Europe).

She is member of the Steering Council and the Executive Committee of the European Technology Platform "Plants for the Future", which she coordinated from 2004 to 2008. She works together with her colleagues from industry, such as individual companies and ESA (the European Seed Association) and from the farming community (CopaCogeca, the European farmer organizations) who jointly published a vision and a strategic research agenda for the plant sector in Europe in the coming 20 years. Karin is now coordinating a joint initiative of nine technology platforms in the Knowledge-Based Bio-Economy (KBBE) area to foster collaborations of all stakeholders across the food and feed and the non-food chains.

Karin has post-doctoral research experience at the John Innes Centre Norwich (on developmental biology and photorespiration), the Federal Health Office in Germany (on molecular biology of animal pathogen bacteria), the Martin-Luther University Halle (on molecular biology and plant species on natural and contaminated biotopes). She obtained her PhD and diploma at the Martin-Luther University Halle (plant genetics and molecular biology) and studied biochemistry there.

Pere Puigdomènech

Centre for Research in Agricultural Genomics. Barcelona. Spain

Professor of Research and Director. Centre for Research in Agricultural Genomics (CSIC-IRTA-UAB). Barcelona. Spain.

Degree in Physics. University of Barcelona. Ph.D. in Physical Chemistry, University of Montpellier, France and in Biology, Autonomous University of Barcelona

Past positions at CNRS, Montpellier, France. Biophysics Unit. Portsmouth Polytechnic, UK. Max-Planck-Institut für Molekulare Genetik, Berlin and Associate Professor at Biochemistry Department, Univ. Autónoma de Barcelona

Member of Academia Europaea, EMBO, Institut d'Estudis Catalans, Reial Acadèmica de Ciències i Arts de Barcelona and Académie d'Agriculture de France.

Member of the European Group on Ethics of Sciences and New Technologies of the European Commission, 2001-2009. Chairman of the Bioethics Committee, CSIC. 2006-

Member of the Spanish Committees on Biosafety and Biovigilance.

His main research activity is on the field of Plant Molecular Biology were he carries research on molecular mechanisms involved in plant development and on plant genomics. He has published more that 180 articles in refereed journals and 250 articles on science vulgarisation in newspapers and magazines. He has participated in research projects funded by public Spanish (since 1981) and European (since 1986) funds including INCO projects.

Ending Hunger and Malnutrition.

Food is a universal right. How can we deal with exponentially growing demands for food and animal feed? How can we produce more food on less arable land, under more challenging environmental conditions? In this session strategies will be discussed to produce healthy, safe and sufficient food, to improve plant productivity and quality, and to reduce the environmental impact of agriculture.

h. 9.00 a.m. - 1.00 p.m.

Chairs: **Chris Bowler**, **Giorgio Poli**

John Krebs
Safe and Healthy Food: Whose Responsibility?

Dirk Inzé
Boosting Sustainable Crop Productivity

Jonathan Jones
Prospects for Reducing Crop Losses to Plant Disease

Daniel Pauly
Fisheries and Global Changes Impacts on Marine Ecosystems and Global Food Security

Tilahun Yilma
Biotechnology to Support Food Sustainability in the Developing Countries

Villoo Morawala-Patell
From the Wisdom of Ancient India to the Global Food and Healthcare Markets. Can India make it?

h. 2.00 p.m. - 6.00 p.m.

Chairs: **Romano Marabelli**, **Giorgio Morelli**

Chunming Chen
Overview on Nutrition in China, Past and Present

Ingo Potrykus
Biofortification, a Cost-Effective Intervention for Micro-Nutrient Deficiency

Cathie Martin
Tackling Chronic Diseases: the Potential of Preventive Medicine through Improvements to Diet

Bruce German
The Future of Foods in a World of Personalized Health

Barbara Corkey
Obesity and Diabetes: Excess Food or Toxic Environment

Pier Giuseppe Pelicci
Italian Association for Cancer Research Lecture
Food, Life Span regulation and Cancer

Chris Bowler

Department of Biology, Ecole Normale Superieure, France

Chris Bowler is Director of plant biology at the Ecole Normale Supérieure in Paris. He was born in 1965 in the UK. Following a first degree in microbiology at the University of Warwick, UK, he performed PhD studies at the University of Ghent in Belgium followed by postdoctoral studies at The Rockefeller University in New York, USA. In 1994 he established his own research group working on higher plants and marine diatoms at the Stazione Zoologica in Naples Italy and in 2002 he took up his current position in Paris.

He has published more than 60 peer-reviewed scientific articles in international journals. His major interest is in understanding the response of plants and marine diatoms to environmental signals. In plants, he identified the first high pigment gene, mutation of which causes light hypersensitivity and increased fruit phytonutrient content.

The gene encodes the photomorphogenesis regulator DET1, which he found to be involved in regulating chromatin architecture around light-regulated genes. In marine diatoms he established molecular tools to assess gene function and has played a major role in coordinating the whole genome sequencing of several species. Using functional genomics he has revealed the cellular response of diatoms to nutrients such as iron and nitrogen, to different light wavelengths, and to allelopathic infochemicals. He is member of the European Molecular Biology Organization (EMBO) and associate editor of several major scientific journals.

Giorgio Poli

Department of Animal Pathology, Hygene and Public Veterinary Health, University of Milan, Italy

Professor Giorgio Poli, born in Grandate (Como), Italy, 19/7/1944, having obtained a diploma in scientific maturity, enrolled in the Faculty of Veterinary Medicine, University of Milan, in the academic year 1963/64. He has obtained the Degree in Veterinary Medicine, grade 110/110 with honours, in the summer session of the academic year 1966/67.

ACADEMIC CAREER: Dean of the Faculty of Veterinary Medicine at the University of Milan a.y. 2001/2207. Co-ordinator of the Section of Veterinary Microbiology and Immunology, Department of Animal Pathology, Hygiene and Veterinary Public Health, Faculty of Veterinary Medicine, University of Milan. Full Professor of Veterinary Microbiology and Immunology, Faculty of Veterinary Medicine, University of Milan. Teacher for the Residency Programs in "Meat Technology and Hygiene" and "Public Veterinary Health". PhD program Co-ordinator for "Biotechnology applied to zootechnical and veterinary sciences". Representative of the Faculty of Veterinary Medicine in the University Commission to co-ordinate and encourage international scientific and cultural exchange. National and international research and organizational activities. From 1969 to present Prof. Giorgio Poli has carried out his research at the Institute (now Section) of Veterinary Microbiology and Immunology, University of Milan, and within other International Universities and Research centres. This research is documented in over 230 publications consisting of experimental articles, reviews and monographs published in national and international journals or presented at seminars and meetings on subjects related to bacteriology, virology, immunology, infectious diseases, molecular biology and biotechnology applied to veterinary and zootechnical sciences. He has carried out many stages on research and study program organisation in prestigious international research centres, such as:

• Central Veterinary Laboratory, Virology Department, Weybridge (UK) • Department of Bacteriology, University of California, Davis (USA) • International Laboratory for Molecular Biology, University of California, Davis (USA) • Joint FAO/IAEA Division for Food and Agricultural Development: Mission in Africa (Sudan, Ethiopia, Tanzania, Zambia and Kenya) to develop an aid program to improve the control of infectious veterinary diseases by improving diagnostic laboratories • ILRAD (International Laboratory for Research on Animal Diseases), Nairobi, Kenya: Research Co-ordinator in the Italy/ILRAD of Nairobi (Kenya) program, as well as Observer on behalf of Italian Government at the "Board of Directors" of ILRAD for the application of immunological and immunogenetical studies to improve the bovine breeding (selection of trypanosome tolerant breeds) • Italy/Brazil cooperation: Coordinator of the Italy/Brazil cooperation for the transfer of technologies on "Immunology and immunogentics applied to improvement of bovine species" finantially supported by Inter-ministery funds.

John Krebs
Former Food Standards Agency; Jesus College, Oxford, UK

Lord Krebs is currently Principal of Jesus College Oxford. He is a zoologist by training, receiving his MA and DPhil from Oxford University. He has taught at the Universities of British Columbia, North Wales and Oxford. Has received many awards and honours for his scientific research in the field of behavioural ecology, including 14 Honorary Degrees and Fellowships of the Royal Society, the US National Academy of Sciences, the American Philosophical Society and the American Academy of Arts and Sciences. Between 1994 he was Chief Executive of the UK Natural Environment Research Council, and from 2000-2005 he was the first Chairman of the UK Food Standards Agency. He is an independent cross-bench member of the House of Lords.

Abstract

Safe and Healthy Food: whose responsibility?

Our food lives are full of contradiction.
First, think of food safety. One the on hand, the food we eat in the developed world is probably safer and more carefully regulated than ever before, yet people still worry about food safety. These worries, whether about BSE, GM crops, pesticide residues or additives, may lead consumers to spend unnecessary extra money, for instance in buying organic food, in the hope of avoiding the risks. Consumers in the developed world who worry about food safety are partly enjoying the luxury of fear of small risks because they have more than enough to eat, but also their worries are exacerbated by reporting by the press and by suspicion of the responsible authorities and their scientific experts.
Second, think of nutrition and health. For up to a billion people in the world, the problem of nutrition and health is not getting enough to eat or enough of the essential nutrients. For many in the developed world, the problem is eating too much, contributing to the "epidemic of obesity", or eating the wrong balance of foods, resulting in a dietary contribution to chronic disease that is estimated to account for as much as one third of the risk of cardiovascular disease and cancer. At the same time, looking to the future, there is increasing recognition that the times of plentiful, cheap food in the developed world may be over, with rapidly rising prices for basic food materials.
Third, consider the question of sustainability of food production. It is generally accepted that the industrialisation of agriculture, whilst is has brought cheap and abundant food to many, has done so at a cost to the environment, in terms of water use, soil degradation, carbon footprint, or loss of biodiversity. This is not sustainable. On the one hand, some consumers in the developed world are beginning to respond to these concerns by purchasing food that they perceive to be produced in ways less damaging to the environment (ethical shopping), on the other, the overall patterns of food consumption are heading in a less sustainable direction. Developing countries tend to increase their consumption of resource intensive foods such as beef, whilst consumers in the developed world largely shop for convenience and price: ethical shopping is still a niche market.

Whose responsibility is it to tackle these three problems: safety, diet and health, and sustainability? Where does the balance lie between state intervention and individual choice?

Dirk Inzè
Department of Plant Systems Biology, Ghent University, Belgium

Dirk Inzé is Professor at the Ghent University and Scientific Director of the VIB Department of Plant Systems Biology (Ghent, Belgium).

Dirk Inzé graduated in 1979 in Zoology at the Ghent University and in 1984 he received his Ph.D. in Zoology from the same university with a thesis on the mechanisms by which Agrobacterium tumefaciens causes the proliferation of plant cells. In 1990, he was appointed Research Director of the French National Institute for Agricultural Research (INRA) at the Ghent Joint Laboratory, where he initiated extensive research programs on the cell cycle and cell death in plants. In 1995, he became Professor at the Ghent University. In 1998, he founded the biotechnology company CropDesign, currently one of the most active players in high throughput analysis of yield related genes in cereals. In 2006 CropDesign was acquired by BASF. In 2006, Dirk Inzé founded Solucel, a biotech company dealing with the production of pharmaceuticals in plants. In 1999, he was appointed Deputy Scientific Director of the Department of Plant Systems Biology of the VIB and he became Director of the Department in July 2002.

In 1994, Professor Inzé was laureate of the Körber Stiftung Prize and in 2003 he became EMBO member. In 2005 he was laureate of the Francqui Prize and became elected member of the Royal Flemish Academy of Belgium for Science and the Arts. He has served on numerous scientific committees and science advisory boards. Currently he is the vice chairman of the European Plant Science Organisation (EPSO).

Prof. Inzé's research focuses on the understanding of the basic cell cycle machinery in plants and on the mechanism of orchestrating plant growth. Prof. Inzé is member of the editorial or advisory boards of Journal of Experimental Botany, Plant Physiology, The Plant Journal, Plant Cell Physiology and EMBO Journal. According to a recent ISI survey, he is one of the most cited and influential researchers in his field.

Abstract

Boosting sustainable crop productivity

The global demand for plant-derived products such as feed and food is increasing dramatically, as illustrated by the recent doubling of the price of most commodity crops. Unfortunally, the poorest people on earth will be the first victims of this food shortage and, recently, the United Nations has estimated that currently 37 countries struggle with a food crisis. Why do food prices rise so quickly? The first obvious factor is the still exponentionally growing world population. It is hard to fathom, but in the coming decades three billion additional people will have to be fed while less arable land is utilized. Furthermore, the standard of living is anticipated to continue to go up in many developing countries where consumption of animal products is burgeoning, in turn necessitating a larger input of plant-derived feed because, on average, the production of one kilogram of meat requires 4 to 8 kilograms of cereals. The high energy prices also make food production more expensive. Last but not least, plants also start to play a major role in supplying the ever-increasing energy needs. Indeed, the next generation of bio-energy crops might provide a sustainable, CO2-neutral solution. Needless to say that efficient utilization of bio-energy crops has to be fully compatible and non-competitive with agriculture for food and feed production and has to preserve the earth's most precious ecosystems.
How can we deal with these exponentially growing demands for food, feed and bio-energy? How can we cope with the fact that we will have to produce more food on less arable land, under environmentally more challenging conditions?

There is an obvious and urgent need to further increase crop productivity. Whereas in the sixties the so-called 'green revolution', based on the use of new crop varieties and the efficient application of agrochemicals, immensely contributed to increased plant productivity, biotechnological innovations are expected to enhance the ability of plants to capture light energy and to convert it into useful products for mankind. One major area for biotechnological improvement is boosting up intrinsic crop yield in a sustainable manner with a minimum input of water, fertilizers, and agrochemicals.

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Abstract

As yield is the most important trait for breeding, a considerable amount of (eco)physiological research has been conducted on yield performance of crops. In contrast, surprisingly little is known about the molecular networks underpinning crop yield, partly because of its multifactorial nature in which many physiological processes, such as photosynthesis, water and mineral uptake, mobilization of starch and lipid reserves, and stress tolerance determine the resources available to new cells, tissues, and organs of the most vital crops.

However, by using model plants, such as Arabidopsis thaliana (thalecress) and Oryza sativa (rice), scientists world-wide start to unravel the mechanisms that control plant growth and productivity under both optimal and environmentally less favorable conditions, such as drought. Plant growth and stress tolerance are complex processes, but novel approaches collectively called "systems biology" allow us to better understand this complexity. I will discuss how this rapidly growing know-how is now being applied for crop enhancement by scientists from the academic and industrial world. Already now, many key genes affecting crop yield and stress tolerance have been identified and spectacular increases in plant productivity have been obtained by using genetic engineering. In view of what is ahead, it is of utmost importance that the world adopts this technology and that these improved plant varieties are delivered to the poorest on earth.

Jonathan Jones
Sainsbury Laboratory, UK

JJ gained his PhD in Cambridge at the Plant Breeding Institute in 1980, and then spent 2 years as a post-doctoral fellow at Harvard with Fred Ausubel working on symbiotic nitrogen fixation. From 1983-1988 JJ worked as a Research Scientist with AGS, an agbiotech start-up company in Oakland, California, before moving to the UK where he was one of the first recruits at the Sainsbury Laboratory in 1988. He was among the first to clone and study plant disease resistance genes. He is currently Head of the Sainsbury Laboratory.

JJ was elected a Professor at the University of East Anglia in 1997, a member of EMBO in 1998, and was elected Fellow of the Royal Society in 2003. He is a highly cited plant researcher [http://in-cites.com/top/2007/first07-pla.html]. He is a cofounder of Mendel Biotechnology (www.mendelbio.com) and (with Cathie Martin) of Norfolk Plant Sciences, established to combine improved crop disease resistance with consumer benefits.

Abstract

Prospects for reducing crop losses to plant disease

Plant disease results in reduced crop yield. Crop plants can be attacked at any phase of their life cycle; during seedling establishment, plant maturation, or grain or fruit setting. Pathogens and pests include nematodes, insects, fungi, bacteria, oomycetes and even parasitic plants. A multibillion dollar crop protection industry provides chemicals that reduce losses, but these chemicals (i) add to farmer costs (ii) require tractor trips that emit CO2 and cost fuel (iii) create a selection pressure that results in emergence of pathogen races that are resistant to the chemical.

Control of pathogens by resistance (R) genes in the crop plant is preferable to chemical control. I will discuss important crop diseases and how they may be more effectively controlled by R genes. It is clear that plant breeding has been effective in some crops for improving resistance, but it is also clear that GM methods, in combination with modern genomics methods, could greatly improve and accelerate the identification, recruitment and deployment of R genes to reduce crop losses. In particular, GM methods could accelerate the use of R genes from wild relatives of crop plants that are sexually incompatible with the crop, dramatically expanding the repertoire of R genes at our disposal.

World food production needs to increase. We no longer have the luxury of spurning GM methods because of purely hypothetical hazards. The Sainsbury Lab is committing its own resources to new methods that will accelerate isolation of R genes that can act against important crop diseases. However, this commitment may be in vain if the regulatory burdens for deploying GM crops are not reduced.

Daniel Pauly
Fisheries Centre, University of British Columbia, Canada

After many years studying tropical fisheries, especially in Southeast Asia, Dr Pauly joined UBC's Fisheries Centre in 1994, becoming its Director in 2003. Dr. Pauly authored over 500 scientific articles, book chapters and other items, including 30 books and reports.
These documents, mainly dedicated to the management of fisheries and to ecosystem modeling, present concepts, methods and software which are in use throughout the world, and which have resulted in numerous awards.
This applies notably to the Ecopath modeling approach (see www.ecopath.org), FishBase, the online encyclopedia of fishes (see www.fishbase.org), and the global mapping of fisheries trends (see www.seaaroundus.org).

Abstract

Fisheries and global changes impacts on marine ecosystems and global food security

Individual fisheries are generally perceived as one fleet exploiting one or several target species, in a specific area. The vision of fisheries that will be presented here, however, is that of a global, integrated system spanning the global oceans. Consumers in the European Union, the United States, Japan and increasingly China, have been to date largely unaffected by the local depletions these fleets induce, as they are buffered by seafood imports from the developing world. Global fisheries, fed by onerous subsidies, have an enormous impact on marine ecosystems, which they degrade, and on their target species, whose abundance is generally reduced by a factor of ten or more a few decades after a fishery opens.

This form of interaction with marine organisms, intensified by the effects of global warming, will lead in the next decades to a succession of local extirpation, followed by global extinctions, which will affect people in both developed and developing countries. Confronting this will require a new mode of thinking on how humans and marine wildlife can co-exist on Earth.

Tilahun Yilma
International Laboratory of Molecular Biology for Tropical Disease Agents,
University of California, Davis, USA

Tilahun Yilma, a veterinary virologist who has developed a number of genetically engineered vaccines for both human and livestock, especially that of rinderpest, a deadly disease of cattle. Yilma's research efforts have advanced our knowledge of vaccine biology, created new vaccines, and saved and empowered lives in developing regions of the world, particularly in Africa.
Dr. Yilma has received numerous awards and recognition and a few are highlighted here. He is a member of the US National Academy of Sciences and a Fellow of the American Academy of Microbiology. In addition, he has received the Ciba Geigy Award for Research in Animal Science (Highest International Award in Animal Science), the University of California (Davis) 2001-2002 Faculty Research Award (UC Highest Research Award), the University of California (Davis) Distinguished Public Service Award (UC Highest Service Award), and the University of California, School of Veterinary Medicine, Class of 2004 Outstanding Teaching Award.
Yilma's dedication to developing a rinderpest vaccine was matched by a passion to encourage young scientists in developing nations. For years he had watched the best and brightest young minds from struggling nations come to the United States for advanced education, only to find upon graduation that their home nations lacked the sophisticated laboratories necessary to carry out the research they had been trained for. Undaunted, Yilma worked to secure funding for new biotechnology laboratories in developing countries. As a result of his efforts, the U.S. Agency for International Development in 1990, with the help of the Egyptian government, constructed near Cairo the Laboratory of Molecular Biology for Tropical Diseases, an offspring of Yilma's own laboratory at UC Davis School of Veterinary Medicine.
Yilma has earned three degrees from UC Davis: a bachelor's degree in veterinary science in 1968, a Doctor of Veterinary Medicine degree in 1970 and a doctoral degree in microbiology in 1977. He served from 1980 to 1986 as a faculty member in the department of veterinary microbiology and pathology at Washington State University and from 1977 to 1979 as a research associate at the U.S. Department of Agriculture's Plum Island Animal Disease Center in New York. He joined the UC Davis faculty in September 1986.

Abstract

Biotechnology to support food sustainability in the developing Countries

Development will bring food security only if it is people-centered, if it is environmentally sound, if it is participatory, and if it builds local and national capacity for self-reliance. These are the basic characteristics of sustainable human development. James Gustave Speth (UNDP, 1994).

The mission of the International Laboratory of Molecular Biology (ILMB) is to conduct and coordinate a research program that brings together experts in molecular biology, in order to facilitate work on the pathogenic mechanisms of human and animal tropical diseases (AIDS, Rift Valley fever, rinderpest, foot-and-mouth disease, etc.). In addition to the study of the molecular biology of disease agents, the ILMB has specific goals of developing vaccines and rapid diagnostic kits to aid in tropical disease control and to transfer these technologies to developing countries. One of the successful examples of the accomplishments of the ILMB is the development of a highly safe and efficacious vaccine and a rapid diagnostic kit for rinderpest, an acute and highly contagious viral disease of ruminants, often resulting in greater than 90% mortality.
The first large-scale rinderpest eradication program in Africa (JP/15), in which more than 124 million cattle were vaccinated with the Plowright tissue culture vaccine (PTCV), failed in its mission primarily because the program did not transfer sustainable technology in disease control to affected countries in Africa and Asia.

The ILMB has addressed this issue by incorporating a strong technology transfer component within our program for development of vaccines and diagnostic kits for diseases of humans and livestock. A major goal of our projects is the training of scientists from developing countries in virology and molecular biology to assist and strengthen regional laboratories. Already, a number of scientists have been successfully trained and have published their work in first-rate international journals (Science, Nature Biotechnology, PNAS, Journal of Virology, Virology, etc.).

>>

Abstract

The recombinant seed stocks for vaccines and diagnostic reagents have already been provided to a number of laboratories in Africa, to bolster their capacity for local production.
In an unprecedented cooperative effort, a workshop conducted by the Institut Sénégalais de Recherche Agricole (ISRA) and led by ILMB-trained African scientists in Dakar, Senegal, November 19-30, 2001 successfully transferred ELISA kit technology for the diagnosis of rinderpest to participants from more than 30 African countries.
The ILMB is pleased to have helped initiate a new program: ASharing Sustainable Technologies Among Developing Nations,@ and stands ready to expand technology transfer throughout Africa and Asia. Empowering nations to develop, produce, and distribute effective vaccines and diagnostic kits will enable a truly global effort to control and even eradicate major diseases of humans and livestock.

Villoo Morawala Patell

Avesthagen, India

Educational Qualifications:
B.Sc. Osmania University, Hyderbad
M.Sc. Bombay University, Mumbai
Ph.D. University Louis Pasteur, Strasbourg, France
Post Doc. University of Gent, Belgium

Dr. Villoo Morawala-Patell is Founder, Chairperson and Managing Director of AVESTHAGEN LIMITED. AVESTHAGEN is globally recognized as a leading systems biology company with a unique model focused on the convergence of food, pharma and population genetics. A convergence that leads to continuous and path-breaking innovations in predictive, preventive, personalised healthcare.

Dr. Patell started her professional career at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) at Hyderabad in 1978. She worked on projects on the biochemistry of nitrogen fixation in legumes, standardizing a screening technique for drought tolerance, and on Heat Shock Proteins in Millet and Sorghum, amongst other projects.

Dr. Patell's Ph.D. studies in plant molecular biology at University Louis Pasteur, Strasbourg, France, on Fundamental aspects of the plant mitochondrial genome, coming face to face with the role of each nucleotide and its importance in cis-, trans-, splicing and RNA editing, ignited a passion to learn and manage this information and develop new products. The Ph.D. was followed by 9 months as a post-doc at the Ghent University, Belgium, working with scientists from all around the world that really sparked off her entrepreneurial spirit. She then returned to India with an idea rooted in her mind – to create a platform that would bridge Academia and Industry. Thus was the seed sown that would give birth, a few years later, to Avesthagen.

On return to India, she established herself as an independent scientist and principal investigator working from the National Center for Biological Sciences (NCBS) with funding from the Rockefeller Foundation and subsequently at the University of Agricultural Sciences (UAS) in Bangalore with a grant from IFCPAR, the Indo-French Centre for the Promotion of Advanced Research.

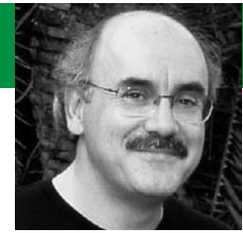
Dr. Villoo Morawala-Patell experimented with different models on how best to create a sustainable innovation platform for the nation. In 1998, she registered Avesthagen as a public-private model as perhaps the best way to build an innovation model. The public–private model found few takers from Academia, Industry, and Financial Institutions. The need for speed in gearing up for the 2005 opening up of India to WTO was the trigger to go solo and to create a full private entity, Avestha Gengraine Technologies Pvt. Ltd in early 2000. A year later, ICICI Ventures, Global Trust Bank and Tata Industries invested 8 crores in the company, which was now settled in its new laboratories in the International Technology Park at Whitefield. This was only the beginning. Since then Villoo has worked ceaselessly to build the company and raised significant international funding, attracting foreign investors and partners who saw a potential in the young Indian biotech sector and particularly in this fast growing company with its promise of innovation in predictive, preventive, personalized healthcare and Environment-Adjusted crops and Nutritionally enhanced seeds for agriculture. Avesthagen now has 650+ employees, foreign investment stands at 31% today. Investors recognized that Avesthagen was unique. Most Indian biotech companies survive by doing reverse engineering or contract work. Dr. Patell set out to give Avesthagen a strong focus in innovative R&D in diverse areas such as bioPharmaceuticals, bioNutrition and bioAgriculture. Today, the company has a portfolio of 350 patents filed, continues to build and intensify its intellectual property through product commercialization. Dr. Patell has built a "business of Science" and developed a new model of "Science of Business" to deliver ideas to products. Collaborating with several giants of global industry has also been one of Dr. Patell's far-sighted endeavours. Avesthagen has fruitful partnerships for co-development and research, with Cipla for bioPharma development and manufacture, a tie-up with France's Groupe Limagrain (the largest seed company in Europe) to create new varieties of seeds. with bioMerieux for diagnostics and alliances with Groupe Danone, and Nestle Nutrition and Godrej Industries. Dr. Patell is a much sought after speaker at national and international events and conferences, and has given presentations at The Harvard University, at Stanford University and the Kellogg Business School.

Dr. Villoo Morawala-Patell was born on 18 June, 1955 in Navsari, Gujarat and grew up with her parents Dara Dinshaw Morawala and Daulat Sorabji Kasad, brother Mahiyar, and sister, Bakhtawar in Nizamabad, Telangana District. She went to Boarding School at Age 6. In 1978, she married Zareer, a jazz pianist, son of Dr. Rashida Reporter and Minoo Patell, and has two daughters Farah, aged 26, and Sanaya, aged 24. They are both Ph.D. students at the University of Cambridge, UK and have recently joined Avesthagen as Board Members.

Romano Marabelli

Department of Public Veterinary Health, Nutrition and Food Safety,
Italian Health Ministry

Head of the Department for Veterinary Health, Nutrition and Food Safety – Ministry of Health, since 2005.
December 1995: Director General for the Department of Food, Nutrition and Veterinary Public Health - Ministry of Health afterwards reorganized and named Directorate General for Veterinary Health and Food
July 1991: Director General for Veterinary Services - Ministry of Health
January 1990: Councilor on Health Matters – Ministry of Foreign Affairs
December 1988: Deputy Councilor – Ministry of Health
January 1985: Prime Director – Ministry of Health
HONORARY CHAIRMAN
Chairman - O.I.E. Paris (2000-2003)
Vice-chairman - O.I.E. Paris (997-2000)
Member of the administrative Commission - O.I.E. Paris (1994)
Vice-chairman of the O.I.E. European Commission Paris (1994)
PROFESSOR DESIGNATE AND COLLABORATION WITH RESEARCH GROUPS
2007 Professor designate at the School of Doctorate on "Agrisystem", University of Piacenza (Cattolica del Sacro Cuore)
2007 Collaboration with morphobiomolecular research groups on genetic resistance of animals, University of Naples (Federico II)
1986-1987, 1990-1993, 1995-1996, 1998-1999, 2004-2007 Specialization Courses "Veterinary Public Health" University of Milan
2004- Specialization Course "Physiological, Pharmacological Sciences", Pharmacological Division Faculty of mathematics and physics - Pavia
1989-1994, 1997-2004 Specialization Courses in "Veterinary Legislation" University of Milan
1991-1992 Specialization Course "Food Hygiene" University of Parma
AUTHOR AND JOINT AUTHOR OF MORE THAN 100 WORKS, PUBLISHED FROM 1981 TO 2008, ON THE FOLLOWING SUBJECTS:
Control on food of animal origin - Food Safety - Animal Health - Drugs and contamination
Organization of Veterinary Services - Achievement of the European Single Market



Giorgio Morelli

National Research Institute on Food and Nutrition, Italy

Giorgio Morelli is Director of the Program in Functional Genomics and Plant Biotechnology at the National Research Institute for Food and Nutrition. He is also contract Professor at the University of Rome Sapienza where he lectures on Food Biotechnology.
He coordinates several research projects funded by national and international agencies. The main research interest concerns the mechanisms controlling plant growth and development in response to environmental changes. He is the author of more than 50 publications in peer-reviewed international journals.
He serves as expert in the Novel Food Commission of the Italian Ministry of Health. He is co-chair of the Italian Plant Technology Platform Plant for the Future.

Chunming Chen

Chinese Center for Disease Control and Prevention, China

Professor on Nutrition, Senior Advisor, Chinese Center for Disease Control and Prevention

EDUCATION
1943-1947 - Department of Agricultural Chemistry, National Central University Bachelor of Science

POSITION HELD AND ACADEMIC APPOINTMENTS
2001-present - Chairperson of the Board, ThankTank Research Center for Health Development
1992-present - Senior Advisor and Professor, Chinese Center for Disease Control and Prevention (Chinese Academy of Preventive Medicine before 2002)
1985- present - Professor on Nutrition, Chinese Center for Disease Control
1983-1992 - Founding President, Chinese Academy of Preventive Medicine
1989-1999 - Dean, Union School of Public Health, Beijing Union Medical University
Director-General, Department of Health and Epidemic Prevention, Ministry of Public Health

OTHER APPOINTMENTS
2001-present - Senior Advisor, State Consultative Committee on Food and Nutrition

INTERNATIONAL APPOINTMENTS
Jan. 2004-present - Advisor, International Life Science Institute Focal Point in China
2002-present - Board member of Center for Health promotion, ILSI
2002-present - Member, Board of Directors, GAIN (Global Alliance for Improved Nutrition)
1995-present - Member of Advisory Group for 2020 Vision, International Food Policy Research Institute
1996-present - Member of Advisory Committee of International Obesity Task Force
1993- Jan.2004 - Director, International Life Science Institute Focal Point in China
2002-2004 - Member, Reference Group for Strategy for Non-communicable Disease Prevention of World Health Organization
2000- 2005 - Member, FAO Eminent Expert Panel on Ethics on Food and Agriculture
1979- 2002 - Member, Expert Advisory Panel on Nutrition, World Health Organization

MEMBERSHIP OF ACADEMIC SOCIETIES
International Life Science Institute Focal Point in China
Fellow, International Union of Nutritional Sciences (IUNS)
Honorary Chair, Chinese Nutrition Society

RESEARCH WORK
Establishment of China Food and Nutrition Surveillance System and 15 year Surveillance during 1990-2005
Nutrition policy research based on 2002 National survey on Nutrition and health status of Chinese residents
Child nutrition and complementary feeding programs
Food fortification in China focused on anemia prevention

Abstract

Overview on nutrition in China, past and present

As a developing country, China is in double burden of nutrition problems, both under-nutrition and overnutrition due to imbalance dietary pattern changes.

The prevalence of underweight of children under 5 has been dramatically reduced from 19.1% in 1990 to 6.9% in 2005, stunting prevalence from 33.4% to 10.5% in 2005. The significant reduction of underweight happened since 1990 but stunting reduced only since 1995. The peak age of under-nutrition of children under 5 was 18-24 months. According to WHO 2007 Reference, the stunting prevalence of children aged 5- 12 years old was 16.5% (boys) and 16.6% (girls), in adolescents aged 13-18years was 8.6% and 12.2%
respectively in 2002, while it was around 20-30% in 1992. But in poor rural area the prevalence of stunting still high, 28.3% for children aged 5-12years and 21.8% for adolescents13-18 years old. Among elderly, underweight prevalence in rural areas was more than double of that in urban areas. Anemia is a common micronutrient deficiency in China and it changed very little even under the speedy economic growth, the national average prevalence for women was 23.3% in 2002, and the anemia prevalence was 30-40% among
children 6-24 month of age.

The prevalence of diet-related chronic diseases such as obesity, hypertension, and diabetes have been going up very fast, 18% of adults were hypertensive in 2002 and about 30% were overweight or obese. 20% f children aged 7-17 in big cities were overweight or obese.

The factors attributed to nutrition improvement and existing nutrition problems in the past decade are:

1) The rapid economic growth, achievement in poverty reduction and the farmer-favorable policies which resulted income increase and food availability in the market.

2) Dietary factors/feeding of young children performed dual-direction impact of both under-nutrition and chronic disease.

3) Social development such as education, environment also played significant role in nutrition status of the population.

The future strategic considerations could be: to give higher priority to the investment to nutrition of children 0-24 months, to focus on nutrition in poor rural areas and to develop community-based chronic disease prevention framework. Implementation of dietary guidelines to the public and iron deficiency anemia prevention should cover the overall population.

Ingo Potrykus

Golden Rice Board and Network; Swiss Federal Institute of Technology, Switzerland

Emeritus Professor, Institute of Plant Sciences, ETH Zuerich.
Studies in Zoology, Botany, Genetics, Biochemistry, Philosophy, Physical Education at Universities in Cologne and Erlangen.
PhD in Plant Genetics 1968 at Max-Planck-Institute for Plant Breeding Research, Cologne, Germany; Habilitation in Botany 1982 at University of Basel, Switzerland.
Ass. Professor, Institute of Plant Physiology, Stuttgart-Hohenheim 1970-74. Research Group Leader, Max-Planck-Institute for Genetics, Ladenburg-Heidelberg 1974-76; Research Group Leader, Friedrich Miescher-Institute, Basel, Switzerland 1976-86; Full Professor in Plant Sciences, Swiss Federal Institute of Technology (ETH), Zürich 1986-99. Research team in the range of 60 members on competitive grants and core funding.
Contributions to food security in developing countries. Focusing on development and application of genetic engineering technology for and to "food security" crops such as rice (Oryza sativa), wheat (Triticum aestivum), sorghum (Sorghum bicolor), and cassava (Manihot esculenta). Focusing on problems difficult to solve with traditional techniques and in the areas of disease- and pest resistance, improved food quality, improved yield, improved exploitation of natural resources, and improved bio-safety.
Inventor and Promoter of "Golden Rice", a sustainable contribution to reduce vitamin A-, iron-, and protein malnutrition.
Ca. 340 publications in refereed journals; ca. 30 international patents.
Lectures and courses in plant biology and plant biotechnology in the faculties of Biology, Agronomy, Pharmacy, Forestry, Environmental Sciences; International Training Courses for e.g. EMBO.
Since the retirement engaged in advancing 'Golden Rice' in an international, humanitarian initiative through the 'product development' phase and the 'deregulation' phase to make it available free of costs and limitations to developing countries as a sustainable contribution to reduction in vitamin A malnutrition. Chairman of the 'Humanitarian Golden Rice Board & Network.

KUMHO (ISPMB) Science International Award in Plant Molecular Biology and Biotechnology 2000. American Society of Plant Biologists (ASPB) Leadership in Science Public Service Award 2001. Crop Science of America (CSSA) 2001, CSSA President's Award 2002, European Culture Award in Science 2002, Honorary Doctor, Swedish University of Agricultural Sciences 2002. Member of Academia Europaea, Swiss Academy of Technical Sciences, Hungarian Academy of Sciences, Academia Bibliotheca Alexandria, Pontifical Academy of Sciences, World Technology Network. Cover TIME Magazine July 31, 2000, Honorary Doctor, University of Freiburg, Germany 2007.
"Top100 living contributor to biotechnology", elected by the peers of the journal "Scientist" in 2005.
"The most influential scientist" in the area of Agricultural, Industrial, and Environmental Biotechnology for the decade 1995-2005, elected by the peers of Nature Biotechnology 2006.

Abstract

Biofortification, a cost-effective intervention for micro-nutrient deficiency

Despite intensive traditional interventions, micro-nutrient deficiency takes a daily toll of ca. 6' 000 lives. With the concept of biofortification an alternative, novel, and complementing approach is under development. This strategy uses the power of genetics to improve the micro-nutrient content in crop plants, especially those used as major food source by micro-nutrient deficient populations in developing countries. Genetic improvement is possible via traditional breeding or genetic engineering.

The first and most advanced example on these lines is a genetically modified rice which provides sufficient amounts of provitamin A from standard daily diets of rice-dependent societies, to prevent vitamin A-malnutrition – "Golden Rice". The activation of the biochemical pathway leading to synthesis and accumulation of provitamin A in the starch-storing tissue of the seed was only possible via genetic engineering.

The Golden Rice project was from the onset, and still is a humanitarian project of the public domain. It is not, as the GMO opposition likes to pretend, a PR plot of the agbiotech industry. Product (variety) development and deregulation and final release to the public is under the control and guidance of an NGO – the Humanitarian Golden Rice Board. Development of agronomically superior and locally adapted varieties is under development in public rice research institutes in developing countries. For reasons of regulatory costs all different national varieties are developed via traditional breeding from one single selected transgenic event. Once deregulated the local varieties will be handed out to subsistence farmers by public seed boards at no extra costs.

All technology is contained in the seed. The farmers will use part of their harvest for the next sowing, and they will use the technology free of any licence fee within the framework of a humanitarian licence signed by the national public rice institutions. There are two limitations: the farmer or trader must not make a profit from Golden rice beyond USD 10' 000 per year and export is not permitted.

These conditions enable free use for the target population of the project, and they are a consequence of the fact, that because of lack of support from the public domain, the humanitarian project required support from the private sector.

Due to GMO-regulations Golden Rice will not be available before 2012. Ex ante studies predict a substantial impact of Golden Rice on health and economy. A Worldbank study[1] published in 2005 calculates a yearly benefit for Asia of ca. USD 15.2 billion and a study specifically for India[2] predicts that up to 40' 000 lives per year could be saved with strong support from the government. As the costs per life year saved are USD 3 compared to USD 156 costs of the, so far, most efficient alternative intervention (free distribution of vitamin A capsules) biofortification is the most sustainable intervention. This first excample of vitamin A-biofortification in rice is now followed by biofortification for iron, zinc, vitamin E, and essential amino acids, in rice, maniok, sorghum, and banana (Bill&Melinda Gates Foundation Grand Challenges in Global Health No.9

[1] GM Rice Adoption: Impact for Welfare and Poverty Alleviation. K Andersen, LA Jackson, CP Nielson. J. Economic Integration 20, 2005

[2] Genetic Engineering for the Poor: Golden Rice and Public Health in India. A.Stein, HPS Sachdev, M Qaim. World Development 36, 144-158 (2008)
www.goldenrice.org

Cathie Martin
John Innes Centre, Norwich UK

She has been a group leader at the John Innes Centre, Norwich UK since 1983. The John Innes Centre is the leading Research Institute in Plant Sciences in Europe. She is Professor at the University of East Anglia and she holds a chair as Niels Bohr Visiting Professor in the Faculty of Life Science, University of Copenhagen, Denmark. Her research has focused on cellular specialisation in plants and she was the first to identify genes regulating cell shaping in plants. While there has been an explosion of research in the EvoDevo area on floral morphogenesis, very few have taken forward research into the evolution of determinants of cellular form and function in flowers, or are studying the importance of these traits with respect to function; pollinator attraction.

She is a recognised authority on MYB transcription factors in plants as evidenced by an enormous number of requests to review manuscripts and grant proposals on all aspects of MYB-gene function in plants. She lists 144 publications in peer-reviewed scientific journals including publications in Nature, Nature Biotechnology, Cell, EMBO Journal, EMBO Reports and PNAS as well as more specialized journals. Her scientific expertise extends to the transcriptional regulation of secondary metabolism, in general. She also conducts research in plant biotechnology. She has been a plenary speaker and session organiser at several international biotechnology meetings, and She has been asked to present the work she co-ordinates on the European Union-sponsored FLORA project at many international biotechnology meetings. She is inventor on seven patents and she recently co-founded a spin-out company (Norfolk Plant Sciences) with Professor Jonathan Jones FRS, to bring the benefits of plant biotechnology (improving both producer and consumer traits of potato) to Europe and the US. She has been involved in setting up the Centre for Preventative Medicine in Norwich which is supported by a unique combination of internationally leading researchers who are developing the scientific understanding of how diet can help to maintain health, lead to healthy ageing and reduce the risk of chronic disease.

Her interests span the entire spectrum of plant biology, and in biological questions from the fundamental right to the applied ends of plant science. It is for these qualities that she is Editor-in-Chief of Plant Cell, the highest ranking international journal for research on plants sponsored by the American Society of Plant Biologists. She is the first woman and the first non-American to hold this post.

Abstract

Tackling chronic diseases: the potential of preventive medicine through improvements to diet

A major challenge for Western societies over the next 50 years is to reduce the frequency of the major chronic diseases; cardiovascular disease, cancer and age-related degenerative diseases. These diseases are particularly exacerbated by the metabolic syndrome which is increasing in frequency associated with a general increase in obesity, linked to declining levels of exercise and increasingly poor diets. Numerous epidemiological studies have demonstrated the efficacy of diets high in fruit and vegetables in reducing the incidence of cardiovascular disease, cancer and age-related degenerative diseases.

The importance of fruit and vegetables in the diet comes from them contributing a number of important phytonutrients or bioactives which often serve to promote antioxidant defence mechanisms. However, despite the specific recommendations of the "five-a-day" program of the National Cancer Institute of America (Launched 15 years ago and now adopted by many countries) which encourage consumption of at least five servings of fruit or vegetables a day, the most recent estimates are that only 23% of the US population reach these dietary targets and, even more worryingly, that the numbers of people that do reach them have declined in recent years.

These figures argue strongly for strategies to increase the levels of health-promoting bioactive compounds, in the fruits and vegetables that people actually consume in significant amounts. Plant biotechnology can make a very significant contribution to exploring this option in a number of ways: developing model foods that test the importance of specific bioactives in promoting particular aspects of health, developing markers that allow molecular breeding for enhanced levels of bioactives in crops and genetic engineering that provides novel, health-promoting foods. Due mainly to the increasing cost of curative medicine, preventive medicine is becoming crucial for improving health in Western societies. Amongst non pharmacological interventions, nutritional improvements developed through plant breeding and plant genetic engineering represent a feasible means of developing preventive strategies against chronic degenerative diseases for the future.

Bruce German
Food Science Department, University of California, Davis, USA

Bruce German received his PhD from Cornell University, joined the faculty at the University of California, Davis in 1988, in 1997 was named the first John E. Kinsella Endowed Chair in Food, Nutrition and Health and is currently professor, at University of California, Davis and serves as senior scientific advisor at the Nestlé Research Center in Lausanne Switzerland and head of the Scientific Board of Lipomics Technologies Inc in California. His research interests include the structure and function of dietary lipids, the role of milk components in food and health and the application of metabolic assessment to personalizing diet and health. The goal of his research is to build the knowledge necessary to improve human health through superior foods. Research projects directed to this goal are studying how individual human lipid metabolism responds to the chemical composition and structural organization of foods. Each person has slightly different responses to diet based on their genetics, their metabolism and their nutrition status. It is thus necessary to understand the molecular basis of these differences, how to recognize them and design food strategies to complement them. We are working on analytical strategies to enable individuals to monitor how their body reacts to various foods and to modify their consumption to maintain good health. With health targets established it is the equally important task of the research to understand how to provide superior choices in foods that integrate the compositional, structural and nutritional functionalities of biomaterials through bioguided food processes. The model being used of how to proceed is milk, the product of Darwinian selective pressure to produce a food to sustain and promote healthy infant mammals to be healthier. Milk is the only bio-material that has evolved for the purpose of nourishing growing mammals. Survival of offspring exerted a strong selective pressure on the biochemical evolution of lactation as a bioguided process. Just like evolution of any biological organism or system, the strong survive, which leads to the appearance of new traits that promote health, strength and ultimately survival. This evolutionary logic is the basis of the research program to discover physical, functional and nutritional properties of milk components and to apply these properties as principles to foods.
Bruce German and colleagues have published more than 200 papers on lipid and food structures, metabolites and functions and patented various applications of fatty-acids as bioactive and immunomodulatory agents. The research articles from the lab over the past 10 years rank in the top 10 most cited in Agriculture available at www.ISIhighlycited.com.

Abstract

The Future of Foods in a World of Personalized Health

Public health is advancing from a disease treatment paradigm to disease prevention and personalized health. This shift will impact the health care system and also all aspects of food and agriculture. Health care will profit from a system of personal assessment that measures and predicts health trajectories of individuals as subtle variations in their metabolic, physiologic and immunologic status.
The fields of Nutrigenomics and Metabolomics are building a clearer understanding of the biological reality that humans are indeed different in their responses to diet. Health assessment will become an important part of routine care and industries that provide these services will increase in value and will align more closely with the food development industries.
The greater information content of personal health will be managed by devices that are similar to those responsible for personal communications, entertainment and finance. Food, drug and lifestyle industries will take advantage of the greater personal knowledge of consumers to provide a wider range of products and services. Consumers will be able to choose alternatives that deliver solutions both deeper into health, i.e. more effective and safer solutions, and wider into more health values, than are currently available.
The entire agricultural enterprise will share a coordinated role in improving human health through foods. This will require greater diversity of agricultural commodities, greater flexibility in food processing and greater education of consumers. The ultimate benefits to consumers and to the industries that supply their food products and services will be considerable.

Barbara Corkey
Department of Medicine, Boston University School of Medicine, USA

Barbara E. Corkey is Vice-Chair for Research and Professor of Medicine and Biochemistry in the Department of Medicine at Boston University School of Medicine, where she is also Director of the Obesity Research Center of Boston Medical Center and the Principal Investigator of the multi-institutional NIH-funded Boston-Obesity/Nutrition Reseach Center. She is was Chair of the Board of AdipoGenix, a start-up drug company that she co-founded to develop drugs to treat obesity. She just completed a term as Editor-in-Chief of the journal Obesity. She has chaired the program committee for the national annual meeting of the American Diabetes Association, served on the National Peer Review Oversight Committee for the American Heart Association and served on review committees of the NIH and the Juvenile Diabetes Foundation.

Professor Corkey received her PhD in 1981 from the University of Pennsylvania, Department of Biochemistry and Biophysics for studies focusing on branched chain amino acid metabolism. She has published over 100 manuscripts and been invited to speak at numerous national and international institutions and symposia.

The main questions in the Corkey laboratory concern how fuels regulate insulin secretion and how the fat cell determines whether to store or burn fat. We seek to answer these questions by studying the fuel-induced signals that modulate secretion, electrical activity, metabolism and gene expression. Recent discoveries include a role for reactive oxygen species in insulin secretion, digital calcium signaling in pancreatic ß-cells and a role for inhibition of the respiratory chain in regulating fat storage in adipocytes. The main tools used in the laboratory include measurement of intracellular ions such as Ca2+ and H+, plasma and mitochondrial membrane potential, oxygen consumption, the signaling consequences of cellular energy state, the influence of fatty acids on protein kinases and the role of fatty acids and long chain fatty acyl CoA on signal transduction. Work is supported by three NIH RO1 grants and done in collaboration with scientists at Boston University, Tufts University, the Karolinska Institute, the Universities of Montreal and Pennsylvania and the CIIT Centers for Health Research.

Professor Corkey is also an avid painter, grandmother and wine connoisseur.

Abstract

Obesity and Diabetes: Excess Food or Toxic Environment

The increased prevalence of obesity in the US population began about 1980 and is continuing worldwide. By 2015 1.5 billion people of the predicted 8 billion world population, (19%), will be obese. WHO estimates that by then non-communicable diseases will be the main causes of morbidity and mortality globally.

The resource burden of chronic disease engendered by obesity is now added to that of malnutrition and infection in developing countries. The complications of obesity related diabetes, stroke and heart disease are seen at lower body weight in certain Asian and Hispanic populations and are seen with weight gain in abdominal fat depots. Treatment of these three diseases is a great burden to all societies. For example, China expects to spend $556 billion on diabetes, heart disease and stroke during the ten years between 2005 and 2015. In developed nations it is now predicted that decreased life expectancy will be the result of increasing obesity. Even more alarming, treatment is largely unsuccessful and dedicated therapists who have placed patients on "diet plans" espoused in the last forty years have usually been frustrated, with failure ultimately blamed on lack of patient compliance, not scientific ignorance.

Epidemiologic studies have provided some correlations with obesity including: psychotropic medication use, home temperature, mother's age at first birth, smoking, time spent awake, being Hispanic in the USA, being age 35 to 55, increased food intake, decreased activity, fast food availability, and global warming. Additional changes in the past half century include: vitamin / mineral content of fruits and vegetables, body composition of food animals and the introduction of thousands of food additives into our food supply. The causes of obesity may be associated with some or many of these changes.

>>

Abstract

Just as it is critical to continue to investigate these correlations, it also is crucial to investigate the fuel ←-→ energy equations at the physiologic, biochemical and molecular levels. For a long time, increased fat was seen as a cosmetic issue by governments. Recent knowledge shows adipose tissue to be a very dynamic actor in energy balance. Simple models that equated fat accumulation with overeating alone have not held up. Scientific studies of normal, weight stable individuals who have been enlisted to either restricted diet or forced overeating show a return, up or down, to their baseline weight, rapidly and spontaneously. This yo-yo effect is also seen in the vast majority of obese dieters and favors the presence of yet other factors in body weight balance.

The fat cell number in the body is largely determined in childhood; for those in whom this is excessive, neither aging nor weight loss in later years changes this number. To treat malnutrition in children with solutions that cause obesity may yield chronic disease in childhood and adulthood.

Neither obesity nor malnutrition will abate until sufficient understanding of the metabolic engine that we all are has been achieved. When pathways, genetics, and cell signaling are understood in a holistic way, then rational choices of treatments can be offered to the earth's people. As we have learned in the past decades, one must be astute to avoid implying causation when our data show only a correlation.

Future science must improve our scientific and technological understanding of nutrition with consideration for the economic and ethical implications of poor choices.

Pier Giuseppe Pelicci

Department of Experimental Oncology, European Institute of Oncology, Milan, Italy

Dr. Pier Giuseppe Pelicci is Chairman of the Department of Experimental Oncology (DEO) at the European Institute of Oncology, Milan (Italy), Scientific Director of the SEMM Foundation (European School of Molecular Medicine, Milan, Italy) and President of the Cogentech Consortium. IEO is a comprehensive cancer center focused on advanced treatments, diagnostics, clinical trials, cancer prevention, training, higher education and advanced research. SEMM is private foundation whose mission is to foster innovative education in molecular medicine, medical nanotechnology and bio-ethics. Cogentech is a Consortium owned by IEO and IFOM whose mission is the development of biomedical technological platforms for genomic research and Molecular Medicine programs. At IEO, Pelicci is responsible for the strategic planning of the IEO institute research programs, including basic, translational (Molecular Medicine Program) and clinical research. At SEMM, Pelicci is responsible for the development of three PhD programs (Molecular Medicine, Medical Nanotechnology, Life sciences: foundations & ethics)

Dr. Pelicci is member of the American Association for Cancer Research, the European Molecular Biology Organization, the European Haematology Association, the European Society for Engineering and Medicine, the European Cytokine Society, The New York Academy of Sciences, the American Society for Microbiology, the Italian Association of Biophysics and Molecular Biology, the Italian Society of Cancerology. He is past president (1998-2000) of the Italian Society of Experimental Hematology.

Dr. Pelicci was honored with several prestigious international fellowships and awards, such as the "C. Cioffrese" Prize for Cancer Research (Fondazione Carlo Erba, Italy), the "Foundation Chiara d'Onofrio" (Italy), the "Guido Venosta" Prize of the Italian Foundation for Cancer Research, the Award for "Excellence in Medicine" of the American-Italian Foundation for Cancer Research (New York, US), the H. S. Raffaele Prize (Italy). He is presently Full Professor of Pathology at the University of Milan and cofounder of the Biotech holding Genextra. Genextra controls four Biotech companies (Congenia, DAC, Tethis and Intercept).

Dr.Pelicci is co-founder and co-director of the IFOM-IEO Campus, a research infrastructure that host IFOM, the IEO laboratory research activities, SEMM, Genextra and Cogentech.

Abstract

Food, Life Span regulation and Cancer

Nascimur uno modo, multis morimu ('in one way we are born, in many ways we die'), and there is probably no single way to age. Indeed, so far there is no single accepted explanation or mechanism of ageing (although more than 300 theories have been proposed), and controversy reigns on whether ageing is the expression of a specific genetic programme or the simple consequence of a lifelong accumulation of random molecular damage.

Genetic evidence suggests that metabolic factors are strong determinants of longevity, and that the adipose tissue plays a critical role in the regulation of lifespan in both invertebrates and mammals:

1) fat-specific disruption of the insulin receptor gene decreases body fat and increases lifespan in mice;

2) overexpression in the fat tissue of Foxo, a key target of insulin/IGF-1 signaling that is inactivated by insulin/IGF-1, prolongs lifespan in Drosophila and C. Elegans;

3) sirtuin1 (SIRT1), the mammalian ortholog of the life-extending yeast gene silent information regulator 2 (SIR2), inhibits adipogenesis in precursor cells and reduces fat storage in differentiated adipocytes by repressing the PPAR-g nuclear receptor, a master regulator of fat cell development in the insulin/IGF1 signaling pathway. Notably, reducing food intake to induce undernutrition but not malnutrition (caloric restriction) extends the life spans of multiple species, ranging from single-celled organisms to mammals.

At the molecular level, the most important mechanisms of aging involve damage to intracellular macromolecules. It is proposed that oxidizing species (reactive oxygen species; ROS) are produced in mitochondria during aerobic metabolism, which consequently causes molecular damage and, over time, cell and tissue dysfunction, ultimately increasing the risk of disease (the free-radical or oxidative-stress hypothesis of ageing).

>>

Abstract

This hypothesis is supported by a vast body of experimental evidence demonstrating that:
1) aerobic organisms chronically generate ROS;
2) cells accumulate oxidative damage over time (oxidative stress);
3) ROS induce cell senescence and apoptosis;
4) ROS, senescence and apoptosis are mechanistically linked to ageing-associated degenerative diseases;
5) mutations of p66Shc, a gene that increases production of mitochondrial ROS, or overexpresion of catalase, that increases their scavenging, prolong lifespan in mice. Despite its popularity, however, one fundamental aspect of this theory still remains puzzling: how and why are dangerous pro-oxidant species generated during oxidative metabolism?
Recent findings from our laboratory demonstrate that a fraction of mitochondrial ROS are generated by specialized enzymes and serve as signaling molecules in the adipose tissue, thus suggesting that these lifespan determinants (insulin/IGF1 signaling in the fat tissue and oxidative stress) are mechanistically related.

We demonstrated that p66Shc functions as a redox enzyme that generates mitochondrial ROS to trigger mitochondrial swelling and apoptosis. For this function, p66Shc uses reducing equivalents of the mitochondrial electron-transfer chain through the direct oxidation of cytochrome c. These findings provide evidence that the generation of ROS by mitochondria is not just the by-product of respiration, but can also be the result of specific enzymes, such as p66Shc. We then investigated the physiological function of p66Shc-generated ROS and demonstrated that insulin activates the redox enzyme-activity of p66Shc specifically in adipocytes, and that p66Shc-generated ROS regulate insulin signaling through multiple and independent mechanisms, including AKT phosphorylation, Foxo localization and regulation of selected insulin-gene targets. Deletion of p66Shc resulted in increased mitochondrial uncoupling and reduced trygliceride accumulation in adipocytes, and, in vivo, increased metabolic rate, decreased fat mass and resistance to diet-induced obesity. In addition, p66-null mice showed improved systemic sensitivity to insulin and impaired thermo-insulation. These findings demonstrate that p66Shc-generated oxidative signal regulates the threshold of sensitivity to insulin in adipocytes, and the development of fat tissue in vivo, suggesting that regulated generation of ROS has evolved to control energy conservation. Since attenuation of p66Shc or insulin signaling in the fat tissue, as by genetic mutations, reduces adiposity and increases lifespan, these results pose the question of why the threshold of insulin sensitivity is apparently "so low" in the fat tissue under physiological conditions. We propose that the physiological size of the fat tissue is set to serve other functions, which are evolutionarily more critical than longevity. Adaptation to cold, which is altered in the lean p66Shc-null mice, could be one of such functions, or, alternatively, optimization of energy storage when food is available.
The findings of reduced adiposity and increased overall insulin sensitivity in p66Shc-null mice might have important implications for the effect of p66Shc on lifespan. Aging is associated with the development of a relative resistance of the peripheral tissues to normal amounts of insulin (insulin resistance), a pathological trait, often associated with obesity, which predisposes to diabetes and cardiovascular diseases (metabolic syndrome). In humans, these diseases strongly affect morbidity and mortality, especially among elderly. P66Shc-null mice, like the caloric-restricted mice, have a relative increase of the systemic sensitivity to insulin, suggesting that reduced oxidative stress in p66Shc-/- mice might increase longevity through the direct effect of reduced adiposity on insulin signalling in peripheral tissues. Notably, p66Shc-null mice are more resistant to diabetes and have reduced risk of atherosclerosis and cardiovascular damage upon HF-diet.

Abstract

Ethics, Economics and Politics.

Future geopolitical scenarios will be defined by inequalities in food and water availability. It is necessary to understand these problems from a historical perspective and face the ethical and political issues related to them, with the ambitious aim of eradicating poverty and hunger in the world.

h. 9.00 a.m. - 1.00 p.m.

Chairs: **Marcelo Sanchez Sorondo**, **Dario Casati**

Angelo Scola
Ethical Perspectives

Giulio Giorello
Wars about Water: From Ancient Mesopotamia to the Present

Per Pinstrup-Andersen
The Eradication of Poverty and Hunger in the Context of High Food and Energy Prices: The MDGs and beyond

Partha Dasgupta
Food and Water as Economic Commodities

Giuseppe Guzzetti
Boosting agro-food research: the role of grant-making foundations

Timothy Hall
Forthcoming funding opportunities in EU Research Programmes

Round Table on *The pursuit of justice; food and water for all.*
Chair: **Kathleen Kennedy Townsend**
Margherita Agnelli de Pahlen, **John Broome**,
Jean Nordmann, **Hervè Nordmann.**

h. 2.00 p.m. - 4.00 p.m.

Shirin Ebadi
Closing Lecture

Chiara Tonelli, Umberto Veronesi
Final Remarks

Marcelo Sanchez Sorondo
Pontifical Academy of Sciences, Vatican

Marcelo Sánchez Sorondo was born in Buenos Aires, Argentina, on 8 September 1942. He was ordained a priest on 7 December 1968 in the archdiocese of Buenos Aires. At the St. Thomas Aquinas University of Rome he was awarded a Ph.D in sacred theology – the highest level of Church postgraduate studies – with the maximum possible grade of summa cum laude (1974). From 1976 to 1998 he was lecturer in the history of philosophy at the Lateran University in Rome where from 1982 onwards he was full professor in the same discipline. He was dean of the Faculty of Philosophy at the same university for three consecutive terms from 1987 to 1996. Since 1998 he has been full professor of the history of philosophy at the Libera Università Maria SS. Assunta (Rome) and in the same year was appointed president of the degree course in education science. In November 1998 he was appointed Chancellor of the Pontifical Academy of Sciences and of the Pontifical Academy of Social Sciences by Pope John Paul II. In March 1999 His Holiness also appointed him Secretary Prelate of the Pontifical Academy of St. Thomas Aquinas. On 19 March 2001 His Holiness John Paul II consecrated him titular Bishop of Vescovìo. He was also decorated as Cavaliere di gran croce of the Italian Republic (1999), official of honour of the Légion d'Honneur by the Republic of France (2000), Grão Mestre da Ordem de Rio Branco by the Republic of Brazil (2004), official of the Republic of Austria (2004) and knight of the Republic of Chile (2006).

Dario Casati
Department of Economics and Agrarian Policy, University of Milan, Italy

Dario Casati, 65, since 2001 is the deputy vice rector of the Università degli Studi di Milano (Milano University) and full professor of Agricultural Economy and policy within the Faculty of Agriculture of the said university. He was the Dean of the Faculty of Agriculture from 1986 to 1998 and from 1998 to 2004 Director of the Department of Agricultural, Agro-Alimentary and Environmental Economy and Politics. He is a member of several research boards and of scientific technical committees of the EU, of the Ministry of Agriculture, of the Lombardy Region, of several provincial administrations and numerous other entities and bodies. He is a member of the Academy of Georgofili, of the Agricultural academy of Bologna, of the Agrarian Society of Lombardy and a member of the principal associations of agrarian economists. He participated in setting up the 1986/90 National Agricultural Plan, the 2000-2006 Lombardy Region Agricultural Plan and the Piedmont District Rice Plan.
His scientific activity mainly concerns the Common Agricultural Policy of the European Union, national and regional agricultural policies; agricultural economy and policy of the development; economy of the food industry; economy of agricultural sectors like cereals, rice and anmal production; economic analyses of the territory and environment in parks and protected areas; economy of innovation and of biotechnologies in agriculture.
He is the author of many scientific publications and collaborates with journals of the sector and the main daily newspapers. He is a member of the scientific committee of several journals in the sector.

Angelo Scola

Patriarch of Venice, Italy

Ordained priest: 1970
Obtained Doctorate in Philosophy from the Catholic University of Milan. Obtained Doctorate in Theology from Fribourg Switzerland. Since 1982 has taught Theological Anthropology at the Giovanni Paolo II Pontifical Institute for Studies on Marriage and the Family, at the Pontifical Lateran University.
From 1986 to 1991 was consultant to the Pontifical Council for Health Workers, Congregation for the Clergy. (appointed by the VII Assembly of the Synod of Bishops). Since 1996 has been consultant for the Pontifical Council for the Family.
Nominated Bishop of Grosseto 20 July 1991, Ordained Bishop 21 September 1991. Episcopal motto "Your is sufficient" (see 2 Cor 12, 9). Took up duties in Grosseto on 14 September 1995.

On 24 July 1995 appointed Rector of the Pontifical Lateran University, Rome, by his Holiness the Pope. On 29 September 1995 appointed President of the Giovanni Paolo II Pontifical Institute for Studies on Marriage and the Family, by his Holiness the Pope.
Since June 1995 has been member of the Episcopal Commission for Catholic Education Culture, Schools and Universities of the Italian Episcopal Conference.
Since January 1996 has been President of the Committee for the Institutes of Religious Science, being concerned with lay theological education in Italy.
From 1996 to 2001 was member of the Pontifical Council for Health Workers. Has written on health questions, for example: Se vuoi, puoi guarirmi; La salute tra speranza e utopia; La buona salute. In 1996 was nominated consultant to the Pontifical Council for the Family. The second appointment in Rome provided the opportunity to write on theological anthropology: Questions Theological Anthropology. 2nd amplified edition and the Human personality; Manual of Theological Anthropology ? two-volume monograph on sexuality, marriage and the family (These books have been translated into various languages).,
Monsignor Scola has also published about 120 articles in theological and philosophical journals.

He was nominated Patriarch of Venice by his Holiness the Pope on January 5, 2002.
He was elected of the Bishops' Conference of the Triveneta region on April 9, 2002.
He was created Cardinal-Priest of the Holy Roman Church, September 28, 2003 and confirmed in this position at the public Concistoro of October 21, 2003.
After being elevated to the cardinalate (2003) he was re-confirmed as member of the President's Committee of the Pontifical Council for the Family and as member of the Congregation to the Clergy.
He was nominated member of the President's Committee of the Pontifical Council for Lay Persons on October 14, 2004.
He was designated member of the Congregation for the Divine Cult and Discipline of the Sacraments on January 19, 2005. He was nominated member of the Prefecture for Economic Affairs of the Holy See on March 6, 2005. He was nominated, by his Holiness the Pope (March 18, 2005) General Chairman of the XI General Assembly of the Synod of Bishops (October 2005), assembly theme: The Eucharist: Source And Culmination of the Life and Mission of the Church.
Recent writings include: *Gesù destino dell'uomo*; *Uomo-donna: il "caso serio" dell'amore* (Capri Prize 2003); *La vicinanza del mistero*; *L'esperienza elementare*; *La vena profonda del magistero di Giovanni Paolo II*; *Liberi davvero*; *Il volto missionario della parrocchia*; *Un pensiero sorgivo*; *La gioia e la fretta*; *Contro la noia*; *Morte e libertà*; *Eucaristia: incontro di libertà*; and *Chi è la Chiesa? Una chiave antropologica e sacramentale per l'ecclesiologia.*

Giulio Giorello
Department of Philosophy, University of Milan, Italy

Giulio Giorello was born in Milan in 1945. After a period of training in research funded by a grant from the Italian National Research Council Research (Logic and Mathematics section), he took up teaching positions in the Faculty of Engineering of the University of Pavia, Faculty of Philosophy and Humanities of the University of Milan, and the Science Faculty of the University of Catania, where he was appointed full professor of the foundations of mathematics

In 1978 he became full professor of Philosophy of Science at the University of Milan and remains in that position. Professor Giorello is member of the editorial board of several journals, including Rivista di Storia della Scienza, Prometeo, and Nuova Civiltà delle Macchine.

In September 2000 the President of Italy Carlo Ciampi honoured him with the title Benemerito della scienza e della cultura. Since 2002 he has been president of the Italian Society of Logic and the Philosophy of Science.

Professor Giorello has published several books, including (with S. Morini), Parabole e catastrofi, Intervista a René Thom su matematica, scienza e filosofia (Milano 1980; translated into French, Portuguese and Polish); Filosofia della scienza (Milano, 1992); La filosofia della scienza nel XX secolo (with D. Gillies; Roma-Bari 1995), Prometeo, Ulisse, Gilgame?. Figure del mito (Milano 2004), and Di nessuna chiesa. La libertà del laico (Milano 2005).

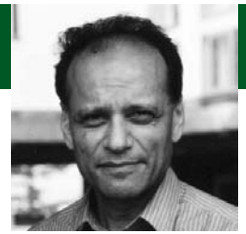
Per Pinstrup-Andersen
Division of Nutritional Sciences, Department of Applied Economics and Management,
Cornell University, USA

Per Pinstrup-Andersen is the H. E. Babcock Professor of Food, Nutrition and Public Policy, the J. Thomas Clark Professor of Entrepreneurship, and Professor of Applied Economics at Cornell University and Professor of Agricultural Economics at Copenhagen University.
He has a Ph.D from Oklahoma State University and honorary doctoral degrees from universities in the United Kingdom, Netherlands, Switzerland, and India.
He is a fellow of the American Association for the Advancement of Science (AAAS) and the American Agricultural Economics Association. He is the 2001 World Food Prize Laureate and the recipient of several awards for his research and communication of research results.

Abstract

The Eradication of Poverty and Hunger in the Context of High Food and Energy Prices: The MDGs and beyond

Hunger and poverty is widespread. Half of the world's population earns less than $2/day and half of Africa's population earns less than $1/day. One in six people in developing countries suffer from food insecurity and every third pre-school child does not grow to his or her full potential. About 5 million of them die every year of hunger and malnutrition. About three-fourth of the world's poor and hungry are in rural areas of developing countries. Most of them depend directly or indirectly on agriculture. In spite of the World Food Summit goal to reduce by half the number of food insecure people between 1990 and 2015, a goal to which virtually every country agreed, the number of food insecure people has not decreased and a policy focus on the rural poor is absent.
While beneficial for food consumers, rapid decreases in food prices between 1974 and 2003 failed to provide incentives to developing country governments to invest in rural and agricultural development and farmers, including millions of poor farmers, were faced with poor and deteriorating rural infrastructure, lack of access to appropriate technology and government policies and poorly functioning domestic markets. Low and falling incomes of the rural poor resulted. However, since 2003 food prices have skyrocketed and are now more that twice the 2003 level. As expected, consumers, particularly low-income ones, who spend a large share of their incomes on food, are experiencing hardships and the prevalence of hunger has increased. On the other hand, the higher food prices now provide an incentive to focus science and policy on rural and agricultural development, a focus that is long overdue, given that such development is essential to promote economic growth and poverty alleviation in both rural and urban areas.
The focus of science should be on creating more with less, producing more food while assuring sustainability in the management of natural resources and utilizing all appropriate scientific methods. The extensive rhetoric and the plethora of plans and strategies must be converted into policy action. Achieving the Millennium Development Goals should be given overriding priority. Investment in rural infrastructure and appropriate technology should take priority along with the elimination of trade-distorting subsidy policies and the use of food commodities for biofuel.



Partha Dasgupta
Department of Economics, University of Cambridge, UK

Partha Dasgupta, who was born in Dhaka (at that time in India) and educated in Varanasi, Delhi, and Cambridge, is the Frank Ramsey Professor of Economics and past Chairman (1997-2002) of the Faculty of Economics at the University of Cambridge, and Fellow of St. John's College, Cambridge. He taught at the London School of Economics during 1971-1984 and moved to the University of Cambridge in 1985 as Professor of Economics.

During 1989-92 he was also Professor of Economics, Professor of Philosophy, and Director of the Program in Ethics in Society at Stanford University; and during 1991-97 he served as Chairman of the (Scientific Advisory) Board of the Beijer International Institute of Ecological Economics, Stockholm.

Professor Dasgupta's research interests have covered welfare and development economics, the economics of technological change, population, environmental and resource economics, the theory of games, and the economics of undernutrition. His publications include "Guidelines for Project Evaluation" (with S.A. Marglin and A.K. Sen; United Nations, 1972), "Economic Theory and Exhaustible Resources" (with G.M. Heal; Cambridge University Press, 1979 (recipient of the United States Association of Environmental and Resource Economists "Publication of Enduring Quality Award 2003")); "The Control of Resources" (Harvard University Press, 1982); "An Inquiry into Well-Being and Destitution" (Clarendon Press, Oxford, 1993); "Human Well-Being and the Natural Environment" (Oxford University Press, 2001; revised edition, 2004); and "Economics: A Very Short Introduction" (Oxford University Press, Oxford, 2007).

Abstract

Food and water as economic commodities

Food (more specifically, nutrition) and water are two of the most urgent of material human needs. As they complement each other, they are of equal importance. Nevertheless, most societies view them differently. Food is almost everywhere regarded as an economic good, by which I mean not only that it is priced, but there is a presumption that the price reflects the cost of production, including the rent on the land on which the food is grown.

In contrast, the price paid for water would seem to reflect only the cost of extraction and purification: water in situ is frequently taken to be a free good. In this lecture I shall try to identify the reasons behind this difference in attitude toward these two vital human needs. I

shall also use those reasons to explain differences in the character of the acute scarcities in food and water that are currently being experienced in many parts of the globe. The current evidence would appear to be that, while water scarcity in many rgions is likely to be an enduring problem, the same is probably not true in the case of food (at least not yet).

Giuseppe Guzzetti
President Acri, Italy

Giuseppe Guzzetti, age 74 years, born in Como, Italy, obtained his degree in law from the Sacro Cuore Catholic University of Milan. He has been President of the Cariplo Foundation (a major philanthropic organisation supporting scientific research) since 1997, and President of ACRI (organisation of Italian Banking Foundations and former Savings Banks) since 2000.

He was president of the Region of Lombardy from 1979 to 1987, Senator of the Italian Republic from 1987 to 1994, and member of the Council of Europe and Western European Union from 1992 to 1994. In his long career he has also filled several other prestigious roles. His current position as head of a philanthropic organisation derives from a personal commitment help others while leaving time to pursue his interests in arte and science.

Abstract

Boosting agro-food research: the role of grant-awarding foundations

Science and technology play crucial roles in ensuring the continuing availability of food and water. Funds made available for projects have achieved much, but the demand for finance remains high, not just to manage food and water emergencies in developing countries, but also to develop sustainable agriculture in all countries so as to improve agricultural production ensure food safety and respect the environment.

Problems of food and water availability and quality require co-ordinated approaches that mobilize and exploit the know-how of disparate elements: scientists, economists, policy-makers, and entrepreneurs. The Italian Foundations, fully aware of the importance of supporting agro-food area projects, have joined forces to support high quality scientific research this area and to encourage collaboration between the disparate forces involved.

Eleven Italian Foundations of originally banking origin have temporarily united to make available more than 23 million euro, to be spent over three years in a project entitled Ager – the first to be promoted by the Foundations in the agro-food area. Other Foundations have expressed an interest in joining the syndicate, so that the funds available may increase by December 2008. Specific areas targeted include apple trees, pear trees, minimally processed vegetables, maize, rice, pig and wine production, and also initiatives to apply the results obtained as widely as possible so as to improve production, favour technological development, and maximise the use of human resources. The Foundations are concerned with the direct development of projects, the financing of projects proposed by others after competitive assessment, and the dissemination of results.

It is hoped that other organisations with resources may be inspired by the example set by the Italian Foundations,, which see themselves as pioneers in the identification and validation of new and effective ways of facing social and economic problems: not as agents for solving these problems (which are on too large a scale), but as pioneers and innovators showing how such problems might be better tackled, while taking a subsidiary role to societal forces acting in the public interest.

The initiative is also a learning experience for the individual Foundations who have to share resources, compare methods, identify priorities and evolve an effective project management and monitoring system. Last but not least Ager is an exercise in applied ethics, making resources available for projects that may suggest solutions to problems that concern the whole of society.

Kathleen Kennedy Townsend

Conference Vice President

Adjunct Professor at Georgetown University's School of Public Policy and Visiting Fellow at the Kennedy School of Government at Harvard. She is a consult for US and international corporations. Kathleen Kennedy Townsend has a long history of service in the public arena. As Maryland's first woman Lieutenant Governor, she was had a multimillion dollar budget and had oversight of major departments including the State Police, Economic Development, Transportation, and the Office of Children Youth and Families. She is known nationally for her innovative and results oriented programs such as Hot Spots, Break the Cycle, the development of Marylands bio-tech business, the launching of the e-readiness initiative and the establishment of one of the first state wide offices of character education.

Before being elected Lt. Governor, Mrs. Townsend served as Deputy Assistant Attorney General of the United States. In that role, she led the planning to put 100,000 police officers into the community and she ignited the Police Corps, a program to give college scholarships to young people who pledge to work as police officers for four years after graduating. Prior to serving at the Department of Justice, Mrs. Townsend spent seven years as the founder and director of the Maryland Student Service Alliance. It was in this role that she led the fight to make Maryland the first state in the nation to require all high school students to perform community service. Before launching that initiative, she worked as an environmental attorney both in private practice and as an Assistant Attorney General in Maryland. In addition, in 1982 she managed Senator Edward Kennedy's successful re-election campaign. Mrs. Townsend has taught foreign policy at the University of Pennsylvania and the University of Maryland, Baltimore County. She has published articles in the New York Times, Washington Post, and Washington Monthly, among others. In the mid 1980s she founded the Robert F. Kennedy Human Rights Award – whose recipients now include the Comadres of El Salvador, Adam Michnic of Poland, and Beyers Naude of South Africa. Mrs. Townsend is Chair of the Institute for Human Virology at the University of Maryland and currently serves on the boards of directors of the John F. Kennedy Library Foundation, Points of Light Foundations, Strategic Partnerships, the Institute for Women's Policy Research, the Character Education Partnership and she is a member of the Council of Foreign Relations and the Inter-American Dialogue. She previously served on the boards of the Export-Import Bank, Johns Hopkins School of Advanced International Studies, the Wilderness Society, the Baltimore Urban League and was chair of the Robert Kennedy Memorial. An honours graduate of Harvard University, she received her law degree from the University of New Mexico where she was a member of the law review. She has received ten honorary degrees.

Margherita Agnelli de Pahlen

Blue Orchard, Geneva, Switzerland

Margherita Agnelli de Pahlen was born in Switzerland in 1955, daughter of Giovanni Agnelli and Donna Marella Caracciolo. She has eight children.

Mother, teacher, writer, artist: she has a strong social commitment.

One of her major social commitments is her role as co-founder and vice president of BlueOrchard, a Swiss asset management company that specialises in managing portfolios which invest in companies active in microcredit in developing countries. Among those managed with the guidance of BlueOrchard is Dexia Micro Credit Fund, the first European SICAV founded with the explicit objective of financing companies that specialized in microcredit. To keep track of BlueOrchard's work in developing countries, Ms De Pahlen has been travelling on numerous trips to South America, Asia, Africa and Eastern Europe over the past few years.

She is recognised in Italy as the Ambassador on Microcredit, being very active in promoting the microcredit culture in Italy and abroad with institutions, companies, banks and media such as:

- Oslo - October 2007 her speech opened the work of the "2007 WIN Forum".
- Milan - November 2007 participated at the conference "Bridging the gap - Microfinance as a new investment asset class", organised by Bocconi University.
- Milan - March 2008 she participated at the second edition of the Women Leadership Forum organised by Sole 24 Ore.

Since 2006, in conjunction with the Turin Municipality, she has been promoting a project to help street children. The Villa Sole community was opened on June 2008.

John Broome

Faculty of Philosophy, Oxford University, UK

John Broome is the White's Professor of Moral Philosophy at the University of Oxford, and a Fellow of Corpus Christi College, Oxford. He was previously Professor of Philosophy at the University of St Andrews, and before that Professor of Economics at the University of Bristol. He holds a Leverhulme Major Research Fellowship, and is a Visiting Fellow at the Swedish Collegium for Advanced Study in Uppsala. He is a Fellow of the Royal Society of Edinburgh, a Fellow of the British Academy, and a Foreign Member of the Royal Swedish Academy of Science.

• His main research at present is on normativity, rationality and reasoning. However, he has spent much of his life working on the theory of value, often on topics that connect philosophy and economics. One of these is the value of human life, and his work on that topic has given him a practical interest in the ethics of climate change, and in the distribution of resources for health.

• His published books are The Microeconomics of Capitalism (1983), Weighing Goods (1991), Counting the Cost of Global Warming (1992), Ethics Out of Economics (1999), and Weighing Lives (2004).

Jean Nordmann

Former Red Cross and UNOCHA

Director of Research (Neurosciences), Centre National de la Recherche Scientifique (France), 1980 - 1992

Delegate of the International Committee of the Red Cross, 1992 -2005 (Malawi, Somalia, Guinea Conakry, Congo, Republic of Central Africa, Liberia, Indonesia (Papua), Afghanistan, Croatia, Bosnia

Head of UNOCHA in South Darfur, Sudan (2006)

Head of Missions of INGOS (Intermon-Oxfam (Tchad) and Action against Hunger (Mauritania), 2007 – 2008)

Hervé Nordmann

Industry Council for Development, London, UK

As a veterinarian by training, food production and nutrition have been driving factors in his professional choice. After a Ph.D. in human pharmacology, on the prevention of CVI (Chronic Venous Insufficiency) by plant extracts, he was trained in the chemical industry (agri & pharma) as a recognized expert in toxicology. This is where he started to think in terms of Risk and Benefit for the population as a whole. In the industry the job cannot be politically influenced as it represents what is closest to the values and ethics of the company. The use of animals in research triggered enormous debates in the early eighties. This forced him to think about ethical aspects and to take a moral approach to the utilitarian use of living beings for the progress of science and for the safety of man and nature. For the past twenty years he has been responsible for the scientific and regulatory aspects within the food sector of an international company, specialized in the production of food ingredients and additives for animal and human use.

The strong link between science and public relations in food issues has added a further dimension to his understanding of communication, and the role of the media in particular. In certain circumstances, major ethical concerns have once again emerged which have been linked with the introduction of new products or new technologies. Due to the weaknesses in risk communication a very high price has been paid i.e. a loss in consumer's trust. During the course of these activities he has built up an extensive net of relationships and friendships among scientists, members of the medical and nutritional community, civil servants of regulatory agencies, politicians, MPs and MEPs, representatives of the food industry who are part of many industrial associations, and members of international organizations like WHO, FAO, WTO, Codex Alimentarius, ILSI (International Life Science Institute) and ICD. This has taken place during repeated visits to over eighty countries. He is presently the chairman of ICD (Industry Council for Development) and he is also chairing the "Nutrition and Public Health "task force of ILSI Europe.

Shirin Ebadi

2003 Nobel Prize for Peace

Shirin Ebadi, Iranian human rights activist and lawyer, was awarded the Nobel Peace Prize in October 2003. She is the first Iranian and Muslim woman to receive the prize. Born in 1947 in Hamadan, Iran, Ebadi received a law degree from the University of Tehran and became one of the first female judges in Iran. She was forced to resign her position following the Islamic Revolution in Iran in 1979 and has been working ever since, at great risk of her own safety, as a lawyer, writer and university professor to advocate for human rights, especially for Iranian women and children. A practicing Muslim, Shirin Ebadi advocates that Islam can and must be interpreted with respect for democratic ideals, equality and human rights. Shirin Ebadi has also received numerous other international awards and acknowledgments including Rafto Human Rights Prize in 2001 and the Légion d'honneuur, one of the most important French distinctions in 2006, as well as a great number of honorary degrees and doctorates from the most prestigious universities all over the world.

Participants of First World Conference on the Future of Science believe it of vital importance that the world community realises we are on the threshold of a new era of knowledge. Science impacts all fields of human life and explosive growth of knowledge in areas such as genetics, astrophysics and information technology will lead to an even greater influence on human activities.
Scientific knowledge offers us the possibility not only of improving the conditions of life for all, but also of radically changing the biological makeup of living organisms.
Humanity must be aware of the new freedoms and responsibilities these advances imply. Participants are also aware that this enhanced potential of science generates unanswered questions about its applications, and reasonable doubts about its possible misuse.
The signatories of this Charter believe science will continue to be vital for the progress and well-being of humanity; however the issues raised by scientific progress must fully and openly debated by the whole of society. They therefore undertake to:

1. Create an alliance for scientific development – involving scientists, philosophers, theologists, politicians, industrialists, jurists, and all interested parties – which will oppose the isolation of science by promoting constructive dialogue between all forms of knowledge that respect human identity and dignity. Maximum priority must be given to harmonising the scientific and religious world views, reconciling ecology movements and science, and inserting scientific issues into political programmes worldwide.
2. Actively reaffirm the humanism of science, its intrinsic spirit of tolerance and incompatibility with absolutism in all its forms. Only if it reasserts these principles can science and other fields of endeavour hope to continue pursuing the fundamental aims of promoting civilisation and protecting human life. While basic research will expand the horizons of knowledge, applied research must be concerned with goals that are essential for the future of humanity, including the eradication of poverty and hunger, reduction of child mortality, conservation of ecosystems and bio-diversity, elimination of pollution, improvement of energy efficiency and reduction of fossil fuel use, reduction of the toll taken by HIV, malaria and cancer, provision of water for agriculture and uncontaminated water for drinking.

3. Promote scientific thought and the scientific method as a way of investigating and understandingthe world, particularly among young people and in societies that have not attained an adequate level of material progress. The universal language of science and the rationality of the scientific method are unifying elements having the potential to bridge deep differences in culture, experience and faith, making constructive dialogue possible. The importance of encouraging interest in science in young children has been recognised by UNESCO, with its Declaration and Programme in Science and Technology Education.

4. Set up a permanent Authority for Science consisting of scientists, philosophers, theologians, industrialists, jurists, politicians and others, whose task will be to suggest the objectives and limits of scientific progress and to make rational proposals for the society of tomorrow. The Authority for Science will not be a group of super-technicians deciding in the name of all, but a committed team that systematically and conscientiously examines the problems posed and the opportunities offered by continuing scientific progress, and periodically submits its deliberations and conclusions to governments and public opinion.

Venice, September 23, 2005

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