BIOVISIONALEXANDRIA 2004

The New Life Sciences: Ethics, Patents and the Poor

3–6 April 2004

Organized in partnership with The World Life Sciences Forum BioVision

PROGRAM
BIOGRAPHIES AND ABSTRACTS

Bibliotheca Alexandrina
Alexandria, Egypt

Under the auspices of

H.E. Mohamed Hosni Mubarak
President of the Arab Republic of Egypt

and in the presence of

H.E. Mrs. Suzanne Mubarak
Chair, Board of Trustees

The Bibliotheca Alexandrina is honored to host the International Conference
BioVisionAlexandria 2004

with

Dr. Ismail Serageldin
Librarian of Alexandria & Chairman of the Conference

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BioVisionAlexandria 2004
The New Life Sciences: Ethics, Patents and the Poor

Bibliotheca Alexandrina, 3–6 April 2004

Invitation

The Bibliotheca Alexandrina is proudly hosting BioVisionAlexandria 2004, an international conference that will blend new and old ideas, inventions, knowledge, and also examine the implications as well as the potential applications of biotechnology.

The main target of the conference will be the exploration of the issues raised by the New Life Sciences in a world undergoing profound transformations…Globalization, the needs of the poor, the new rules governing international trade all call into question the directions we must pursue to assure the universal ideals of sharing and benefiting from the enormous advantages offered by the New Life Science revolution.

As we unlock the secrets of life, and learn to manipulate the very building blocks of heredity, who is to be the judge of when what is feasible technically is no longer acceptable ethically? It is natural that we should address ethics, patents and the poor in this important gathering. Discussions on ethics and biotechnology will examine questions of moral responsibility, limitations and boundaries that should be set on research and practical applications, as well as exclusivity *versus* the sharing of knowledge.

Coordination and cooperation of the scientific community within itself as well as with those who put their ideas, discoveries, and inventions to practical use is essential for rapid progress. Without such coordination and cooperation, progress can be slow and awkward.

BioVisionAlexandria 2004 will be an all-embracing examination of the relationships between the New Life Sciences and development. It will address the key issues in:

- Health
- Agriculture
- Food
- Industry and Environment

In addition, special sessions on ethics, patents, and the poor will look into:

- Ethics:
  - What are our moral obligations in the realm of biotechnology?
  - What limits should we set in exploring biotechnology?
  - What obligations do we have when applying current knowledge?
  - Should scientific knowledge be universally shared or should discovery and information be exclusive to a few?

- Patents:
  - What kind of influence do patents have on science and its applications?
  - Should there be limits placed on patents?
  - Who benefits from patents and who suffers losses?
  - How can patents be used to balance between the encouragement of science exploration and provision for the poor?
- The Poor:
  - What can we profit from our poor force?
  - What can be achieved from improving their well-being?
  - The majority of people in the world are impoverished. By improving health and education, can we increase, both in size and strength, our global workforce and global productivity?
  - Where should the focus of biotechnology be in attempting to alleviate the burden of poverty?
  - Will biotechnology help the impoverished, or will it increase the gap between the rich and the poor?

The majority of the world's natural resources are in less developed and poverty-ridden nations. Lack of quality education and healthcare prevents optimal extraction and utilization of these resources, which in turn slows down growth and development in these nations. Should biotechnological advancements be applied to attempt to rectify this inefficiency?

Individual experts from all over the globe who not only represent virtually all aspects of biotechnology, its applications, and its regulation, but the many nations of the world as well, will come together to discuss the different topics of the BioVisionAlexandria 2004 conference: "The New Life Sciences: Ethics, Patents, and the Poor".

BioVisionAlexandria 2004 will be importing the highest caliber of experts in the field of biotechnology. The goal of this conference will be to promote the active exchange of biotechnological information, innovation, and new ideas in order to benefit the world as a whole. It will include representatives from the scientific, academic, governmental, and industrial communities. Due to this multilateral approach, the conference will provide more than a limited forum for scientists to share research and information among themselves. The conference will facilitate the interactions between those who provide biotechnological information with those who govern its regulation and application.

The BioVisionAlexandria conference is especially attuned to the needs and capabilities of the less developed nations, and will strive to achieve growth and progress for these nations as well as for the rest of the world.

The Bibliotheca Alexandrina is honored to host such a prestigious event, so join us, and together let us work towards a better, healthier and safer world for us and for our children.

Ismail Serageldin
Librarian of Alexandria
Chairman of the Conference

Nobel Laureates

LEHN, Jean-Marie
1987 Nobel Laureate in Chemistry

NOYORI, Ryoji
2001 Nobel Laureate in Chemistry

ROWLAND, Sherwood
1995 Nobel Laureate in Chemistry

ZEWAIL, Ahmed H.
1999 Nobel Laureate in Chemistry

Speakers

ABOU GHARBIA, Magid
Vice President & Head, Chemical & Screening Sciences, Wyeth Research (USA)

AMARAL, Weber
Senior Scientist, International Plant Genetic Resources Institute, IPGRI (Italy)

AMMANN, Klaus
Director, Botanical Garden (Switzerland)

AMRI, Ahmed
Biodiversity Project Coordinator, West Asia Regional Program, WARP, ICARDA (Morocco)

BADR, Effat
Professor of Genetics, Faculty of Agriculture, Alexandria University (Egypt)

BADRAN, Ibrahim
Former Minister of Health (Egypt)

BEACHY, Roger
President, Donald Danforth Plant Science Center (USA)

BENNETT, Andrew
Executive Director, The Syngenta Foundation (Switzerland)

BENNETT, David
Acting General Secretary, European Federation of Biotechnology (Netherlands)

CARLONE, Claudio
Chairman, Hypothesis Communication Agency (Italy)

CATLEY-CARLSON, Margaret
Chair of the Global Water Partnership (USA)

CERNEA, Michael
Former Senior Advisor for Sociology and Social Policy, the World Bank (Romania)

CHEN, Zhu
Vice President, Chinese Academy of Sciences (China)

CHOUDHARY, MUHAMMAD
Acting Director, HEJ Institute of Chemistry, University of Karachi (Pakistan)

CHRISTIE, Werner
President, World Health Connections; Former Minister of Health (Norway)

CLARK, Brian
President, International Union of Biochemistry and Molecular Biology, Aarhus University (Denmark)

COFFMAN, Ronnie
Chair, Department of Plant Breeding, Cornell University (USA)

CUNNINGHAM, Patrick
Professor of Animal Genetics, Trinity College; Member of European Group on Life Sciences (Ireland)

DAHLSTROM, Annica
Professor, Department of Cell Biology, Göteberg University (Sweden)

DE CARVALHO, Antonio Paes
President and CEO of EXTRACTA Moleculas Naturais S/A (Brazil)

DE GREEF, Willy
Executive Director, International Biotech Regulatory Services (Belgium)

DESMARESCAUX, Philippe
Chairman, The World Life Sciences Forum, BioVision (France)

DIDERICHSEN, Boerge
President, European Federation of Biotechnology; Vice-President, Novo Nordisk (Denmark)

EBEID, Nadia Makram
Former Minister of State for Environmental Affairs (Egypt)

EHLERS, Stefan
Head of Department, Borstel Leibniz Center for Medicine and Biosciences (Germany)

EL-BAZ, Farouk
Director, Center for Remote Sensing, Boston University (USA)

EL BELTAGY, Adel
Director General, International Center for Agricultural Research in Dry Areas (Syria)

EL ITRIBY, Hanaiya
Director, Agricultural Genetic Engineering Research Center (Egypt)

ELLIOTT, Malcolm
Director, The Norman Borlaug Institute for Plant Science Research (UK)

ERBISCH, Frederick
Former Director, Office of Intellectual Property at Michigan State University (USA)

FRISON, Emile
Director-General, IPGRI (Italy)

GABR, Mamdouh
Secretary-General, Egyptian Red Crescent (Egypt)

GARZELLI, Massimo
Head of Regional Office, UNIDO

GROS, Francois
Honorary Permanent Secretary, Academy of Sciences (France)

HAMZE, Mouin
President, International Center for Advanced Mediterranean Agronomic Studies—CIHEAM (Paris); Secretary General, National Council for Scientific Research, CNRS (Lebanon)

HASSAN, Mohamed
Executive Director, Third World Academy of Sciences

HAUTEA, Randy
Global Coordinator, International Service for the Acquisition of Agri-biotech Applications, SEAsia Director (Philippines)

HELMY, Hassan Abass
Chairman and Managing Director, Pharco Pharmaceuticals (Egypt)

HOOGENDOORN, Coosje
Deputy Director-General, Programmes, International Plant Genetic Resources Institute, IPGRI (Italy)

HUTTNER, Eric
General Manager, Diversity Arrays Technology Pty Limited (Australia)

JARRETT, Stephen
Deputy Director, Supply Division, UNICEF

JASMIN, Claude
Founding President, International Council for Global Health Progress (ICGHP); Professor of Oncology, Hematology and Immunology, Hôpital Paul Brousse (France)

JOHNSON, Brian
Head of Biotechnology Advisory Unit, English Nature (UK)

LACHMANN, Sir Peter
Former President, Academy of Medical Sciences (UK)

MACMILLAN, Whitney
Chairman Emeritus, Cargill Inc (USA)

MADKOUR, Magdi
President, Agriculture Research Centers, Ministry of Agriculture (Egypt)

MATTA, Cherif F.
Chemistry Department, University of Toronto (Canada)

MCCONNELL, David
Department of Genetics, University of Dublin (Ireland)

MURPHY, Noel
Department of Genetics, Smurfit Institute of Genetics, Trinity College (Ireland)

NAGAYAMA, Osamu
Chairman of the Board of Directors, President and Chief Executive Officer of Chugai and President of Jabex and JPMA (Japan)

NAKHLA, Rafik
Bibliotheca Alexandrina (Egypt)

NUTTI, Marilia
Biosafety and Human Nutrition Researcher, National Research Center on Food Technology, Embrapa (Brazil)

OMI, Koji
Former Minister of State for Science and Technology Policy (Japan)

PARDEY, Philip
Professor of Science and Technology Policy, Department of Applied Economics, University of Minnesota (USA)

PEACOCK, Jim
President of Australian Academy of Science (Australia)

PERSLEY, Gabrielle
Scientific Advisor, the World Bank

POORTMAN, Ysbrand
Vice President, World Alliance of Organizations for the Prevention of Birth Defects (Netherlands)

POTRYKUS, Ingo
Professor Emeritus of Plant Sciences, Institute of Plant Sciences, Swiss Federal Institute of Technology (Switzerland)

PRAKASH, C. S.
Director, Center for Plant Biotechnology Research (USA)

RABBINGE, Rudy
University Professor, Executive Board of Wageningen UR (Netherlands)

RAMPHELE, Mamphela
Managing Director, Human Development Network, the World Bank

ROMEO–CASABONA, Carlos
Director, Inter-University Chair BBVA Foundation-Provincial Government of Biscay in Law and the Human Genome (Spain)

SASSON, Albert
Former Assistant Director General of UNESCO (Morocco)

SCHNEIDER, Cynthia P.
Associate Professor, Georgetown University; Former US Ambassador (USA)

SERAGELDIN, Ismail
Director of Bibliotheca Alexandrina, Chairman of European Action on Global Life Sciences (Egypt)

SOLH, Mahmoud
Director, Plant Production & Protection Division, Agricultural Department, FAO

SOLIMAN, Salah
Professor, Faculty of Agriculture, University of Alexandria (Egypt)

SWAMINATHAN, M. S.
UNESCO Chair in Ecotechnology; M.S. Swaminathan Research Foundation (India)

THORNTRÖM, Carl-Gustaf
Senior Research Advisor, Agriculture Department for Research Cooperation, Sida/SAREC (Sweden)

VAN MONTAGU, Marc
Chairman, Institute of Plant Biotechnology for Developing Countries (Belgium)

VON DER OSTEN-SACKEN, Alexander
Former Executive Secretary, Consultative Group on International Agricultural Research (Germany)

YANG, Huanming
Director, Beijing Genomics Institute/Genomics and Bioinformatics Center, Chinese Academy of Sciences; Co-Vice-Chairman, European Action on Global Life Sciences (China)

ZHENG-HONG, Yuan
Vice Dean, Medical College, Fudan University (China)

CONFERENCE AT A GLANCE

SATURDAY, 3 APRIL 2004 **BIOVISION NOBEL LAUREATES' DAY**	10:00–11:30	Conference Opening Session
	11:30–12:00	Break
	12:00–13:30	Session 1
	13:30–14:30	Break
	14:30–16:00	Session 2
	16:00–16:30	Break
	16:30–18:00	Round Table Discussion: Nobel Views and Perceptions
SUNDAY, 4 APRIL 2004	08:30–	Registration (available during all days of conference)
	09:30–11:30	**Opening Plenary Session**: *The New Biology: A Survey of the Issues*
	11:30–12:00	Break
	12:00–13:30	**Plenary Session 2**: *EAGLES: The Issue of Biotechnology and Sustainable Consumption – The Major Challenge for the 21st Century*
	13:30–14:30	Break
	14:30–16:00	*Parallel Sessions*: **State of the Art** Panel 1 A-1: Healthcare and the Poor Panel 2 B-1: Agriculture and Safe Food Sufficiency Panel 3 C-1: Exploiting Biodiversity and Protecting the Environment Panel 4 D-1: Trade, Patents and Developing Countries
	16:00–16:30	Break
	16:30–18:00	*Parallel Sessions:* **Technical Papers/Case Studies** Panel 5 A-2: Healthcare and the Poor Panel 6 B-2: Agriculture and Safe Food Sufficiency Panel 7 C-2: Exploiting Biodiversity and Protecting the Environment Panel 8 D-2: Trade, Patents and Developing Countries
	18:30–19:30	CEO Panel
	19:30–21:00	Break
MONDAY, 5 APRIL 2004	09:00–10:30	*Parallel Sessions:* **Technical Papers/Case Studies** Panel 9 A-3: Healthcare and the Poor Panel 10 B-3: Agriculture and Safe Food Sufficiency Panel 11 C-3: Exploiting Biodiversity and Protecting the Environment Panel 12 D-3: Special Session on Intellectual Property Rights
	10:30–11:00	Break
	11:00–12:30	*Parallel Sessions:* **Issues and Options** Panel 13 A-4: Healthcare and the Poor Panel 14 B-4: Agriculture and Safe Food Sufficiency Panel 15 C-4: Exploiting Biodiversity and Protecting the Environment Panel 16 D-4: Trade, Patents and Developing Countries
	12:30–13:30	Break
	13:30–15:00	**Plenary Session 3**: *Promises and Delivery: Inventing New Partnerships*
	15:00–15:30	Break
	15:30–17:00	**Plenary Session 4**: *Capacity Building in Science and Technology*
TUESDAY, 6 APRIL 2004	09:00–10:30	**Reporting Plenary Session**: *Conclusions and Recommendations from the Parallel Sessions*
	10:30–11:00	Break
	11:00–12:30	Closing Plenary Session

DETAILED PROGRAM

Saturday, 3 April 2004

BioVision Nobel Laureates' Day

Opening Addresses *Great Hall*

10:00–11:30 *Special Inauguration Session where world renowned International Political, Social and Scientific Leaders will introduce BioVisionAlexandria 2004, with their views on the implications of the Life Science Revolution in today's world…*

(in order of presentation)

Ismail Serageldin, Director, Bibliotheca Alexandrina (Egypt)

Philippe Desmarescaux, Chairman, The World Life Sciences Forum, BioVision (France)

Koji Omi, Former Minister for Science and Technology Policy (Japan)

Sherwood Rowland, Nobel Laureate, Chemistry 1995 (USA)

Mohamed Hassan, Executive Director, Third World Academy of Sciences

Jean-Marie Lehn, Nobel Laureate, Chemistry 1987 (France)

Ibrahim Badran, Former Minister of Health (Egypt)

H.E. Dr. Atef Ebeid, Prime Minister, Arab Republic of Egypt

11:30–12:00 Break (*Visit the Book Fair*!)

12:00–13:30 **Highlights of the Biochemical Revolution** *Great Hall*

Chair: Francois Gros, Honorary Permanent Secretary, Academy of Sciences (France)

Ahmed Zewail,
Chemistry 1999 (Egypt/USA)
"BioVision at the Interface"

Jean-Marie Lehn,
Chemistry 1987 (France)
"Supramolecular Chemistry: Some Contributions to Life Sciences"

13:30–14:30 *Break (Visit the Book Fair!)*

14:30–16:00 **The New Life Sciences: Implication in Civil Society** *Great Hall*

Chair: M. S. Swaminathan,
UNESCO Chair in Ecotechnology; M.S. Swaminathan Research Foundation (India)

Ryoji Noyori,
Chemistry 2001 (Japan)
"Asymmetric Catalysis: Roles in Biomedical Science and Technology"

Sherwood Rowland,
Chemistry 1995 (USA)
"The Changing Atmosphere in 2004"

16:00–16:30 *Break (Visit the Book Fair!)*

16:30–18:00 **Round Table Discussion: Nobel Views and Perceptions** *Great Hall*

Moderator: Ismail Serageldin, Director, Bibliotheca Alexandrina (Egypt)

Sunday, 4 April 2004

08:30–09:30 Registration

09:30–11:30 ***Opening Plenary Session*** *Great Hall*

The New Biology: A Survey of the Issues

Keynote BioLeaders will open The World Life Sciences Forum BioVisionAlexandria 2004 by assessing the current and future applications of Life Sciences and their social or economic implications

Chair: Andrew Bennett, Executive Director, Syngenta Foundation (Switzerland)

Rapporteur: Gabrielle Persley, Chair, The Doyle Foundation (UK)

Economic Issues: Providing the Conditions for Life Science Research and Development

Ismail Serageldin, Director, Bibliotheca Alexandrina (Egypt)

Ever-green Revolution and Biohappiness

M. S. Swaminathan, UNESCO Chair in Ecotechnology; M.S. Swaminathan Research Foundation (India)

New Biology for Developing Countries: Opportunities and Constraints

Malcolm Elliott,
Director of The Norman Borlaug Institute for Plant Science Research (UK)

Global Biotechnology Forum in Chile: Overview and Conclusions

Massimo Garzelli, Head of Regional Office, UNIDO

11:30–12:00 *Break (Visit the Book Fair and Posters Area!)*

12:00–13:30 **Special Session of the EAGLES Initiative** *Great Hall*

The EAGLES initiative has been created to propose strategies by which the huge power of the life sciences and biotechnology, mostly controlled by the developed world, can be directed for the benefit of the Third World… Its working session will be the opportunity to foster concrete grounds for action.

Chair: **Ismail Serageldin,** Director, Bibliotheca Alexandrina,
Chairman, European Action on Global Life Sciences (EAGLES)

Members of the EAGLES Consortium including:

Huanming Yang, Professor of Genetics, Director of Beijing Genomics Institute, Chinese Academy of Sciences, Beijing (China);
Co-Vice-Chairman, European Action on Global Life Sciences (EAGLES)

Boerge Diderichsen, President, European Federation of Biotechnology

Marc van Montagu, Chairman,
Institute of Plant Biology for Developing Countries (Belgium)

David McConnell, Smurfit Institute of Genetics, Trinity College (Ireland)

13:30–14:30 *Break (Visit the Book Fair and Posters Area!)*

14:30–18:00 **Parallel Sessions** (see detailed program on the following pages)

18:30–19:30 **CEO Panel** *Great Hall*

Moderator: ***Boerge Diderichsen,*** Novo Nordisk

- ***Hassan Abbas Helmy,*** Pharco
- ***Magid Abou-Gharbia,*** Wyeth
- ***Whitney Macmillan,*** Cargill
- ***Osamu Nagayama,*** Chugai Pharmaceutical Co, Ltd, JABEX

19:30–21:00 *Break (Visit the Book Fair and Posters Area!)*

Parallel Session 1/4 on "Healthcare and the Poor"

Life Sciences Applications to New Healthcare in Low Resource Environments: High Hopes?

Rapporteur: **Rafik Nakhla,** Bibliotheca Alexandrina (Egypt)

Sunday, 4 April 2004

14:30–16:00 **State of the Art (Panel 1)** *West Hall*

Chair: **Ibrahim Badran,** Former Egyptian Minister of Health (Egypt)

Discussant: **Brian Clark,** President, International Union of Biochemistry and Molecular Biology, Aarhus University (Denmark)

- **Muhammad Choudhary,** Acting Director, HEJ Institute of Chemistry, University of Karachi (Pakistan)
  "Medicinal Plants-Importance in Health and Economy"
- **Claude Jasmin,** Founding President, International Council for Global Health Progress (France)
  "Losing Life"
- **Sir Peter Lachmann,** Past President, Academy of Medical Sciences (UK)
  "The Enduring Threat of Infectious Disease"

16:00–16:30 *Break (Visit the Book Fair and Posters Area!)*

16:30–18:00 **Technical Papers/Case Studies (Panel 5)** *West Hall*

Chair: **Sir Peter Lachmann,** Former President, Academy of Medical Sciences (UK)

Discussant: **Claude Jasmin,** Founding President, International Council for Global Health Progress (France)

- **Stephen Jarrett,** Deputy Director, Supply Division, UNICEF
  "Vaccine Security: Ensuring the Uninterrupted Sustainable Supply of Affordable Vaccine to Developing Countries"
- **Cherif Matta,** Chemistry Department, University of Toronto (Canada)
  "Computational Chemistry: A Powerful and Inexpensive Tool for Basic and Applied Research in Life Sciences"
- **Noel Murphy,** Department of Genetics, Smurfit Institute of Genetics, Trinity College (Ireland)
  "Delivering Practical, Sustainable Solutions for Problems of Neglected Diseases in the Post-genomics Era"

18:30–19:30 **CEO Panel** *Great Hall*

19:30–21:00 *Break (Visit the Book Fair and Posters Area!)*

Parallel Session 1/4 on "Healthcare and the Poor" (*cont'd*)

Life Sciences Applications to New Healthcare in Low Resource Environments: High Hopes?

Rapporteur: **Rafik Nakhla,** Bibliotheca Alexandrina (Egypt)

Monday, 5 April 2004

09:00–10:30 **Technical Papers/Case Studies (Panel 9)** *West Hall*

Chair: **Mamdouh Gabr,** Secretary General, Egyptian Red Crescent (Egypt)

Discussant: **Annica Dahlstrom,** Professor, Cell Biology, Göteborg University (Sweden)

- **Stefan Ehlers,** Head of Department, Borstel Leibniz Center for Medicine and Biosciences (Germany)
  "Genetics and Biotechnology in Tuberculosis Research: Ethical Issues"
- **Magid Abou Gharbia,** Vice President, Wyeth Research (Egypt/USA)
  "Impact of Chemical and Screening Technologies in Drug Discovery"
- **Annica Dahlstrom**, Professor, Cell Biology, Göteborg University (Sweden)
  "Women's and men's brains and the intellectual power"

10:30–11:00 *Break (Visit the Book Fair and Posters Area!)*

11:00–12:30 **Issues and Options (Panel 13)** ***(round table discussion)*** *West Hall*

Chair: **Albert Sasson,**
Former Assistant Director-General of UNESCO (Morocco)

Panel Head: **Werner Christie,** Former Norwegian Minister of Health, President, World Health Connections (Norway)
"Global Health Challenges and the Impact of Biotech Community on the Developing World"

- **Stephen Jarrett,** Deputy Director, Supply Division, UNICEF
- **David Bennett,** Acting General Secretary, European Federation of Biotechnology (Netherlands)
- **Effat Badr,** Professor of Genetics, Alexandria University (Egypt)

Parallel Session 2/4 on "Agriculture and Safe Food Sufficiency"

AgBiotech for Higher Food Safety and Higher Productivity: Application and Inclusion Processes

Rapporteur: **Cynthia Schneider,** Ass. Professor, Georgetown University; Former US Ambassador

Sunday, 4 April 2004

14:30–16:00 **State of the Art (Panel 2)** *Great Hall*

Chair: **Gabrielle Persley,** Chair, The Doyle Foundation (UK)

Discussant: **Rudy Rabbinge,** University Professor at the Executive Board of Wageningen UR (Netherlands)

- **Patrick Cunningham,** Department of Genetics, Trinity College Dublin (Ireland)
  "New times, New Challenges"
- **Marc van Montagu,** Chairman, Institute of Plant Biotechnology for Developing Countries (Belgium)
- **Magdi Madkour,** President, Agriculture Research Centers, Ministry of Agriculture (Egypt)
  "Science and Technology Strategy for Improving Agricultural Productivity in Egypt"

16:00–16:30 *Break (Visit the Book Fair and Posters Area!)*

16:30–18:00 **Technical Papers/Case Studies (Panel 6)** *Great Hall*

Chair: **Rudy Rabbinge,** University Professor at the Executive Board of Wageningen UR (Netherlands)

Discussant: **C.S. Prakash,** Director, Center for Plant Biotechnology Research at Tuskegee University (USA)

- **Ingo Potrykus,** Professor Emeritus, Institute of Plant Sciences (Switzerland)
  "Developments Beyond Golden Rice"
- **Mouin Hamze,** President, International Center for Advanced Mediterranean Agronomic Studies (Lebanon)
  "CIHEAM: an intergovernmental organization supporting development in the Mediterranean area"
  (Presented by Mohamed Nawar, President of Scientific Advisory Commission of CIHEAM)
- **Hanaiya El Itriby,** Director, Agricultural Genetic Engineering Research Center (Egypt)
  "Biotechnology Serving Agricultural Development in Egypt"
- **Adel El Beltagy,** Director General, International Center for Agricultural Research in Dry Areas (Syria)
  "Harnessing New Science for Sustainable Agriculture in Dry Areas"
  (Presented by Richard Cross, Director of the Germplasm Program of ICARDA)

18:30–19:30 **CEO Panel** *Great Hall*

19:30–21:00 *Break (Visit the Book Fair and Posters Area!)*

Parallel Session 2/4 on "Agriculture and Safe Food Sufficiency" (*cont'd*)

AgBiotech for Higher Food Safety and Higher Productivity: Application and Inclusion Processes

Rapporteur: **Cynthia Schneider,** Ass. Professor, Georgetown University; Former US Ambassador

Monday, 5 April 2004

09:00–10:30 **Technical Papers/Case Studies (Panel 10)** *Great Hall*

Chair: **Alexander Von Der Osten,** Former Director, Consultative Group on International Agricultural Research (Germany)

Discussant: **Marilia Nutti,** Director, National Research Center on Food Technology, Embrapa (Brazil)

- **Ronnie Coffman,** Chair, Department of Plant Breeding, Director, International Programs/CALS, Ithaca (USA)
  "The Agricultural Biotechnology Support Project II"
- **Randy Hautea,** ISAAA Global Coordinator and SEAsia Director (Philippines)
  "Transferring Technology and Knowledge to Develop Biotechnology-derived Tropical Crops"
- **Willy de Greef,** Executive Director, International Biotech Regulatory Services (Belgium)
  "Agriculture in the age of regulation"

10:30–11:00 *Break (Visit the Book Fair and Posters Area!)*

11:00–12:30 **Issues and Options (Panel 14)** ***(round table discussion)*** *Great Hall*

Chair: **Ingo Potrykus,** Professor Emeritus, Institute of Plant Sciences (Switzerland)

Panel Head: **Roger Beachy,** President, Donald Danforth Plant Science (USA)
"Developing Partnerships to Facilitate Agriculture Biotechnology for Developing Economies"

- **C. S. Prakash,** Director of the Center for Plant Biotechnology Research, Tuskegee University (USA)
- **Willy de Greef,** Executive Director, International Biotech Regulatory Services (Belgium)
- **Alexander Von Der Osten,** Former Director, Consultative Group on International Agricultural Research (Germany)
- **Marc van Montagu,** Chairman, Institute of Plant Biotechnology for Developing Countries (Belgium)

Parallel Session 3/4 on "Exploiting Biodiversity and Protecting the Environment"

Exploiting Natural Resources while Preserving Biodiversity and Protecting the Environment: What is the Secret Formula?

Rapporteur: **Salah Soliman,** Professor, Faculty of Agriculture, Alexandria University (Egypt)

Sunday, 4 April 2004

14:30–16:00 **State of the Art (Panel 3)** *East Hall*

Chair: **Michael Cernea,** Former Senior Adviser for Sociology and Social Policy, the World Bank

Discussant: **Eric Huttner,** General Manager, Diversity Arrays Technology Pty Limited (Australia)

- **Farouk El-Baz,** Director, Center for Remote Sensing Boston University (USA)
  "Space platforms as environmental monitors"
- **Klaus Ammann,** Director, Botanical Garden, University of Bern (Switzerland)
  "Impact of Agriculture on Biodiversity"
- **Coosje Hoogendoorn,** Deputy Director General, International Plant Genetic Resources Institute (Italy)
  "Agricultural Biodiversity for Sustainable Development: Strengthening the Knowledge Base"

16:00–16:30 *Break (Visit the Book Fair and Posters Area!)*

16:30–18:00 **Technical Papers/Case Studies (Panel 7)** *East Hall*

Chair: **Eric Huttner,** General Manager, Diversity Arrays Technology Pty Limited (Australia)

Discussant: **Brian Johnson,** Head of Biotechnology Advisory Unit, English Nature (UK)

- **Weber Amaral,** Senior Scientist, International Plant Genetic Resources Institute (Italy)
  "Application of Biotechnology Tools on Biodiversity and Biocomplexity Studies"
- **Mahmoud Solh,** Director, Plant Production & Protection Division, Agricultural Department, FAO
  "Agrobiodiversity, People and the Environment"
- **Ahmed Amri,** Biodiversity Project Coordinator, West Asia Regional Program, ICARDA (Morocco)
  "Preventing land degradation and loss of agrobiodiversity in dryland ecosystems in West Asia"

18:30–19:30 **CEO Panel** *Great Hall*

19:30–21:00 *Break (Visit the Book Fair and Posters Area!)*

Parallel Session 3/4 on "Exploiting Biodiversity and Protecting the Environment" (*cont'd*)

Exploiting Natural Resources while Preserving Biodiversity and Protecting the Environment: What is the Secret Formula?

Rapporteur: **Salah Soliman,** Professor, Faculty of Agriculture, Alexandria University (Egypt)

Monday, 5 April 2004

09:00-10:30 **Technical Papers/Case Studies (Panel 11)** *East Hall*

Chair: **Nadia Makram Ebeid**, Former Minister of State for Environmental Affairs (Egypt)

Discussant: **Emile Frison,** Director General, International Plant Genetic Resources Institute (Italy)

- **Eric Huttner,** General Manager, Diversity Arrays Technology Pty Limited (Australia)
  "Diversity Arrays Technology, A Novel Tool for Harnessing the Genetic Potential of Orphan Crops"
- **Antonio Paes De Carvalho,** General Director, Extracta Moléculas Naturais Ltda (Brazil)
  "Intellectual property in Accessing Biodiversity"
- **C. S. Prakash,** Director of the Center for Plant Biotechnology Research, Tuskegee University (USA)
  "Agriculture Biotechnology: Its Impact on Biodiversity"

10:30–11:00 *Break (Visit the Book Fair and Posters Area!)*

11:00–12:30 **Issues and Options (Panel 15)** ***(round table discussion)*** *East Hall*

Chair: **Jim Peacock,** President, Australian Academy of Science (Australia)

Panel Head: **Brian Johnson,** Head of Biotechnology Advisory Unit, English Nature (UK)
"Is Biosafety only the first step towards more sustainable cropping systems?"

- **Weber Amaral,** Senior Scientist, International Plant Genetic Resources Institute (Italy)
- **Mahmoud Solh,** Director, Plant Production & Protection Division, Agricultural Department, FAO
- **Nadia Makram Ebeid,** Former Minister of State for Environmental Affairs (Egypt)

Parallel Session 4/4 on "Trade, Patents and Developing Countries"

Facing the Issue: How can Free Trade and the Patent System Benefit Developing Countries?

Rapporteur: **Frederick Erbisch,** Former Director, Office of Intellectual Property, Michigan State University (USA)

Sunday, 4 April 2004

14:30-16:00 **State of the Art (Panel 4)** *Middle Hall*

Chair: **Claudio Carlone,** Hypothesis Communication Agency (Italy)

Discussant: **Philip Pardey,** Professor of Science and Technology Policy, Department of Applied Economics, University of Minnesota (USA)

- **Malcolm Elliott,** Director of The Norman Borlaug Institute for Plant Science Research (UK)
  "IPR: Must there be a Conflict between Commercial Need and Humanitarian Benefits?"
- **Carlos Romeo–Casabona,** Director, Inter-University Chair BBV Foundation, Provincial Government of Biscay in Law and the Human Genome (Spain)
  "Intellectual Property Rights and the controversy between Developed and Developing Countries: is it ethical to take care for animals suffering but to forget the needs for survival of humans?"
- **Zhu Chen,** Vice President, Chinese Academy of Sciences (China)
  "Filling the South-North gap in life science and biotechnology through capacity building, innovation and benefit sharing: View from a Chinese life scientist"

16:00–16:30 *Break (Visit the Book Fair and Posters Area!)*

16:30–18:00 **Technical Papers/Case Studies (Panel 8)** *Middle Hall*

Chair: **Mohamed Hassan,** Executive Director, Third World Academy of Sciences

Discussant: **David Bennett,** Acting General Secretary, European Federation of Biotechnology (Netherlands)

- **Claudio Carlone,** Hypothesis Communication Agency (Italy)
  "Venture Capital, Patents and the Market: The Case-Study of Biotechnology in Italy"
- **Willy de Greef,** Executive Director, International Biotech Regulatory Services (Belgium)
  "Non-Conventional IPR Issues"
- **Philip Pardey,** Professor of Science and Technology Policy, Department of Applied Economics, University of Minnesota (USA)
  "Agricultural R&D and Crop-related IPRs"

18:30–19:30 **CEO Panel** *Great Hall*

19:30–21:00 *Break (Visit the Book Fair and Posters Area!)*

Parallel Session 4/4 on "Trade, Patents and Developing Countries" (*cont'd*)

Facing the Issue: How can Free Trade and the Patent System Benefit Developing Countries?
Rapporteur: **Frederick Erbisch,** Former Director, Office of Intellectual Property, Michigan State University (USA)

Monday, 5 April 2004

09:00–10:30 **Special Session on Intellectual Property Rights**

Middle Hall

- **Ismail Serageldin,** Director, Bibliotheca Alexandrina (Egypt)
- **Carl-Gustaf Thornström,** Senior Research Advisor, Agriculture Department for Research Cooperation, Sida/SAREC (Sweden)
- **Philip Pardey,** Professor of Science and Technology Policy, Department of Applied Economics, University of Minnesota (USA)

10:30–11:00 *Break (Visit the Book Fair and Posters Area!)*

11:00–12:30 **Issues and Options (Panel 16)** ***(round table discussion)***

Middle Hall

Chair: **Philip Pardey,** Professor of Science and Technology Policy, Department of Applied Economics, University of Minnesota (USA)

Panel Head: **David McConnell,** Co-Vice Chairman of European Action on Global Life Sciences; Professor at Smurfit Institute of Genetics, Trinity College (Ireland)

"Managing the Risks of Biotechnology"

- **Yuan Zheng-Hong,** Vice Dean, Medical College, Fudan University (China)
- **Carl-Gustaf Thornström,** Senior Research Advisor, Agriculture Department for Research Cooperation, Sida/SAREC (Sweden)
- **Carlos Romeo–Casabona,** Director, Inter-University Chair BBV Foundation, Provincial Government of Biscay in Law and the Human Genome (Spain)

Monday, 5 April 2004

09:00–12:30 **Parallel Sessions** (see program on previous pages)

12:30–13:30 *Break (Visit the Book Fair and Posters Area!)*

13:30–15:00 **Promises and Delivery:** *Great Hall*
Inventing New Partnerships (Plenary Session)

From new biology to its universal applications: common elaboration of new partnerships

Chair: **Philippe Desmarescaux,** Chairman,
The World Life Sciences Forum, BioVision (France)

Discussant: **Andrew Bennett,** Executive Director, Syngenta Foundation (Switzerland)

Rapporteur: **Gabrielle Persley,** Chair, The Doyle Foundation (UK)

Jim Peacock, President, Australian Academy of Science (Australia)
"Partnerships for Success"

M. S. Swaminathan, UNESCO Chair in Ecotechnology;
M.S. Swaminathan Research Foundation (India)
"Towards an Era of Symbiotic Biopartnerships"

Ysbrand Poortman, Vice President,
World Alliance of Organizations for the Prevention of Birth Defects (Netherlands)
"A Global Partnership of Scientists, Doctors and Patients' Organizations
Working on Prevention and Management of Genetic Disease and Birth Defects"

Monday, 5 April 2004 (*cont'd*)

15:00–15:30 *Break (Visit the Book Fair and Posters Area!)*

15:30–17:00 **Capacity Building in Science &Technology (Plenary Session)** *Great Hall*

"Inventing a Better Future: A Strategy for Building Worldwide Capacities in Science and Technology" with the InterAcademy Council's Report as the support of the discussion…

Chair: **Margaret Catley-Carlson,** Chair, Global Water Partnership (USA)

Rapporteur: **Gabrielle Persley,** Chair, The Doyle Foundation (UK)

Ismail Serageldin, Director, Bibliotheca Alexandrina (Egypt)

Muhammad Choudhary, Director, HEJ Institute of Chemistry, University of Karachi (Pakistan)

Mamphela Ramphele, Managing Director, the World Bank

Mohamed Hassan, Executive Director, Third World Academy of Sciences

17:00–18:00 *Library Tour*

18:00 **EAGLES Reception** *Middle Hall*

"EAGLES: Come and Meet"

Tuesday, 6 April 2004

09:00–10:30 **Reporting Plenary Session:** *Great Hall*

Conclusions and Recommendations from the Parallel Sessions

Conclusions and Recommendations of the four Parallel Sessions will be presented and open to discussion to all the participants of the Forum, opening grounds for new collaborations and concrete implementations

Chair: **Gabrielle Persley,** Chair, The Doyle Foundation (UK)

Healthcare and the Poor

Rafik Nakhla, Bibilotheca Alexandrina (Egypt)

Agriculture and Safe Food Sufficiency

Cynthia Schneider,
Associate Professor, Georgetown University, Former US Ambassador (USA)

Exploiting Biodiversity and Protecting the Environment

Salah Soliman, Professor, Faculty of Agriculture,
University of Alexandria (Egypt)

Trade, Patents and Developing Countries

Frederick Erbisch, Former Director,
Office of Intellectual Property at Michigan State University (USA)

10:30–11:00 *Break (Visit the Book Fair and Posters Area!)*

11:00–12:30 **Closing Plenary Session** *Great Hall*

International Leaders will close The World Life Sciences Forum BioVisionAlexandria 2004 by sharing their views and hopes on the universal applications of Life Sciences.

The BioVision Award

The session will start with the presentation of the BioVision Award, given to young scientists who are achieving projects for the development and application of new technologies of Life Sciences, to benefit developing countries.

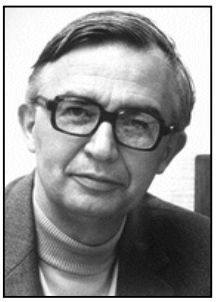
Chair: **Ismail Serageldin,** Director, Bibliotheca Alexandrina (Egypt)

Francois Gros, Honorary Permanent Secretary, Academy of Sciences (France)

Mamphela Ramphele, Managing Director, the World Bank

Philippe Desmarescaux, Chairman, The World Life Sciences Forum, BioVision (France)

NOBEL LAUREATES



1987 Nobel, **Jean-Marie LEHN**

Jean-Marie Lehn is a French chemist, born in 1939, who received his PhD from University of Strasbourg in 1963. A Professor at Louis Pasteur University (1970–78) and later at the Collège de France (1979–), Lehn did groundbreaking research in the creation of artificial enzymes.

Lehn expanded on the work of Charles J. Pedersen, in synthesizing crown ethers, a class of two-dimensional, ring-shaped organic compounds that are capable of selectively recognizing and combining with other molecules. In the course of his efforts to synthesize three-dimensional molecules that would possess similar reactive characteristics, Lehn created a molecule that combines with the important neurotransmitter, Acetylcholine, in the brain. This raised the possibility of creating artificial enzymes that function better than the natural enzymes found in the human body.

He shared the *1987 Nobel Prize in Chemistry* with Pedersen and Donald J. Cram for the development and application of molecules with highly selective, structure specific interactions, i.e. molecules that can "recognize" each other and choose which other molecules they will form complexes with. This laid the foundation for the active interdisciplinary area of research within chemistry that has now come to be termed host-guest chemistry or supramolecular chemistry.

Abstract

Supramolecular Chemistry: Some Contributions to Life Sciences

Supramolecular chemistry is concerned with the structures and functions of the entities formed by the binding of substrate species to a molecular receptor. Numerous studies have been directed toward the design of artificial receptors capable of selectively binding specific substrates, thus achieving molecular recognition processes. The incorporation of functional components opens ways towards the design of molecular and supramolecular devices (photoactive, electroactive, ionoactive, etc.). A number of investigations have been performed at the interface between supramolecular chemistry and biology. They concern developments in areas such as: optical sensing of biomolecular recognition, modified liposomes bearing recognition groups (recosomes), dynamic combinatorial chemistry, gene transfer methodology, self-assembly processes. Several of them will be discussed.

1995 Nobel, Sherwood ROWLAND

Sherwood Rowland, born in 1927, is an American chemist who shared the *1995 Nobel Prize in Chemistry* with chemists Mario Molina and Paul Crutzen for research on the depletion of the Earth's ozone layer. Rowland specializes in the research areas of radiochemistry, photochemistry, and atmospheric chemistry.

Rowland, while working with Molina, discovered that man-made chlorofluorocarbon (CFC) propellants accelerate the decomposition of the ozonosphere, which protects the Earth from biologically harmful ultraviolet radiation.

Rowland and Molina theorized that CFC gases combine with solar radiation and decompose in the stratosphere, releasing atoms of chlorine and chlorine monoxide that are able to destroy large numbers of ozone molecules. Their research initiated a federal investigation of the problem.

Research on CFCs and stratospheric ozone eventually led, in the 1970s to the regulation of use and manufacture of CFC-based aerosols in the United States, Canada and Scandinavia. The discovery of the so-called hole in the ozone layer over Antarctica in the mid-1980s supported their theory further. In 1987, the Montreal Protocol of the United Nations Environment Program became the first international agreement to control and reduce atmospheric damages by banning CFC production after 1996. Measurements of CFCs in the lower atmosphere confirm that the global response to this protocol has been remarkable.

Rowland has also been investigating the effect of methane gas, which has been steadily increasing in concentration, on the atmosphere. Methane absorbs global infrared radiation, and increases in its concentration contribute to the "greenhouse effect," the gradual warming of the earth's surface.

He is currently the elected Foreign Secretary of the National Academy of Sciences. Prizes received by Rowland include the Tyler World Prize in Ecology and Energy and the Albert Einstein Prize.

Presentation
The changing atmosphere in 2004

1999 Nobel, **Ahmed ZEWAIL**

Professor Ahmed H. Zewail, born in Egypt in 1946, won the *1999 Nobel Prize in Chemistry* for his groundbreaking work in "showing that it is possible with rapid laser technique to see how atoms in a molecule move during a chemical reaction."

Linus Pauling Professor of Chemical Physics, Professor of Physics at the California Institute of Technology (CalTech) and Director of the NSF Laboratory for Molecular Sciences, he is internationally recognized for his efforts in a field which he pioneered, known as femtochemistry. This technique uses ultra-fast lasers to probe chemical reactions as they actually occur in real time.

Because reactions can take place in a millionth of a billionth of a second, Zewail's research has, with state-of-the-art lasers, made it possible to observe and study this motion for the first time, thus allowing scientists to explore nature at its fundamental level.

Specifically, Zewail seeks to better understand the way that chemical bonds form and break. With the development of laser techniques, he and his team have been able to obtain greater insights about the exact nature of chemical bonds. The field has had wide-ranging impact on chemistry and photobiology all over the world.

Zewail's current research is devoted to dynamical chemistry and biology, with a focus on the physics of elementary processes in complex systems.

His other honors include the Robert A. Welch Prize, the Wolf Prize, the King Faisal Prize, and the Peter Debye Award. From Egypt he received the Order of the Grand Collar of the Nile, the highest state honor, and postage stamps were issued to pay tribute to his contributions to science and humanity.

Presentation
BioVision at the Interface

2001 Nobel, **Ryoji NOYORI**

Ryoji Noyori, born in Japan in 1938, shared half of the *2001 Nobel Prize in Chemistry* with William S. Knowles "for their work on chirally catalyzed hydrogenation reactions". The other half went to K. Barry Sharpless.

Together, Noyori and Knowles developed molecules that can catalyze important reactions so that only one of the two mirror image forms is produced. The catalyst molecule, which is chiral itself, speeds up the reaction without being consumed, and just one of these molecules can produce millions of molecules of the desired mirror image form. Their work opened up a completely new field of research in which it is possible to synthesize molecules and materials with new properties, and the results of their basic research are being used in industrial syntheses of many pharmaceutical products such as antibiotics, anti-inflammatory drugs and heart medication.

Noyori has been a Professor of Chemistry at Nagoya University since 1972, and is currently the President of RIKEN (the Institute of Physical and Chemical Research), Japan's top Center of Excellence (CEO) Institute in the field of natural science and technology. In addition, he is a member of the editorial boards of more than 30 international journals, and has served as Science Advisor for the Japanese Ministry of Education, Culture, Sports, Science and Technology.

Presentation
Asymmetric Catalysis: Roles in Biomedical Science and Technology

BIOGRAPHIES
and
ABSTRACTS

ABOU GHARBIA, Magid

Dr. Abou-Gharbia received his BSc in Pharmaceutical Sciences in 1971; MSc in Organic Chemistry in 1974 from Cairo University; PhD in 1979 from the University of Pennsylvania; two-year NIH Postdoctoral Fellowship at Temple University. Dr. Magid joined Wyeth Drug Discovery and Development in 1982. As Vice-President and Head of Chemical and Screening Sciences, he oversees research efforts at Collegeville, PA; Princeton, NJ; Pearl River, NY and Cambridge, MA.

Research contributions impact in various therapeutic areas: Wyeth Medicinal Chemistry discovered three marketed drugs and many compounds under clinical evaluation including first-in-class Antidepressant Effexor®; Anticancer Agent Mylotarg™; a Sedative Hypnotic Sonata®; a Broad Spectrum Antibiotic Tigecycline, and a Non-Steroidal HRT Bazodoxifen.

Scientific contributions include over 140 invited lectures, presentations and publications; inventor of 95 US-issued patents and over 300 patents worldwide. Awards include the Procter Medal for contributions in advancing public health and progress of pharmaceutical research and health profession (2003); American Chemical Society Earle B. Barnes Award for Outstanding Leadership in Chemical Research Management (2001); Philadelphia Organic Chemists Club (POCC) Award, Outstanding Scientific Research in Organic Chemistry (2001); Egyptian Pharmaceutical Society Award, Drug Discovery Research (2000); Wyeth–Ayerst Exceptional Achievement Award (1992); and others.

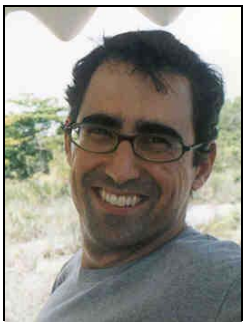
Scientific and professional activities include: ACS, Corporation Associates Committee, ACS Award Canvassing Committee, Society for Neuroscience, American Association for the Advancement of Science, the Royal Society of Chemistry and on the Editorial and Scientific Advisory Boards of many journals. He holds several academic appointments and is an adjunct Professor of Medicinal Chemistry at Temple University, Philadelphia, PA; Cairo University, Cairo, Egypt and the University of Ferrara, Ferrara, Italy; Chair of the Scientific Advisory Board of Rider University; Board of Visitors of the School of Pharmacy, Temple University and member of the R&D Council of New Jersey.

Abstract

Impact of Chemical and Screening Technologies in Drug Discovery

M. Abou-Gharbia, Chemical and Screening Sciences, Wyeth Research

Drug Discovery and Development is a challenging and complex process that involves the dedicated multidisciplinary efforts of many R&D functions. Breakthroughs in innovation and process refinements have dominated drug discovery during the last decade, which have been aimed at increasing efficiencies and, thus, reducing cycle time. Despite these technological advances, the number and diversity of new chemical entities (NCEs) approved for human use has not kept pace from the 1980s to 2000. At the turn of the 21st century, the deciphering of the human genome will lead to an explosion in genomic technologies and, subsequently, to the identification and characterization of new targets for new small molecule ligands. Meeting these demands will require a well-integrated discovery effort and the application of many state-of-the-art technologies at the earlier stages of the R&D process. Chemical & Screening Sciences will play a pivotal role in this process, not only at the front end in discovering and optimizing new leads, but also at the later stages of lead selection to improve the efficiency of drug development. The desired out-come will be to increase the "hit rate" for identifying clinical candidates that reach NDA registration. This presentation will discuss Wyeth Chemical & Screening Sciences capabilities and enabling technologies which led to the discovery of several innovative drug candidates.



AMARAL, Weber

He is currently a Senior Scientist at the International Plant Genetic Resources Institute (IPGRI) (http://www.ipgri.cgiar.org), based in Rome, coordinating the Global Forest Resources Project. Weber A.N. Amaral, a Brazilian national, obtained his PhD and MA degrees from Harvard University, USA. He also holds a Master of Sciences degree from the University of São Paulo (USP), Brazil. His research and professional interests are in the areas of conservation genetics, sustainable use of biodiversity, biotechnology and biosafety, sustainable development and environmental public policy. He is also an Associate Professor at the University of São Paulo (http://www.esalq.usp.br), ESALQ, Brazil (on leave). Prior to his current assignment at the University of São Paulo, he was an Assistant Professor, Agronomy and Forestry at the State University of São Paulo (UNESP: http://www.fac.unesp.br) from 1989 to 1996. He has published more than 50 articles in peer-reviewed journals, several book chapters and two books. His professional career has included working as a researcher in Plant Genetics and Breeding and Head of the Research Department of the company Votorantim Celulose S/A in Brazil. Weber has been a consultant on Forest Genetics and Forest Biodiversity for the Brazilian government, NGOs and private sector. He speaks fluent English, Italian, Portuguese and Spanish.

Abstract

Application of biotechnology tools in biodiversity and biocomplexity studies: Examples from forests ecosystems and tree-species

Weber Amaral, Senior Scientist, International Plant Genetic Resources Institute (IPGRI), Italy

This paper focuses on how recent advances in molecular genetics and biotechnology are contributing to better understand genetic processes as well as evolutionary studies in forest ecosystems. It explains how and in what biotechnology tools are contributing to set priorities for conservation of biodiversity as well for better assessing patterns of diversity across terrestrial landscapes. It provides examples from forest ecosystems and case studies from developing countries. Tree species are, in general, non-domesticated (with a few exceptions of certain species of *Eucalyptus*, *Pinus*, *Populus* and *Prunus*), and long living organisms, from which basic information on their biology, geographical distribution, breeding systems and genetic structure are either lacking or scattered. During the past decades, modern biotechnology tools, such as molecular markers, DNA sequencing and functional genomic studies had contributed to address some of these questions, and to help in the development of better sustainable use strategies. This paper also claims that genetic engineering techniques for the production of GMTs (genetically modified trees) are another emerging set of the biotechnology tools, therefore they should not be treated as a surrogate of biotechnology itself. There were several concerns about the use of genetic engineering tools for food and agriculture. The intrinsic differences between crops and trees explain why and how the debate about genetic modification in crops could be instructive for forest trees and forestry research, and why this debate should include other dimensions besides the production of genetically modified organisms in production systems, and also to encompass studies on functional diversity and evolution of complex adaptive traits in tree species from multiple ecosystems.

AMMANN, Klaus

Prof. Dr. Klaus Ammann, Director, Botanical Garden, University of Bern, Altenbergrain 21, CH–3013 BERN, Switzerland (klaus.ammann@ips.unibe.ch). Studied at University of Berne: Thesis on Vegetation History 1972, *summa cum laude*. Studies at Duke University, NC, USA, Bergen, Norway and Kingston, Jamaica. Director of Botanical Garden, University of Berne, since 1996, Prof. Hon. University of Berne since 2000. Lecturing in Biodiversity, Air Pollution Biomonitoring (ETHZ). Chairman European Group of Plant Specialists, IUCN. Steering Committee of PLANTA EUROPA, Euro+Med, AIGM, Swiss Biosafety Committee Chairman of Section Biodiversity of European Federation of Biotechnology. Editor-in-Chief (Ecology) of Environmental Biosafety Research. Faculty Biotechnology teaching UNIDO Member of Steering Committee Global Forum Chile UNIDO Research Projects Chemotaxonomy of macro-lichens, calibrated biomonitoring of air pollution with lichens, molecular systematics with lichens, ecological monitoring, ethnobotany in Jamaica, ecological monitoring in Bulgaria. Ecological risk assessment of vertical gene flow in Switzerland (http://www.bats.ch). Two EU Projects on Gene Flow and Plant Conservation of Europe: First, Gene Flow of Brassicaceae in Europe, coordinator Swiss participation; and second, Euro+Med, coordinator work packages Atlas Florae Europaeae, Caryological Data Base Patras, European Red List. Two projects in collaboration with UNIDO (United Nations Industrial Development Organization): (a) Compendium on Risk Assessment Research, Member of Teaching faculty for Diploma Course; (b) Global Initiative on Education in Biotechnology. One Website Project (http://www.bio-scope.org), in collaboration with Biolinx in Frankfurt. Report on the Impact of Biotechnology on Biodiversity: http://www.botanischergarten.ch/Biotech-Biodiv/Report-Biodiv-Biotech12.pdf. He encourages the process leading to solutions concerning today's crucial themes such as protection of biodiversity, risk assessment of genetically engineered crops and the public debate about biotechnology, which should serve to enhance the dialogue between the rich and the poor, hunger being the foremost problem on this planet.

Abstract

Impact of Agriculture on Biodiversity

Prof. Dr. Klaus Ammann, Director, Botanical Garden (Switzerland)

The greatest threats to biodiversity are destruction and deterioration of habitats, particularly in tropical developing countries, and introductions of exotic species. Maintaining biodiversity requires addressing these threats. Many of the factors affecting biodiversity are related directly or indirectly to the needs of agricultural production, and it is important to consider how these impacts could be mitigated. Increasing human population and limited arable land have demanded increased agricultural productivity leading to more intensive agricultural practices on a global basis. In response, higher yielding crop varieties have been coupled with increased inputs in the form of fertilizers, irrigation, and pesticides and more intensive practices such as greater tillage of soil and fewer crop rotations and fallows. More recently, technological advances have led to the development of genetically modified (GM) crops with insect resistance and herbicide tolerance that have a demonstrated potential to enhance productivity. These technologies have been broadly adopted in some farming systems, replacing broad-spectrum insecticides in some systems and facilitating reductions in tillage in others. Agricultural impacts on biodiversity can be divided into impacts on in-field biodiversity and impacts on natural (off-site) biodiversity. Intensive agriculture has negative impacts on both species and genetic biodiversity within agricultural systems, primarily because of low crop and structural diversity but also through pesticide use and tillage. These impacts can be addressed by encouraging diversification of agricultural systems, and by reducing broad-spectrum insecticide use and tillage, both of which GM crops can achieve in some systems. Agricultural impacts on natural biodiversity primarily stem from conversion of natural habitats into agricultural production and from irrigation. Transport of fertilizers and pesticides into aquatic systems also causes significant habitat deterioration through eutrophication and toxicity. Increasing the efficiency of agricultural production can reduce these impacts, as can minimizing off-site movement of fertilizers and pesticides by reducing tillage and total agricultural inputs. Technologies such as GM crops are important in this respect. Overall, creating agricultural systems with lower impact on offside biodiversity and maintenance of high levels of inside biodiversity will require us to utilize all available technologies while simultaneously encouraging appropriate farmer practices. This also means that agricultural and conservation policy should work together in order to develop appropriate markets.

AMRI, Ahmed

Moroccan citizen, PhD in plant genetics and breeding from Kansas State University in 1989. Worked for INRA Morocco for 20 years as cereal breeder contributing to the release of more than 20 varieties and to germplasm enhancement for resistance to pests mainly Hessian fly in wheat. He joined ICARDA in 1999 to coordinate the West Asia Dryland Agrobiodiversity Project, and since 2001 he is also coordinating the activities of West Asia Regional Program in Amman.

Abstract

Preventing land degradation and loss of agrobiodiversity in dryland ecosystems in West Asia

Ahmed Amri, Jan Valkoun and Eddy De–Pauw
International Center for Agricultural Research in the Dry Area (ICARDA)

Recent decades have witnessed rapid degradation of dryland ecosystems that led to negative impacts on livelihoods of local communities and an increasing loss of resource base, mainly agrobiodiversity of significance to global food security. These losses might be irreversible if no actions are undertaken to ensure sustainable agricultural development through an integrated ecosystems management and diversification of income sources for local communities.

A holistic research/development approach based on integrated natural resources management, participatory approaches, sustainable livelihood strategies and international and regional cooperation and networking, needs to be developed. The approach faces a challenge of individual and national interest for increasing agricultural production while sustaining the natural resources.

The GEF-funded West Asia dryland agrobiodiversity project coordinated by ICARDA and implemented in Jordan, Lebanon, Palestinian Authority and Syrian Arab Republic aims at promoting community-based *in-situ* conservation of landraces and wild relatives of species of world importance originating from the Fertile Crescent center of diversity. Eco-geographic and farming systems surveys showed that overgrazing and habitats destruction for cultivation, urbanization and quarrying purposes are reducing significantly natural habitats and the wild biodiversity they encompass. The expansion of introduced species mainly of fruit trees and the use of improper agricultural packages have led to the replacement of landraces even in areas where long-term economic returns are questionable and degradation of soil and water resources is apparent. GIS/RS techniques were very instrumental in mapping the changes in land uses, and cost–benefit analysis are helping to draw necessary messages for farmers and policy-makers.

The project helped in spotting areas of high diversity and in developing their management plans based on use of water harvesting techniques, replanting with native species, demonstration of low-cost agricultural packages (improving seed quality, nursery development, integrated pest management, etc.) and use of alternative feed resources that can help to take pressure on degraded rangelands. The project has provided training and helped initiate business–oriented actions for local communities and mainly women on add-value technologies (processing, libeling, etc.) and on alternative sources of income (honey and dairy production, cultivation of medicinal plants, eco-tourism, etc.).

Increasing public awareness and building national capacity in areas of integrated natural resources management will help to sustain the goals of the approach that will require also the empowerment of local communities through reforms of existing policies and legislations.

Badr, Effat

- PhD Columbia University, USA, 1963
- Professor of Genetics, Alexandria University, 1977–99
- Chairman, Department of Genetics, Alexandria University, 1991–94
- Vice-President, Egyptian Society of Genetics, 1979–84, 2001–present
- Chairman of the Permanent Scientific Committee of Genetics, Supreme Council of Universities, 1995–98 and member of the Board, 1978–present
- Fulbright Award, Genetic Engineering Research, Harvard University, 1984
- Visiting Professor, National Center for Scientific Research (CNRS) France 1979 and Grenoble University, 1983
- Notional Award in Agricultural Sciences Egypt, 1974
- Medallion of Sciences and Arts, 1st Class, Egypt, 1976
- Listed in the Encyclopedia of Egyptian National Figures, 1989
- Member of the Task Force Committee on Biotechnology, center for International Development at Harvard University, 1999–present
- Member of the High Education Sector Committee of Genetic Engineering and Biotechnology, Supreme Council of Universities, 1998–present
- PI of Several Joint Scientific Projects with American and French Universities
- Director of Central Laboratory of Biotechnology, Faculty of Agriculture, 1992–95
- Chairman of Molecular Biology Unit, University of Alexandria Research Center, 1978–84
- On the editorial board of the Egypt. J. of Genetics and the Arab J. of Biotechnology
- Member/member of board of several NGOs concerned with society and the environment
- Active in promoting public awareness on Genetic Engineering Biotechnology and environment through public lectures and the media
- Member of the Biotechnology and Geneting Engineering Committee, Mubarak City of Science and Technology, Burg El Arab, Alexandria, 2002–present.

Abstract

Gene Manipulation Technology and Human Health:
Ethical and Social Considerations
Effat A. Badr, Professor of Genetics, Faculty of Agriculture, Alexandria University

Modern techniques of genetics promise applications in agriculture and medicine that will greatly increase our well-being. However, prospects of the new technology are clouded by doubts and fears of consequences. In medicine, the progress of genetic knowledge is creating new ethical dilemmas as well as magnify existing ethical problems. Few would argue against the development of new drugs, therapies and forensic applications, where clear benefits are obtained. Perhaps the one area in the medically related applications of genetic research that is difficult is the human genome information. Genetic screening, and thus the possibility of genetic discrimination, is an area of active debate at the moment. The molecular diagnosis of genetically based disease is now well-established, and the major ethical dilemmas tend to center around whether or not a fetus should be aborted if a disease-causing trait is detected. If, and when, it becomes possible to screen routinely for polygenic and multifactorial traits, perhaps involving personality and predisposition to behavioral problems, the ethical picture will become even more complex. This whole area of predisposition, as opposed to a confirmed causal link between genes and disease, is a difficult area in which to establish ethical rules, as many of the potential problems are as yet hypothetical.

The influence of commercial interests is an important moral issue of this technology. Patenting gene sequences raises questions, as does the production of products such as *bovine somatotropin* (BST). Many people see applications of this advanced technology, as driven by commercial pressures. Whether its benefits will be available only to the rich, is questionable!!

Despite the purist argument that science is ethically and morally neutral and that its applications create dilemmas, such separation is probably an artificial distinction. We will all have to cope with the consequences of gene-based research and its applications. Informed and vigorous debate is the only way that the developments of gene manipulation technology can become accepted and established.

BADRAN, Ibrahim

Professor Dr. Ibrahim Badran was born in 1924, in Egypt. He had his M.B. CH.B from Cairo University, Faculty of Medicine in 1947, and his M.Ch, M.D. from Cairo University in 1951. Professor Badran is one of the leading and eminent surgeons and he is known as the father of Surgery in Egypt. He has been a University Professor and Chairman of Surgery Department, Cairo University since 1966, President of the University, 1978–1980.

He served as the Egyptian Minister of Health (1976–1978).

He was the President of the Academy of Scientific Research and Technology (1980–1984), Chairman of the Specialized Research Council of Medical Sciences since 1984, Chairman of National Social Services Council since 1996, member of Supreme Council of Islamic Affairs, member of Islamic Research Organization, Al-Azhar since 1995, Medical Consultant of WHO, member of the board of governors of the Islamic Medicine Organization, Fellow of Royal Society of Medicine, Chairman of the Specialized National Council for Medicine in Egypt.

He was awarded the Republic Order, First Grade, Egypt, 1983; Honourable Order, France, 1983. Order of Recognition, First Grade, Egypt, 1985.

Professor Badran was awarded Honorary Doctorates from Menoufia University, 1983; Honorary Doctorate from American University in Cairo, 1988; Honorary Fellow of the World Surgeons Faculty, 1990.

He is author of 7 books dealing with health policy in Egypt, future of scientific research, development of university education and development of human resources.

Professor Badran has 120 scientific papers in surgery and articles in different medical and social disciplines.

Professor Badran was elected a Fellow of the IAS in 2001.

BEACHY, Roger

Roger N. Beachy is President and Director of the Donald Danforth Plant Science Center in St. Louis, Missouri. He is recognized for his work in molecular virology, gene expression and biotechnology, in particular for development of transgenic plants that are resistant to virus infection. Beachy was born in Ohio in 1944. He received the BA degree from Goshen College (IN) and a PhD in Botany and Plant Pathology from Michigan State University in 1972. After post-doctoral fellowships at the University of Arizona and Cornell University, in 1978, Beachy was appointed to the faculty at Washington University, St. Louis. In 1991, he joined The Scripps Research Institute in La Jolla, California, holding the Scripps Family Chair in the Department of Cell Biology, and as Head of the Division of Plant Biology. He was co-founder of the International Laboratory for Tropical Agricultural Biotechnology. In 1999, he accepted the position as founding president of the Danforth Center. Beachy was elected to the National Academy of Sciences in 1997 and received the Wolf Prize in Agriculture in 2001. He is a Fellow of the American Society for Microbiology, and the American Association for the Advancement of Science. He received awards from the American Society from Plant Physiology and American Phytopathological Society and was recipient of the Commonwealth Award. He continues to run an active research program at the Danforth Center. Beachy is a frequent speaker on the role of biotechnology in agriculture, and is a strong proponent for training of, and cooperative research with, scientists in developing countries. He is an advocate for implementation of policies of technology management that encourage sharing of intellectual properties, and research for the public goods.

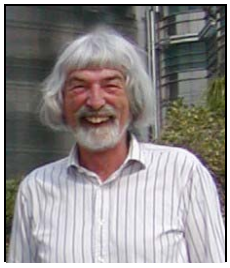
Abstract

Developing partnerships to facilitate agriculture biotechnology for developing economies
Roger N. Beachy, Donald Danforth Plant Science Center, St. Louis, MO, USA

The many potential applications of agricultural biotechnology that are being developed in advanced laboratories around the globe promise many benefits if judiciously integrated with other aspects of crop production. However, the technologies will have little or no chance of success without the participation of partners that collaborate in priority setting, technology transfer, and eventually in leading the efforts to fulfill regulatory requirements in the participating country. And, while there is substantial interest in partnering there are many hurdles to overcome, not least of which is identifying one or more donors that are willing to see the process through to its conclusion. Increasingly, a successful conclusion includes bringing economic benefit to farmers/producers in the target country. At the Danforth Center we have developed partnerships to develop and apply technologies to enhance disease resistance and nutritional value in food crops for selected countries in Africa and Asia. The presentation will discuss the challenges of partnerships, and the progress that has been made to implement several R&D projects. This includes: developing durable resistance to virus diseases in cassava, sweet potato, and rice; enhancing folic acid content in plants; and enhancing drought tolerance. While these projects are at different stages of development and implementation, they represent opportunities for agriculture that will bring benefits if, and only if, meaningful partnerships are established.

BENNETT, ANDREW

Andrew Bennett is Executive Director of the Syngenta Foundation for Sustainable Agriculture. He is also President of the Tropical Agricultural Association (United Kingdom), a member of the Council of the Overseas Development Institute, London, and a member of the Board of Trustees of the Centre for International Forestry Research, Indonesia. He was formerly Director, Rural Livelihoods and Environment for the British Department for International Development where he was responsible, as advisor, to UK Ministers on policy and programs in the fields of livelihoods, natural resources, environment, sustainable development and research. He has over 35 years experience in international development and disaster management, having worked in development programs in Africa, Asia, Latin America, the Pacific and the Caribbean. He also has extensive experience in international negotiations on natural resources, research, environment and development.
Andrew is married with one daughter and relaxes by walking and gardening.



BENNETT, David

Dr David Bennett David Bennett is Acting General Secretary of the European Federation of Biotechnology (EFB), and Secretary of its Task Groups on International Relations, on Public Perceptions of Biotechnology, and on Education and Mobility together with its Task Groups on Innovation and on Biosafety pro tem. He has a PhD in biochemical genetics and an MA in science policy studies with long term experience, activities and interests in the relations between science, industry, government, education, law, the public and the media. He is a member of numerous national and international organizations and committees in biotechnology, and works with the European Commission, government departments, companies, universities, media and public interest organizations in these areas.

CARLONE, Claudio

Claudio Carlone was born in Rome, in 1952, and currently lives in Milan, where he works as an entrepreneur and consultant. Carlone received his degree in chemical engineering and biology from the University of Rome "La Sapienza" and later did research in the biotechnology sector. In the 1980s, Carlone launched a career in communications, focusing on the relationship between science, enterprise and society and the role of new technology in development. In 1989, he founded Hypothesis (of which he is still president), an agency devoted to the diffusion of scientific and technological culture and the provision of strategic consulting services in the hi-tech sector for a wide variety of companies and institutions. The company is a partner of the *Nuovo Mercato di Borsa Italiana Spa* (the Italian Stock Exchange). Carlone has chaired or participated in numerous international conferences and congresses and, among his other activities, he coordinated the City of Milan's Committee for Science and Technology (CAST), whose members included the Nobel laureates Renato Dulbecco and Carlo Rubbia.

Abstract

Venture Capital, Patents and the Market: The case study of Biotechnology in Italy

Claudio Carlone, Chairman, Hypothesis, Milano, Italy.

The biotechnology sector has recently returned to the limelight as a result of the notable increase in sales by biotech firms. Estimated annual growth rates have a trend that is even more positive in the light of the setback that affected this sector.

Biotechnology is gaining more Venture Capital (VC) in the USA as investors encounter fewer regulatory hurdles for new drugs. Its rise among VCs comes as some of the biggest names in traditional tech who predict biotech will usurp technology in terms of impact.

Biotech is one of the riskiest industries because start-up costs are especially high, as are failure rates. It is surging, in part, because the US Food and Drug Administration is speeding-up the drug-approval process.

In terms of the performance of listed companies, the biotech sector is comfortably outstripping the other indices. At the global level, equity investment in biotech reached its peak in 2000. Since 2001 onwards, there has been a considerable decrease in the capacity of these companies to attract financial resources.

At the European level the trend is strongly positive, with investment amounting to about 1.4 billion Euros in 2002. Nevertheless, the ratio of biotechnology patents to total patents is far higher in the USA than the European Union and Japan.

Moreover, countries as Canada, Denmark and New Zealand, have the highest ratio of biotechnology to total patents. In contrast, Italy and South Africa have the lowest.

If we examine the picture in greater detail, biotech accounts in Italy for just 1% of total investment, mainly focusing on mature companies. Start-ups have just a small and dwindling presence.

The key problems for investment in start-ups in the biotech sector will be reported together with solutions available to boost investment in the risk capital of biotech companies.

In addition, some Italian equity investment experiences show the importance of this form of investment as a growth instrument.

CATLEY–CARLSON, Margaret

Margaret Catley–Carlson is actively involved in organizations that apply science and knowledge to national and international problems in freshwater governance, health, agriculture, environmental protection, international development and development finance. She is Chair of the Global Water Partnership, of the Board of ICARDA (International Center for Agricultural Research in the Dry Areas) in the Syrian Arab Republic, and the Water Resource Management Advisory Committee for Suez Lyonnaise des Eaux of Paris. She is Vice Chair of the International Development Research Center in Ottawa and a member of the Board of the International Institute for Environment and Development (IIED) in London and the Library of Alexandria (Egypt). Mrs. Catley–Carlson was President of CIDA, the Canadian International Development Agency (1983–89), and of the Population Council (1991–99). Her professional career began as a career diplomat Canada; she has been Deputy Minister of Health in Canada, and Deputy Director (Operations) of UNICEF, with the rank of Assistant Secretary-General of the United Nations. She has received eight honorary became an Officer of the Order of Canada in 2002.

CERNEA, Michael

Dr. Michael M. Cernea is Research Professor of Anthropology and International Affairs, George Washington University, Washington, DC, and Member of the Science Council of the Consultative Group for International Agricultural Research (CGIAR). Formerly, he worked as the World Bank's Senior Adviser for Social Policy and Sociology for about two decades. He has provided advisory work on social policy, cultural and poverty issues to ADB, CGIAR, FAO, OECD, UNDP, BP and other international organizations. A native of Romania, Professor Cernea was also elected as Member of Romania's Academy of Sciences, and Chairman and Chief Scientist of the Science Board of the Social Development Institute, Hohai University, China. At the World Bank, Dr. Cernea held several senior positions in the Operational Policy Vice-Presidency and in the Environmental and Social Sustainability Vice-Presidency. He wrote or contributed in defining some of the Bank's key social and cultural policies, particularly its policies on agricultural extension, population resettlement, cultural heritage preservation and management, water and irrigation, indigenous populations, forestry, and others. Dr. Cernea has carried out social research on policy and operational issues in hydropower, agriculture, irrigation, forestry, mining, and other sectors, as well as direct project design and evaluation work in many countries including: Burma, China, India, Indonesia, Kenya, Mexico, Moldova, Morocco, Nepal, Pakistan, the Philippines, Romania, Tanzania, Thailand, Togo, Ukraine, Vietnam, Republic of Yemen and others. He also worked as member of several International Development Expert Panels. Professor Cernea has taught in Universities in Europe, India, Japan, China, and the US. He was a Fellow of the Center for Advanced Studies in Behavioral Sciences, Stanford, a Fellow in Residence of the Netherlands Institute for Advanced Studies in Wassenaar, the Netherlands; a Visiting Scholar at Harvard University (1990/91).

CHEN, Zhu

Vice President, Chinese Academy of Sciences; Director, Chinese Human Genome Center at Shanghai; Director, Shanghai Institute of Hematology, Ruijin Hospital, Shanghai Institute of Hematology; Co-Chair, InterAcademy Panel.

Academic background

1975–77: Undergraduate study in Shangrao Medical School, Jiangxi, China.
1977/78: Teaching assistant, Shangrao Medical School, Jiangxi, China.
1978–81: Graduate study in Shanghai Second Medical University (SSMU), Shanghai, China.
1981–84: Intern, Department of Medicine, Shanghai Rui-Jin Hospital, Shanghai Second Medical University (SSMU), Shanghai, China.
1984/85: "Interne étranger des Hôpitaux de Paris", Laboratoire Central d'Hématologie, Hôpital Saint-Louis, Paris, France.
1985–89: PhD study in Hôpital Saint-Louis, Université Paris VII, Paris, France.
January–July 1989: Postdoctorial study in Hôpital Saint-Louis, Université Paris VII, Paris, France.

Working experiences and positions

In China

1990–present: Professor, Shanghai Rui Jin Hospital, SSMU, Shanghai, China.
1995–present: Director, Shanghai Institute of Hematology
Member, Chinese Academy of Sciences
1998–present: Director, Chinese National Human Genome Center at Shanghai
2000–present: Vice President, Chinese Academy of Sciences

In other countries

July–October 1991
Visiting Professor in Division of Medical Oncology, Department of Medicine, Mount Sinai Medical Center, New York, USA.
June 1992–January 1993
Visiting Professor in l'Institut d'Hématologie, Hôpital Saint-Louis, Paris, France.

Awards and honors

1996 HLHL Award for Science and Technology, China
1997 Doctor Honoris Causa, University of Genova, Italy, approved by the Italian Ministry of Education
1997 Prix de l'Qise, La Legue Nationale contre le Cancer, France
1998 "Qiu-Shi" Award for Outstanding Young Scientist, China
1999 Cheung Kong Scholars Achievement Award from the National Ministry of Education, China
2002 Chevalier de l'Ordre National de la Légion d'Honneur, France

Membership

Member, Chinese Academy of Sciences
Foreign Associate, National Academy of Sciences of US
Council Member, Human Genome Organization (HUGO)

Abstract

Filling the South–North gap in life science and biotechnology through capacity building, innovation and benefit sharing: view from a Chinese life scientist

Zhu Chen, Vice-President, Chinese Academy of Science

Life sciences and biotechnologies represent new opportunities not only for science and technology advancement, but particularly for socioeconomic development in the 21st century all over the world. Nevertheless, sound strategies are needed to promote the life science/biotechnology and bioeconomy in both North and South countries. In China, over the past two decades, through substantial investment into infrastructure and improvement of environment in favor of innovation, a number of centers of excellence have been established. Significant progress has been achieved in some areas of priority basic research, including genomics and functional genomics, neuroscience, developmental biology, biodiversity and molecular evolutions. Attention has been paid to two aspects: combination of science frontiers with the local need and resources, and the multidisciplinary approach. Concerning the biotechnology, China occupies a leading position in the areas of hybrid rice and drug development based on natural compound. Meanwhile, sophisticated transgenic technology and research on stem cell as well as therapeutical cloning have also been implemented. While improving the legal and ethical atmosphere for protection of intellectual property and healthy use of biotechnology, China applies the principles of benefit sharing, both in information/knowledge accessibility in pre-competitive research and in the recognition of local community contribution, scientific body and biotechnology R&D industry. A new move in China is to create policies to attract more talents, to acquire more patent/standards, and to promote South–South and South–North collaboration.

CHOUDHARY, Muhammad

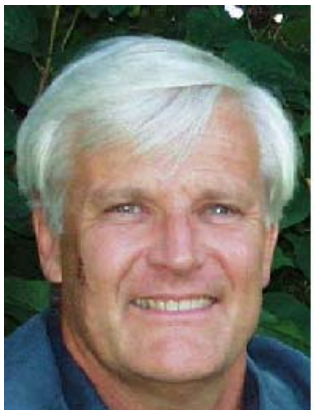
Dr. M. Iqbal Choudhary, is a Professor of Structural Organic Chemistry and Acting Director, Hussein Ebrahim Jamal (H.E.J.) Research Institute of Chemistry, University of Karachi, Pakistan. He has written and edited 8 books, most of which have been published in USA and Europe. He is also the author of over 313 research papers and chapters in top international science journals of the West including Journal of American Chemical Society, Journal of Organic Chemistry, Tetrahedron, Journal of Chemical Society, etc. This is by far the largest number of quality publications from any scientist in Pakistan of his age group. He is the Volume Editor of an international book series, "Studies in Medicinal Chemistry" (the Netherlands) and Editor of an international Science journal, "Mini Reviews in Medicinal Chemistry" published from Amsterdam. He has served as visiting faculty and research associate in many prestigious universities of the world including Cornell University (New York), Purdue University (Indiana), Pennsylvania State University (Pennsylvania), the Scripps Institution of Oceanography (University of California at San Diego, California) and University of Barcelona, Spain. His work has resulted in a number of important scientific discoveries including the discovery of plant materials with pronounced antidiabetic, anti-epileptic and cholesterol-lowering activities. Over 300 new natural products including steroids, triterpenoids, alkaloids, flavones, etc. have been isolated from a variety of medicinal plants, sea alga, marine invertebrates and microorganisms by his research group. During this outstanding work, several new classes of natural products were discovered which expanded the knowledge of this important field of chemical sciences.

Abstract

Medicinal Plants—Importance in Health and Economy

M. Iqbal Choudhary and Atta-ur-Rahman, H.E.J. Research Institute of Chemistry, International Center for Chemical Sciences, University of Karachi, Karachi–75250, Pakistan.

About 80% of the people in the developing world rely on herbal remedies as a principal means of preventing and curing illnesses, and several traditional medical systems are based on the use of plants. The remedies based on traditional medicinal plants often have minimal side effects, and the relatively high cost of synthetic medicines in developing countries often makes traditional herbal medicines an affordable choice for the poor, especially those living in rural areas. Even where modern medical care is available and affordable, many people prefer more traditional practices. Modern health care research is largely focused on increasing the life span and intervention and development for the improvement of quality of life is often neglected. Similarly drug development efforts, largely financed by multinational conglomerates, are focused on diseases prevalent in the developed world and diseases such as parasitic diseases, kidney disorders, epilepsy, diarrhoeal diseases, the so-called poor man diseases are often neglected. It is therefore important that the developing world, which is the custodian of waste floral resources and unbroken tradition of the use of natural products for therapeutic purposes, should contribute in the process of drug development. The value-addition on floral resources can also be an important source of earning for the developing world in the global market, of over US$70 billion annually.



CHRISTIE, Werner

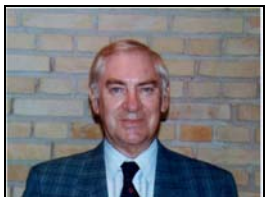
Dr. Werner Christie is a former Minister of Health of Norway, and Chair of the Biotechnology Advisory Board of Norway. Werner is a Medical Doctor who also studied Social Sciences. He also has long experience as a farmer. He has worked as a public health officer and hospital manager in Norway and has carried out research and published a textbook in the planning and management of health care. He has served on a number of boards for health-care providers, investors and startups. He is a special advisor in Medicine and Biotechnology for the Norwegian Trade Council, and has served two years in that function in San Francisco. He served as Chairman of WHO's "Stop TB" initiative in its initial two years, now a worldwide public–private partnership against tuberculosis. He is now also working out of his own Company "World Health Connections" as an independent advisor in biotechnology, consulting both private and public enterprises on entrepreneurship, strategy and partnerships.

Abstract

Global Health Challenges and the Impact of Biotech Community on the Developing World

Dr. Werner Christie, President, World Health Connections; Former Minister of Health (Norway)

The presentation will address the global health challenges, and the impact that a more focused effort from the biotech community could have on better health conditions and welfare for the population in the developing world. It will also elaborate on the hurdles for this effort, both medical, economic and political. As a conclusion some possible action points for the world community will be indicated as a departure point for panel discussion. The main challenges relate to the three epidemic diseases Aids, Tuberculosis and Malaria. Other infectious and non-infectious diseases are causing high death and disease tolls as well. The suffering, social and economic impact related to these diseases is huge, but in many cases not impossible to significantly reduce. Biotechnology can offer great new possibilities in the diagnosis, prevention and cure of such diseases, but not alone. It will require a much more comprehensive and concerted action from the world community than we see today. We need stronger commitment, more research, better focused and more coordinated research from the international academic community. We also need a more interested medical industry and business community, for which new inventive mechanisms like different kinds of public private partnerships and funding mechanisms is necessary. Finally we need new effective policies for and in the developing world to implement both existing and new technologies and health programs. And the developed world needs to reinvent and reorganize its research, foreign aid and investment policies to be able to reach global health goals in due time. Some of the challenges and possible solutions to hurdles met in the current efforts from the world community will be addressed.



CLARK, Brian

Brian F.C. Clark obtained both his PhD in Chemistry and ScD in Molecular Biology from Cambridge University. Currently, he holds the post of Professor in the field of Biostructural Chemistry at the Institute of Molecular Biology, University of Aarhus.

Among his achievements in his field, he is responsible for the discovery of the Initiation Codon, which led to the start of protein coding. He is also credited for his work on the crystallization of an RNA molecule, the establishment of a research group for X-ray crystallographic structures, and, lately, for conducting studies on the concepts of structural macromolecular mimicry.

In the area of research, his interests and observations lie in subjects such as macromolecular mimicry and molecular mechanism of protein synthesis, molecular and cellular mechanism of ageing, and the use of phage display for different functions. He has also conducted research in functional genomics and technological transfer.

He has been a member of several prestigious scientific organizations and societies, such as the European Molecular Biology Organization Council and the Federation of European Biochemical Societies. He has risen to the post of Vice-Chairman of the former in 2003 and Chairman of the latter from 1998/99. He is also a member of the Board of Advisors of BankInvest.

Several honors were also bestowed on him starting in 1977 by becoming a member of the European Molecular Biology Organization Council and culminating in his receiving the Diplôme d'Honneur from the Federation of European Biochemical Societies in 2001.

COFFMAN, Ronnie

Ronnie Coffman serves as Director of International Programs and Chair of the Department of Plant Breeding of the College of Agriculture and Life Sciences, Cornell University. Previous positions include Associate Dean for Research and Director, Cornell University Agricultural Experiment Station; and Plant Breeder at the International Rice Research Institute (IRRI). Coffman's work has been important to the development of improved rice varieties grown on several million hectares throughout the world. He has collaborated extensively with institutions in the developing world and has served as a board member for several international institutes. His PhD is from Cornell and undergraduate work was done at the University of Kentucky, his home state.

Abstract

The Agricultural Biotechnology Support Project II (ABSPII) focuses on the safe and effective development and commercialization of genetically modified (GM) crops as a complement to conventional approaches in developing countries. The project will help boost food security, economic growth, nutrition and environmental quality in Africa and in Indonesia, India, Bangladesh and the Philippines. Funded by the United States Agency for International Development (USAID) and led by Cornell University, ABSPII is implemented by a consortium of public and private sector institutions.

Anticipated outcomes include increased agricultural productivity; improved local resource availability for research and development and the enhancement of leadership capacities; enhanced connection to global biotechnology resources; and institutionalization of FTO and IP audit processes in local partner institutions; an enabling environment for local IP licensing and for evaluation of bioengineered products; new private–public sector partnerships for product development and commercialization; and increased understanding by scientists of markets, regulatory environments, IP issues and other commercialization components.

The strategic approach is to focus on delivering bioengineered products to improve farmer productivity, working with actual products as concrete examples to develop capacity in licensing of IP and the regulatory approval process. It is also expected that working with actual products will improve the focus and productivity of institutional partnerships and bring focus to the communications and outreach.

Priority setting activities have attempted to address local demands through a systematic, participatory process; identified the bioengineered crop products that will bring the most benefit to each country or region; and determined the supportive and complementary roles that ABSPII should play.

Activities have been classified into four tiers. Tier I includes Bt eggplant and Bt potato, opportunities judged as likely to generate commercial products that will be adopted by substantial numbers of small scale farmers within 5 years. Tier II includes virus resistant tomato, late blight resistant potato, and papaya resistant to ring spot, opportunities that lack a key element allowing them to satisfy Tier I criteria. Tier III is comprised of opportunities promising for capacity building or product development that do not meet some of the key elements necessary for a higher priority. These include cassava resistant to mosaic disease, sigatoka resistant banana, Bt chickpea, feathery mottle resistant sweet potato, sunflower and groundnut resistant to tobacco streak virus, mustard high in pro-Vitamin A and rice tolerant to abiotic stress.

CUNNINGHAM, Patrick

Patrick Cunningham is Professor of Animal Genetics in Trinity College Dublin (Trinity College is the University of Dublin). He was formerly Deputy Director (Research) in the Irish National Agriculture and Food Research Institute (1980–88), Visiting Professor at the Economic Development Institute, World Bank (1988) and Director of the Animal Production and Health Division, Food & Agriculture Organization of the UN, Rome (1990–93). He is the author of over 200 scientific publications on the genetics of domesticated animals. He is Co-founder and Chairman of the biotechnology company IdentiGEN. He has been President of the European and World Associations of Animal Production, and serves on the European Life Sciences Group which advises Commissioner Busquin.

Abstract

New Times, New Challenges

Professor Patrick Cunningham, Animal Genetics, Trinity College;
Member of European Group on Life Sciences (Ireland)

The pace of scientific innovation has never been greater. In the developed world the expanding front of knowledge is creating new horizons of opportunity. Meanwhile the need for solutions to the problems of rural poverty, human health and nutrition, and food security are in many areas more urgent than ever.

The challenges to the biological sciences are many, but I wish to concentrate on two. The first is the task of understanding and then controlling or eliminating persistent and difficult tropical animal diseases. These cause enormous loss in the poorest areas in the world. Developments in the basic biological sciences should be able to provide solutions. In contrast to much of agricultural technology where application requires massive parallel investments in education and work practices, solutions in animal health can often be delivered rapidly and economically.

The second focus is more an urban one. As developing countries seek to double their meat supply in the coming decades, much of the response will be in the form of industrialized pig and poultry production. Such industrialized systems present huge challenges to feed supply, animal health, human health, environment and animal welfare. This is a rich field for application of talent and resources in biotechnology.

DAHLSTROM, Annica

Annica Birgitta Dahlström, Swedish, born 11 May 1941, widow with two children.

Education
1966: PhD (MD) thesis (Cum laude) at Karolinska Institute, Stockholm
1967: Assistant Professor (docent) of Histology, same institution
1978: MD exam. completed (Med. lic., leg.läk.) at Medical Faculty, University of Göteborg
"Post-doc" 1967 Visiting Professor at Rockefeller University, New York, with Professor P. Weiss
Present position: Professor since 1983, Department of Histology (Anatomy and Cell Biology) (Retiring in 2008) and was Vice-President (elected) of the University of Göteborg from 1992–95
External offices held: President of Swedish Council for Working Life Research 1995/96
Council and founding member of Swedish Brain Foundation 1994
Council member of the Swedish Military Academy since 1993–2002
Board member of the Skövde High School since 2000
Board member of the Royal and Hvithfeldt Foundation for support of studies since 2000.
Board member of the Swedish Parkinson Foundation for Research, since 1998.
Member of the Swedish Research Council, Medicine, since 2000.
Chair of the Scandinavian Committee for Bibliotheca Alexandrina
Since 1972, she defended 18 PhD theses.
She has about 450 articles in the fields of neurobiology, neurodegenerative diseases, intra-axonal transport, carcinoid tumors, gastrointestinal physiology, neuroendocrinology, neuropharmacology, mapping of neuronal pathways in the CNS and PNS, tissue culture, confocal laser-scanning studies on human brain, especially from epileptic areas, neurodegenerative diseases (especially Alzheimer and Parkinson diseases). Co-editor of Volumes "Progr. in Catecholamine Research", Parts A, B, C 1984 and 1987, Alan R. Liss Inc., New York. Chapters in monographs on "Neurochemistry" and "Axonal Transport". Entry in Encyclopedia Neuroscientia under "Adrenergic Neurons".
She received several *honors and awards*

(a) The Retzius Prize, Karolinska Institute 1965
(b) Visiting professor, The Rockefeller University, New York 1967
(c) The Fernström Award to Young Scienteists, unshared, Göteborg 1982
(d) Elected Fellow of the Royal Soc. of Arts and Sciences in Göteborg (VVS), 5th class (Medical Sciences) 1985
(e) "Who is Who in Science?" (since 1985)
(f) Member of the Volvo Medical Advisory Board 1987-2000
(g) Rotarian, elected 1/7 1991, (Göteborg central), president 2003
(h) Elected member of the Am. Soc. for the Advancement of Sciences (1994)
(i) An issue of Neurochemical Research (vol. 22, 1997) dedicated to A. Dahlström
(j) Göteborg City honorary medal for services to the city, 1997
(k) Distinguished Award Lecturer in Neuroscience, New Orleans University, 1997

Abstract

Female and male brains and the intellectual power

Professor Annica Dahlström, Department of Cell Biology, Göteberg University (Sweden)

Female capacities must be taken into use in developing countries. One very important issue to improve health and prosperity around the world is to offer more education and power to women. Women have influence and can teach their children before school age, they have shown initiatives to start small enterprises, if given bank loans. The brain of most females differs in some anatomical respect from most men. In general, females can perform and serve just as well as males, and often with a lack of hunger for power, authority and might that are often present in males. Females generally have more communication nerve paths between the logical and the emotional hemisphere, which enables them to have a wider perspective with decision-making. In addition, women, probably due to their life-giving power, have longer perspective in reviewing long-term consequences of actions. Networking and collaboration in horizontal links are usually present in groups of females, favoring efficiency. Studies on IQ levels have shown that more women have high to median intelligence power than men; thus it is a great waste for societies around the world not to benefit from their female intellectual capacity, and have them participate in economy, health and food issues.

de CARVALHO, Antonio Paes

Antonio Paes de Carvalho, born in Rio de Janeiro, in 1935. President and CEO of EXTRACTA Moléculas Naturais S.A., active in drug discovery in Brazilian Biodiversity.
Degrees obtained at UFRJ (Universidade Federal do Rio de Janeiro) the Federal University of Rio de Janeiro (MD, 1959; PhD, 1961; Privat Dozent, 1964; and Full Professor of Biophysics and Physiology at the Carlos Chagas Filho Institute of Biophysics, 1977). Extensive experience in scientific research in biophysics and physiology of heart muscle over a 30-year span. Post-Doctoral Fellow and Visiting Assistant Professor at State University of New York (Department of Physiology, Downstate Medical Center at Brooklyn, 1961–64). Research and teaching positions at Columbia University (Department of Pharmacology, College of Physicians and Surgeons, New York, 1968–78) and at the Harvard-MIT Health Sciences & Technology Program (Boston, 1979). Executive Vice-President for Graduate Studies and Research at UFRJ (1971/72); Member of the Federal Education Council of Brazil (1974–80); Director of the Carlos Chagas Filho Institute of Biophysics at UFRJ (1980–85); Member of the National Science and Technology Council (1990–92); Member and President of GEA, the International Advisory Group for the Brazilian Federal Program for Science and Technology (1990–96). Member of the Brazilian Academy of Sciences, the National Academy of Medicine of Brazil and several Scientific Societies in Brazil and the USA. Several prizes and honors, both Brazilian and International. Founder and President of the first Brazilian Company that dealt with Plant Biotechnology (1985–90). Founder and First President of ABRABI the Brazilian Association of Biotechnology Enterprises (1986–present). Co-Founder of FELAEB, the Latin American Federation of Industrial Biotechnology Associations and President (2001–2004). Organizer of PÓLO BIO-RIO and of its managing institution, the Bio-Rio Foundation (1988–2000).

Abstract

Intellectual property in accessing biodiversity: Can patents harm or help bring natural molecules to low-income populations?

Antonio Paes de Carvalho, EXTRACTA Moléculas Naturais S.A., Rio de Janeiro, Brazil.

Assembling a large collection of natural substances for screening against disease targets necessarily needs the consent of landholders in mega diverse regions. It also encompasses offering them a share of eventual profits from royalties or direct commercialization of products and services derived from collected material. Such future gains are usually far advanced in time and stand a chance of success of 1:10,000 for the locating of a useful product against a given target in collected material. We propose that effort should be made to make benefit sharing a more immediate gain to local dwellers. Local agronomical exploitation of high yielding plant varieties for the particular chemical of interest is of course a first choice. Frequently, therapeutically interesting novel natural molecules are not produced in large amounts. This can be circumvented by determining metabolic pathways and engineering locally domesticated plants to convey the product of interest. Quantities of the product (or a suitable precursor) could become available at reasonable cost. Yet, this approach encompasses a considerable amount of advanced technology and research, as well as the opportunity for intellectual property gains by small or medium research companies associated with academic scientists. We discuss how the actual cost of research could be shared with national and international organizations in order to ensure that the end cost of the product can be kept at a level to permit its distribution to low-income countries and regions. Maximal use of scientific human resources in developing countries is a fundamental step in this process and would warrant North–South technology transfer in an ambience of respect for intellectual property.

DE GREEF, Willy

Willy de Greef, has been trained as a plant geneticist and plant breeder. Spent most of his early career as a plant breeder and research manager in Africa, running research institutions in DCR (then Zaïre), Malawi, Cameroon and Zimbabwe. In 1986, when he became Head of Product Development at Plant Genetic Systems, he introduced in biotech regulations. In 1998, became head of regulatory affairs at Syngenta (the Novartis) Seeds. Has been involved in the biotech policy debate since 1987, including the OECD Group of National Experts on Biosafety, the negotiations of the Cartagena Protocol and its implementation, the EU regulations on agricultural biotechnology. Has been involved in training and technology transfer projects in biotech regulations and biosafety since 1991, with numerous contributions to training activities organized by OECD, EU, USAID, UNIDO, ICGEB, UNEP, ISAAA. Currently heading a consulting firm on regulations in agricultural biotechnology, and assisting developing countries and their practitioners in developing biotech strategies under the framework of the Cartagena Protocol and other regulatory constraints.

Abstract (Panel 8)

Non-conventional IPR issues

The field of intellectual property rights (IPRs) is expanding as both technology and society evolve. While the life science sector focuses on the patent as the main tool for recognition of IPRs, international policy is putting pressure on the very concept of patents as a morally acceptable tool for IPRs related to the living world, and at the same time other forms of property rights, including IPRs are crowding into the field.

With the entry into force of the convention of biodiversity (CBD) in 1994, a fundamental shift occurred in the ownership rules of the living world. Previously, genetic resources were freely accessible in most countries. After the CBD, they became the property of the nation state on whose territory they were found. This has ushered in an entire new field of international policy-making related to access and benefit sharing (ABS) of these genetic resources. Moreover, the CBD introduced a strong voice for traditional knowledge, which was linked to the notion of the protection of the rights of indigenous communities, and the protection thereof. This has changed the rules of the game for many life science practitioners.

Biotechnology developers now face legal and regulatory challenges once the ABS agreement will be in place, and they face equally daunting challenges of their corporate reputations if their activities can be positioned as being in transgression of traditional knowledge.

Most of the life sciences, both in the public and the private sector, still have to face up to these emerging realities, which are rapidly moving to become international law. This year, the Conference of the Parties (COP) of the CBD launched a formal process towards a legally binding international regime for access and benefit sharing of genetic resources.

At the same time, the world of indigenous communities has become more than just a stakeholder in the debate about biotechnology. They have established themselves, and have been recognized by the countries that are parties to the Convention, as *rights holders*, in a different category from all other stakeholders, such as the research community, industry, or even the CSOs.

In the meantime, many developing countries have set up national access legislation, often based on massive misperceptions about the value of their resources, often with the net effect of closing their borders for bio-prospecting. Perhaps the biggest misconception in this field—but one that is carefully nurtured by those who promote tight international legislation on access and benefit sharing—is the notion that the technology is in "the North" and the biodiversity in "the South", and that therefore, developing countries can play a waiting game about genetic resources.

Nothing could be further from the truth though. More than half of all the coral reefs of the world are in the territory of OECD countries, as are hundreds of thousands of square kilometers of rainforest. There is therefore not much incentive for a technology developer from the North (say, a major pharmaceutical company) to risk its assets and its corporate reputation by creating a strategic bio-prospecting program in developing countries, knowing that, no matter how fair the deal is constructed, they will face stiff public exposure and challenges. They have many alternatives in the jurisdictions of OECD countries. Moreover, the proponents of "an OPEC for genes"—the term is regularly used in CBD meetings—have probably underestimated what technology can do to mimic the creation of chemical and biological diversity as raw material for the biotechnology industry.

This leaves us with a set of parallel realities in the international arena. On the one hand, we have a rapidly moving biotechnology science and industry, proceeding more and more towards pure knowledge—mostly embedded in computer power, combinatorial chemistry and *in-vitro* evolutionary genetics—instead of proceeding towards the environment as a major source of raw materials. On the other hand, a policy framework, which in the name of social equity, sets up an escalating set of rules for access to genetic and other biological resources that have as their major impact that technology developers try to look elsewhere. The end result is that while developing countries have more and more control over their biodiversity as an environmental resource, its likely "economic value" (which was the *quid pro quo* of the CBD negotiations) is rapidly eroding.

The most remarkable point about this fundamental shift of the property environment of the life sciences is that life sciences are absent from the debate. This is unhealthy. One of the most important points we learned in the life sciences over the past 20 years is that once a sector of technology starts having a deep impact on peoples' lives, at the individual and the societal level, then it becomes essential for the science to interact intensely with society. In the case of "who owns what in biotechnology" the technologists have a lot more to achieve to claim their place in the debate between science and society.

Abstract (Panel 14)
Agriculture in the age of regulation

As agriculture and food production are becoming high tech, they are also rapidly becoming a highly regulated activity in the global economy. The most rapid expanding area of regulation is the environmental regulation of agricultural production.

Those who are working in the life sciences are still adjusting to this new reality, just as public authority and society as a whole are struggling to keep up with the pace of technological innovation. In the past decade, a deep gap in understanding has opened up between the scientific and technological community in agricultural biotechnology and other stakeholders in the societal process of farming and food production.

This is leading to some very poorly informed policy development and decision-making. It is delaying the integration of the results of a quarter-century of revolution in the life sciences into food production, at the same time as that same revolution is rapidly having its massive impact on health care.

There appears to be a massive disconnect between the agricultural reality, where technologies such as GM technology and genomics assisted breeding are renewing the rapid pace of innovation, and the environmental reality, where these technologies are seen as a major threat to the environment and indeed to the structure of rural societies in the developing world. Much of this is probably not directly caused by these new technologies, but rather by the fact that we live in urbanized societies where very few, including those of us who are responsible for policy, have any direct understanding of how agriculture functions. If that is true, then all the current efforts to redress the public image of GM technology by itself may not do much to improve public confidence in it.

As policy-makers become more wary of technological innovation in agriculture, they are missing major opportunities to achieve the multiple challenges of global food production. These are to achieve a more reliable production of a more diversified food basket, with improved regional and indeed food security. All this has to be achieved with less input: less land, less water, less chemical inputs, less fossil energy use. Biotechnology has a massive task ahead, and twenty years into the era of agricultural biotech, it is actually delivering, not only in the lab, but where it counts: in the hands of farmers throughout the world. In that context, the massive antagonism against modern gene technology in the environmental policy world is having a pronounced negative effect on our ability to make agriculture more environmentally and socially sustainable.

The technological community still acts as if it does not fully understand the nature of the disconnect with society. It is still trying to win the public and policy debate with the trusted rational and information-rich approach to communication which is the strength of the scientific method. We still seem to struggle with the reality that even in the 21st century, facts come a poor second against belief systems in the value chain of society. We are in a much better position today than 10 years ago to win the public and policy debate, with a decade of extraordinary achievement to show. But that is not sufficient by itself in a world where perception is reality.

DESMARESCAUX, Phillippe

Philippe Desmarescaux obtained his doctorate degree in Physics at La Sorbonne in Paris (1965). He was Researcher at the Centre National de la Recherche Scientifique (CNRS). In 1966, he joined the Rhône–Poulenc Group and became President (1992–2000). He was Chairman of the Board of Ecole Normale Supérieure de Lyon (ENS Lyon). Since 1998, he chairs the Scientific Foundation of Lyon, and founded the World Life Sciences Forum BioVision with Raymond Barre, former Prime Minister and Mayor of Lyon and François Gros, Secrétaire Perpétuel of the French Academy of Sciences. He is Chairman of EUROTAB S.A. and of BIOSQUARE S.A.S and Member of the Board of AURIGA, INNATE PHARMA and SEB S.A. Decorations: Chevalier de la Légion d'Honneur, Officier du Mérite National.

DIDERICHSEN, Boerge

Professor Boerge Diderichsen, PhD;
Vice-President, Novo Nordisk, Denmark;
PhD in Microbiology from Copenhagen University, 1980;
Research Scientist, Novo Industry, from 1981;
Vice-President of Corporate Research Affairs, Novo Nordisk, 1996;
Adjunct Professor at Aarhus University, 1993;
Member of the Governing Board of the European Industrial Research Management Association, 1996–2000;
Member of the board of Medicon Valley Academy, 1997;
Member of the Faculty Council of the Faculty of Health Sciences at the University of Copenhagen, 1997–2001;
Member of the Academy of Technical Sciences, 1997;
Member of the Senate at Aalborg University, Denmark, 2001;
Chairman of the Research Policy Steering Group of the Danish Association of Pharmaceutical Industries, 2001;
Chairman of the Board of Directors of the Nano- and Microelectronics Institute, October 2001;
President of the European Federation of Biotechnology, 2002;
Member of the European Commission Advisory Group for Life Sciences, Genomics, and Biotechnology for Health, the 6th Framework Program, October 2002;
Vice-Chairman of ScanBalt BioRegion, October 2002;
Co-Chairman of High-Level Supervisory Committee of EFBIC (European Focus on Biotechnology in China), 2002.

EBEID, Nadia Makram

Dr. Nadia Makram Ebeid, Executive Director, Centre for Environment and Development for Arab Region and Europe; Formerly Egyptian Minister of Environment for five years (first woman to hold this position in Arab World); Special Peace Envoy of Secretary General of Arab League; Member of several prestigious institutions including General Secretariat, National Democratic Party; Board of Directors, Suzanne Mubarak Women's International Peace Movement and UNDP Advisory Board, New York. Visiting Professor, George Washington University, USA. Holder of numerous awards.

EHLERS, Stefan

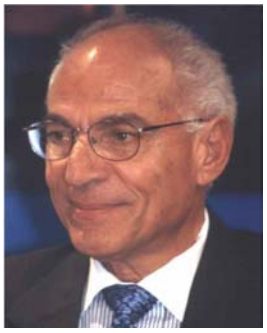
Professor Dr. (med.) Stefan Ehlers is Head of the Division of Molecular Infection Biology at the Research Center Borstel, Leibniz Center for Medicine and Biosciences, in Borstel, Germany. Dr. Ehlers received his medical degree from the University of Freiburg, Germany. Following completion of a postdoctoral fellowship in immunology research at Dartmouth Medical School in the United States in 1990, Dr. Ehlers was appointed Assistant Professor of Medical Microbiology at the Free University of Berlin, a position he held until he joined the Research Center Borstel in 1996. He has earned speciality degrees in medical microbiology and infectious diseases, as well as in immunology, and was accorded a status of extracurricular professor by the University of Luebeck in 2000. Professor Ehlers is Secretary of the German Society for Hygiene and Microbiology Section of Immunology of Infection, and the German Society for Immunology Section of Immunology of Infection. He is a member of the Editorial Boards of *Infection and Immunity*, *FEMS Medical Microbiology and Immunology*, *Medical Microbiology* and *Immunology and Medical Immunology*, and is an *ad hoc* reviewer for other leading journals. Professor Ehlers' research interests include infection biology of mycobacteria, in particular *M. tuberculosis* and *M. avium*, mechanisms of granuloma induction, maintenance and disintegration in mycobacterial infections, antimycobacterial defense mechanisms of the macrophage and molecular basis of resistance and susceptibility to pulmonary mycobacterial infections. He is the current recipient of many government-funded collaborative grant awards in support of his research activities. Professor Ehlers has published more than 60 original peer-reviewed articles on the infection biology of intracellular pathogens in scientific journals, among them Nature Medicine, The Journal of Experimental Medicine, The Journal of Immunology, and Infection and Immunity, and he is the author of more than 20 review articles and book chapters on various aspects of the immunology of tuberculosis.

Abstract

Genetics and Biotechnology in Tuberculosis Research: Ethical Issues

Dr. Stefan Ehlers, Head of Department, Borstel Leibniz Center for Medicine and Biosciences (Germany)

Approximately one-third of the world's population is infected with *Mycobacterium tuberculosis*, the causative agent of tuberculosis (TB). Every year, 8 million new individuals develop disease and 2 million patients die of TB. Technological advances in the fields of genomics (high troughput sequencing), molecular biology (knock-out and transgenic mice), microbiology (virulence and persistence trait mapping), immunology (identification of vaccine targets and adjuvant design) and pharmacology (antibiotic drug development) have brightened the prospects for containment of the "white plague". Since the large majority of infected and diseased individuals live in developing countries, they are the ultimate beneficiaries of new chemotherapeutic drugs or vaccines. TB research therefore appears intrinsically "ethical". Nevertheless, ongoing studies must adhere to guidelines that guarantee sustained improvement of existing health care in participating underdeveloped countries. For example, during studies aimed at determining resistance and susceptibility traits in infected populations, it is important to implement the highest possible standards of treatment and follow-up and, if necessary to achieve these, provide adequate training and equipment to local agencies to establish diagnostic laboratories that remain functional until well after study completion. Further, it is self-evident to let local scientists participate not only in the collection of samples, but also in the experimental data acquisition and analysis, and finally in manuscript preparation and presentation of results. In this way, a scientific infrastructure can be nurtured that will allow sustained development long after immediate study goals are reached. During vaccine and drug trials, a high degree of participation of the local research and medical community and informed consent of the study participants must be obtained, not only for the success of the study itself, but also to substantially elevate medical and technical standards in the country where the study is conducted. This should include building networks between institutions and agencies in partner countries that, by initiating exchange programs, providing continued training, and serving as reference laboratories, will provide long-term benefits to all participants. Thus, despite its worthy goal, TB research is not exempt from ethical considerations. These need to be followed at the level of the individual researchers, their institutions, the funding agencies, industrial sponsors, and regulatory governmental departments.



EL BAZ, Farouk

Dr. Farouk El-Baz is Research Professor and Director of the Center for Remote Sensing at Boston University. He received his BSc (1958) in Chemistry and Geology from Ain Shams University, Cairo, Egypt; his MS (1961) in Geology from the Missouri School of Mines and Metallurgy, Rolla, Missouri; and his PhD (1964) in Geology from the University of Missouri, after performing research at the Massachusetts Institute of Technology, Cambridge, Massachusetts (1962/63). He taught Geology at Assiut University, Egypt (1958–60) and at the University of Heidelberg, Germany (1964–66). In 1989, Dr. El-Baz received an honorary Doctor of Science from the New England College, Henniker, New Hampshire, and in 2002 an honorary Professional Degree from the University of Missouri. Between 1967 and 1972, Dr. El-Baz participated in the Apollo program as Supervisor of Lunar Science Planning at Bellcomm, Inc. of Bell Telephone Laboratories in Washington, DC. During these six years, he was Secretary of the Site Selection Committee for the Apollo lunar landings, Chairman of the Astronaut Training Group, and Principal Investigator for Visual Observations and Photography. From 1973 until 1983, he established and directed the Center for Earth and Planetary Studies at the National Air and Space Museum, Smithsonian Institution, Washington, DC. In 1975, Dr. El-Baz was selected by NASA to be Principal Investigator for Earth Observations and Photography for the Apollo-Soyuz Test Project, the first joint American–Soviet space mission. From 1982 to 1986 he was Vice President for International Development and for Science and Technology at Itek Optical Systems of Lexington, Massachusetts. He served on the Steering Committee of Earth Sciences of the Smithsonian Institution, the Arid and Semi-Arid Research Needs Panel of the National Science Foundation, the Advisory Committee on Extraterrestrial Features of the US Board of Geographic Names, and the Lunar Nomenclature Group of the International Astronomical Union. In 1979, he coordinated the first visit by US scientists to the desert regions of northwestern China. In 1985, he was elected Fellow of the Third World Academy of Sciences and represents the Academy at the Nongovernmental Organizations Unit of the Economic and Social Council of the United Nations. He also served as Science Advisor (1978–81) to the late Anwar Sadat, President of Egypt. He is known for pioneering work in the applications of space photography to the understanding of arid terrain, particularly the location of groundwater resources, and his recommendations led to the discovery of groundwater resources in the Sinai Peninsula, the Western Desert of Egypt, northern Somalia, Red Sea Province of eastern Sudan, Sultanate of Oman, and the United Arab Emirates. During the past 20 years, he contributed to interdisciplinary field investigations in all major deserts of the world. At present, his research objectives include the application of remote sensing technology to the fields of archaeology, geography and geology. Dr. El-Baz is also President of the Arab Society of Desert Research and the recipient of numerous honors and awards, including: NASA's Apollo Achievement Award, Exceptional Scientific Achievement Medal, and Special Recognition Award; the University of Missouri Alumni Achievement Award for Extraordinary Scientific Accomplishments; the Certificate of Merit of the World Aerospace Education Organization; and the Arab Republic of Egypt Order of Merit-First Class, the 1989 Outstanding Achievement Award of the Egyptian American Organization. In 1995, he received the Award for Outstanding Contributions to Science and Space Technology of the American–Arab Anti-Discrimination Committee, and the Achievement Award of the Egyptian American Professional Society. He is a member of the African Academy of Sciences, Arab Academy of Sciences, Islamic Academy of Sciences, Third World Academy of Sciences, and the US National Academy of Engineering.

Abstract

Space platforms as environmental monitors

Dr. Farouk El-Baz, Director, Center for Remote Sensing, Boston University (USA)

Biodiversity is drastically affected by changes to the environment of the biota. In turn, the Earth's environment responds to both natural changes and activities of mankind. Such changes have caused the extinction of numerous species in the geological past. They also threaten living things on Earth today. In order to fully understand the changes and remedy the resulting problems, we must ascertain the nature of the changes and where and at what rate do they occur. Much can be learned in this regard through the application of remote sensing methodologies, particularly photographing the Earth from space platforms.

For the acquisition of data from Earth orbit, manned and unmanned spacecraft fly in high, medium or low orbits. The highest orbits are left to the unmanned weather satellites, such as Meteosat of the European Space Agency (ESA). These are propelled to a height of 36,000 km above the Earth. At this altitude, their motion is equivalent in speed to the rotation of the Earth about its axis. Such satellites are termed geostationary; they remain above the same point on the Earth in order to acquire and transmit repetitive images as frequently as every hour.

On the low end, most manned missions are placed in orbits between 200 km and 600 km above the Earth. For example, the Space Shuttle operational altitude is about 400 km. From this altitude, images show greater detail such as those of the Large Format Camera with images at 10-meter resolution.

The intermediate orbits are those between 600 km and 1000 km above the Earth, the region where most unmanned imaging satellites are placed. For example, the polar-orbiting satellites of the National Oceanic and Atmospheric Administration (NOAA) fly at altitudes of 835 km to 870 km; the near-polar orbits of Landsat of the National Aeronautics and Space Administration (NASA) reach a maximum altitude of 920 km above the Earth; and the French digital imaging satellites, Système pour l'Observation de la Terre (SPOT) operate from an altitude of 830 km or less. Images collected from these altitudes provide greater local detail than is possible from the high-altitude satellites.

Several commercial satellites of a new generation provide details that were not possible by earlier satellites. These high-resolution satellites such as IKONOS and Quick Bird fly at altitudes of 400–500 km and provide details of one meter or less. These images promise to be exceedingly useful in enforcing the laws of environmental protection because of their clarity and lack of ambiguity.

Images obtained by all such systems are useful tools in environmental monitoring. First, meteorological satellites have helped us to better understand global weather patterns and the effects of local events on such patterns. Second, medium resolution images helped us establish the effects of phenomena such as hurricanes and forest fires in vegetated areas, waging war in desert regions, and oil spills in the oceans. Third, high-resolution images promise to detail the environmental parameters that affect local phenomena and pinpoint sources of charges, whether natural or man-made.

EL-BELTAGY, Adel

Adel El-Beltagy has been the Director-General of the International Center for Agricultural Research in the Dry Areas (ICARDA), Syrian Arab Republic, since 1995. He earned his PhD from University of Wales, UK, specializing in stress physiology (1974). Before joining ICARDA, Professor El-Beltagy served as Professor of Arid Land Agriculture at Ain Shams University, Cairo; First Under-Secretary of State for Land Reclamation, Egypt (1987–91); Director and Board Chair of Agricultural Research Center, Egypt (1991–94); Chairman of the Executive Board of Arab Center for the Studies of Arid Zones and Dry Lands (ACSAD) (1989–95); and a Member of the CGIAR Genetic Resources Policy Committee (1994–99). He continues to be the President of the Scientific Technical Council (STC) of the International Sahara and Sahel Observatory (OSS) (1993–2002), and Chairman Elect of the International Dryland Development Commission (IDDC) since 1987 up to the present. Dr. El-Beltagy is member of international and regional scientific societies and author of more than 100 scientific publications in Egyptian and International journals. In 1993, he was honored by University of Wales as its distinguished Fellow.

Abstract

Harnessing New Science for Sustainable Agriculture in Dry Areas

Adel El-Beltagy, Director-General, International Center for Agricultural Research in the Dry Areas (ICARDA), Aleppo, Syrian Arab Republic

Drought, salinity and cold stress cause nearly 35% of crop losses throughout the world. Climate changes will increase the frequency of droughts, particularly in West Asia and North Africa (WANA). Over 67% of the world's population is projected to be facing water shortages by 2050.

The International Center for Agricultural Research in the Dry Areas (ICARDA) has a world mandate for the improvement of crops to increase their productivity and adaptability, while protecting the natural resource base, in the dry areas. To achieve this, ICARDA employs biotechnology tools in its crop improvement and genetic resources research programs. Emphasis is given to the identification and exploitation of genetic resources for sources of improved stress resistance and water-use efficiency. Non-radioactive DNA technology is being used for fingerprinting genetic resources. Numerous molecular-marker systems have also been used for genome mapping and gene-tagging, and markers have been identified to be linked with traits of agronomic importance. Fluorescent-labeled allele-specific markers are being developed and can be used with automated sequencers to allow the screening of thousands of lines within a short period to meet the needs of breeding programs. The use of marker-assisted systems to pyramid genes is proving to be an essential tool for breeders. Besides gene tagging and genome mapping, considerable effort is being devoted to characterize pathogen populations and develop their geographical distribution maps. These maps will allow the deployment of effective host-plant resistance genes. Recent advances in functional genomics provide new opportunities to identify, characterize, and utilize genes for abiotic stress tolerance. These new developments include Expressed Sequence Tags (ESTs) from abiotic stress-treated libraries of various crop plants, expression profiling by micro-arrays, information on complete genome sequence for rice and *Arabidopsis,* and the availability of new bioinformatics tools.

Where variability for key traits is low, genetic engineering is being used to incorporate genes from within the Plant Kingdom to improve strategic food crops. Fungal and abiotic stress resistance is being engineered in chickpea in cooperation with the University of Hanover, Germany, and insect and abiotic stress resistance is being engineered in lentils in cooperation with the Centre for Legumes in Mediterranean Agriculture (CLIMA), Australia. Cereal transformation is being carried out jointly with the Agricultural Genetic Engineering Research Institute (AGERI) in Cairo, Egypt. For the exploitation of genetic engineering, regional initiatives have been taken to help promote the development of national or regional biosafety frameworks in national programs in the West Asia North Africa (WANA region).

EL ITRIBY, Hanaiya

Director, Agriculture Genetic Engineering Research Institute (AGERI), Agriculture Research Center (ARC), Ministry of Agriculture and Land Reclamation. Deputy-Director for Research (AGERI) from 1993–2001, in addition to acting as Senior Scientist in the Genome Mapping and Molecular Genomics Laboratory. MSc and PhD in Genetics from the Faculty of Agriculture, Cairo University.

ELLIOTT, Malcolm

Malcolm Elliott is Professor of Plant Molecular Biology and Director of The Norman Borlaug Institute for Training and Research in Plant Sciences. He graduated with First Class Honours in Plant Sciences from The University of Wales (1963) and received his PhD from The University of Wales in 1966 for plant biochemistry research directed by the late Professor H E Street. He was a Fulbright Scholar and Research Fellow at Yale University (1967–69); Lecturer in Plant Biochemistry at The University of Leicester (1969–71); Professor and Head of The School of Life Sciences at De Montfort University, Leicester (1971–94); Chairman of The College of Deans at De Montfort University, Leicester (1989–93) then Founding Director of The Norman Borlaug Institute (1994 to date). The International Institute's mission is to facilitate the delivery of sustainable food security and the creation of wealth in the developing world, by providing training in the application of cutting edge plant science research to the improvement of agricultural production.

Professor Elliott is the author of several hundred research publications with emphasis on molecular biological approaches to cereal improvement. He is frequently invited to speak on the genetic enhancement of crops for the benefit of developing countries. He was awarded the Gregor Mendel Gold Medal for Research of Exceptional Merit in the field of Biological Sciences in 1963 and The Jan Evangelista Purkyne Medal for Contributions to the Development of Czech Science, in 1994.

Abstract

New Biology for Developing Countries: Opportunities and Constraints

Malcolm C. Elliott and Anatole Krattiger, The Norman Borlaug Institute for Training and Research in Plant Sciences, The Gateway, Leicester, LE1 9BH, United Kingdom.

The 1970 Nobel Peace Prize Laureate, Norman E. Borlaug, has emphasized the potential of genetically enhanced crops for boosting food production in the world. During an interview in June 2000, he said that Africa is undergoing political instability because there is not enough food to feed the people. "We need more investments in agriculture and we must stop looking at agriculture as a donkey's profession," he said. Dr. Borlaug challenged African leaders to embark on productive technology that would ensure predictable food supplies for their masses. "The so-called GMOs can play a very vital role in peoples' lives. However, this must be accompanied by political goodwill because technology alone cannot survive without decisive support," he said. It is supremely ironic that the principle objections to exploitation of the new technology have come from countries where obesity, not malnutrition, poses a major threat to human health. If the developing countries are fully to benefit from the opportunities created by The New Biology it will be necessary to overcome:

(a) the political constraints;
(b) the scientific constraints;
(c) the barriers to market participation that particularly disadvantage developing countries.

Abstract "**State of the Art**" **(Panel 4)**
IPR: Must there be a conflict between commercial need and humanitarian benefits?

Intellectual Property Rights (IPRs) were developed to define ownership of intellectual and human creations, which principally deal with intangible creations. In debates about IPRs, a major problem stems from the fact that to become useful, such intellectual creations need to be expressed in tangible materials. Whereas materials in themselves are not, typically, protected, the value-added human creations are. This poses a significant conceptual problem that this paper will attempt to clarify.

IPRs are territorial. National institutions issue them allowing the owners to prevent others from using an invention. Limiting such access, however, is only economically interesting if the owner intends to exploit the invention in particular markets. In the absence of direct economic interests or strategic imperatives, it is economically inappropriate to prevent others from using an invention. Since IPRs are typically expressed in tangible expressions, two significant problems arise.

First, the majority of inventions are only protected in rich economies. They can therefore freely be used in other countries with a license only if production of the invention is exported to rich countries. From a humanitarian and development perspective, this should not be a significant stumbling block because when products are exported, this usually means that significant value has been added. In such cases, licensing negotiations on reasonable royalty rates should normally be successful unless such exports directly compete with the holder of the IPR.

Second, the manner in which such tangible expressions are obtained is critical. Scientists often collaborate by sharing material under legally binding agreements. If a product has been developed utilizing such material, then a license must be attained. This is irrespective of whether or not the particular invention is protected in that particular country.

In both cases, product quality (stewardship) and indemnity (liability) are among the key stumbling blocks to obtaining licenses for both humanitarian and commercial uses. Arguably, the fact that some entity has rights to certain products would only make that entity more interested in collaborating to see that the fruits of its inventive endeavors are reaped in both humanitarian terms and commercial ones.

In conclusion, IPRs are not obstacles to reaching humanitarian goals but can be an effective means to engage owners of inventions in humanitarian programs, provided other systemic constraints are addressed successfully.

ERBISCH, Frederick H.

Frederick H. Erbisch completed his tertiary education by obtaining his PhD in Botany from the University of Michigan in 1966. At present, he is an expert consultant in Intellectual Property Management in East Lansing, Michigan, Adjunct Professor at the Institute of International Agriculture, and Faculty Associate–DCL College of Law at Michigan State University, East Lansing, MI. Among his publications are two books (co-editor), more than 70 refereed book chapters, papers and abstracts, more than 50 non-refereed reports and papers, and most recently, his co-authored book entitled *Intellectual Property Rights in Agricultural Biotechnology.*

His expertise in Intellectual Property was sought internationally, thus taking him to several countries across the globe. He has been to Egypt, India, Costa Rica, China, Philippines, et al, where he gave innumerable presentations in Intellectual property Rights as well as designing IP management programs, working directly with government and institutional representatives.

Besides his present post as an expert consultant working for Michigan State University, he has also been Professor of Biological Sciences (1963–92), Director of Research Services Office, and Executive Director of the Intellectual Properties Office at Michigan Technological University (MTU), Houghton MI.

FRISON, Emile

Dr. Emile Frison, a Belgian national and Director General of the International Plant Genetic Resources Institute (IPGRI) since 1 August 2003, has spent most of his career in international agricultural research. A plant pathologist by training, he obtained his MSc and PhD in Belgium. He worked for six years in Africa, in Nigeria and Mauritania, and was Development Manager of an Agro-chemical company in Belgium for three years.

In 1987, he joined IPGRI's predecessor to coordinate research on the phytosanitary aspects of international germplasm movement. In 1992, as IPGRI's Regional Director for Europe, he initiated a new phase of the European Cooperative Programme for Crop Genetic Resources Networks. In collaboration with FAO, he launched the European Forest Genetic Resources Programme, as the mechanism for the implementation of Resolution 2 of the Ministerial Conference on the Protection of Forests in Europe.

He became Director of the International Network for the Improvement of Banana and Plantain (INIBAP) in 1995. In 1997, he launched the Global Programme for *Musa* Improvement (PRO*MUSA*), which now counts more than 120 members and became a model for the development of Global Programmes on Commodity Chains in the context of the Global Forum for Agricultural Research. In 2002, he launched a Global Consortium on *Musa* Genomics with 27 members from 14 countries.

With a keen interest in policy issues, Dr. Frison was a co-author of the first paper written about a "multilateral system for plant genetic resources" in 1994. He has also been chairing the Biosafety Committee of IPGRI since 1997, in addition to being the Secretary of the Genetic Resources Policy Committee of the Consultative Group on International Agricultural Research (CGIAR) since November 2003.

He is author and co-author of over 120 scientific publications and is a member of several scientific societies.

GABR, Mamdouh

Dr. Mamdouh Gabr, born on 8 November 1925.
Graduated: Faculty of Medicine, Cairo University, December 1947 MD Pediatrics, Cairo, November 1951, FRCP London 1981.
1985–89: President, International Union of Nutrition Sciences
1992–95: President, International Pediatric Association
1991–94: President, Global Advisory Committee on Health Research, WHO, Geneva
President, CAMAS (Union of African Medical Associations), 1983/84
President, Union Middle East Mediterranean Pediatric Societies, 1984/85
Secretary General, Arab Council for Childhood and Development, 1987–1991
Vice-Chairman, International Federation of Red Cross and Red Crescent (1997–2005).
Minister of Health of Egypt (1978–82); Chairman, Egyptian National Committee on Nutrition (1977–to the present); Chairman, Pediatric Department, Cairo University (1982–86); Member, High Ministerial Council of Childhood and Motherhood (1974 and from 1990–to the present); Member of the Board and Secretary-General of the Egyptian Red Crescent Society (1991–present).
Awards: National Prize of Science, Egypt (1961); Bearer of the Order of Science First Degree, Egypt (1961); Bearer of the High Order of the Republic First Degree, Egypt (1980); Bearer of the High Order of the Sacred Treasure, Japan (1986); WHO Shousha Prize (1997). He published four monographs and 150 publications on food and nutrition, child health, health and food ethics.

GARZELLI, Massimo

Italian, born on 1 October 1947, in Leghorn, Italy. Married with two sons. *Education*: Master Degree in Physics, Faculty of Physics, University of Pisa. *Fields of specialization and expertise*: Privatization, Human Resources Development, Industrial Upgrading/Modernization, Technology Transfer, Assistance to the Small and Medium Enterprises, University lecturer (in Mathematics and Physics), Technical Instructor, Project Manager, Project formulation and evaluation, Training methodologies and technologies. *Countries where professional experience has been carried out*: Algeria, Benin, Chile, Egypt, Gabon, Ghana, Italy, Kenya, Libyan Arab Jamahiriya, Morocco, Sudan, Togo, Tunisia and Zambia. *Professional experience*: A.LONG TERM ASSIGNMENTS: 01/10/00–to date; Egypt: UNIDO Representative, Head Regional Office in Egypt 09/8/1998–30/9/2000; GHANA: UNIDO Representative for Ghana, TOGO and Benin 01/3/1995–08/8/1998; TUNISIA UNIDO Country Director 14/05/1990–28/02/1995; SUDAN UNIDO Country Director of Sudan and Yemen.

GROS, François

«Attaché», «Chargé», «Maître» then «Directeur de Recherche» at the CNRS (1945–72). Professor of Molecular Biology at the Faculty of Sciences (1968–72). Professor at the Pasteur Institute (Head of the Biochemistry Unit (1972–95). Professor of Cellular Biochemistry at the Collège de France (1973–96).

General Director of the Pasteur Institute (1976–81). Counselor to the Prime Minister (Science and Technology (1981–85). Special advisor to the Commissioner of Science and Technology (EEC) (1993–95). Permanent Secretary of the French Academy of Sciences (1991–2001)

The scientific work of François Gros had dealt with the molecular biology of the genes and has led to the co-discovery (1961) of the messenger ribonucleic acids (mRNA), work initiated with J. Monod and F. Jacob. Since 1970, the research work carried out in his laboratory concerns the study of developmental biology.

François Gros is member of: the American Academy of Arts and Sciences, the American Society of Biological Chemists, the Indian National Academy of Sciences, the National Academy of Sciences of Venezuela, the Russian Academy of Sciences. He is the foreign associate Member of the Academy of Sciences of Athens and of the Royal Academy of Belgium. He received the Golden Medal of the Pontifical Academy of Sciences (1964) the Prize of the Lacassagne Foundation (1968), the Charles–Léopold Mayer Prize (1969), the Alexander Von Humbold Award (1989), the Golden medal of the Academic Society «Arts–Sciences–Lettres» (1991) and more recently, the Jawaharlal Nehru Birth Centenary Medal from the Indian Academy of Sciences (1999).

Books
Sciences de la Vie et Société, avec F. Jacob et P. Royer, in «La Documentation française» 1979
Les Secrets du gène (Editions Odile Jacob-Seuil) 1986
La civilisation du Gène (Editions Hachette) (several translations into: English, Greek, Italian, Japanese, Portuguese, Spanish) 1989
L'ingénierie du vivant (Editions Odile Jacob) 1990:
Remarques sur la Biologie contemporaine (Editions Gallimard and UNESCO) 1993.

He is author and co-author of more than 400 publications dealing successively with the control of gene expression in bacterial and phage operons; the control of myogenesis: studies on somatic cell differentiation; the nerve cell system: studies on the structure, functions and differentiation of nerve cells using the methods and technologies of molecular biology.

Honors: He received the following honors:
Commandeur de l'Ordre national du Mérite
Commandeur de la Légion d'Honneur
Golden Medal of the Pontifical Academy of Sciences
Dignitary of foreign Academic honors
Laureate of several French and foreign major prizes

HAMZE, Mouïn

Mouïn Hamzé was born in Beirut, Lebanon, in 1948.
He received his PhD in Plant Sciences from the University of Montpellier, in 1973. Shortly after he started his academic career at the Lebanese University he moved as a Visiting Professor to the American University of Beirut. He was then appointed Dean of the School of Agricultural Sciences (1977–85) at the Lebanese University, then Secretary-General of the National Council for Scientific Research (1998).

He was elected Member of the Board of Trustees of ICARDA (1990–2000), Member of the UNESCO National Commission (1990–94). He was also a Member of the Science Partnership Committee of the CGIAR (1999–2001) and Member of the Scientific Board of the "Agence Universitaire de la Francophonie" (1998–2001).
In 2003, Mouïn Hamzé was elected President of CIHEAM (Le Centre International de Hautes Etudes Agronomiques Méditerranéennes—International Center for Mediterranean Agronomic Studies).

Mouïn Hamzé is a recipient of a number of regional and international awards and distinctions: Abdul-Hamid Shouman Foundation Prize, for Young Researchers in the Arab World, Jordan, 1986; "Chevalier de l'Ordre du Mérite Agricole, France, 1988; and "Chevalier de l'Ordre National du Mérite", France, 1994.

Abstract

CIHEAM: An intergovernmental organization supporting development in the Mediterranean area

The International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM) was founded under the aegis of the OECD and the European Council on 1962, resulting from an Agreement between the governments of seven Southern European countries (France, Greece, Italy, Portugal, Spain and Turkey). Later on, six other Mediterranean countries have joined CIHEAM, i.e. Albania, Algeria, Egypt, Lebanon, Malta and Morocco.

The founding Agreement set the Centre's objectives "provide additional, both economic and technical education and to promote the spirit of international co-operation between decision makers in the area of agricultural, environmental and rural development in the Mediterranean Basin".

At present, CIHEAM is endowed with four Mediterranean Agronomic Institutes (MAI): the MAI of Bari–Italy, and the MAI of Montpellier-France, which were created along with the Centre in 1962; the MAI of Saragossa–Spain, accredited as an establishment of CIHEAM in 1969 and the MAI of Chania–Greece created in 1983.

The CIHEAM programmes are implemented in close co-operation with the training and research Institutions of the Mediterranean partner countries. Its role is defined as to deliver innovative post-graduate training in order to complement the education given in national institutions.
The programme of each MAI offers two types of training:
1) An extended period of training leading to a diploma (one or two years) with:
   a) The first year accredited by a *Diploma in Post-Graduated Specialization* (DPGS)
   b) The 2nd year of training and research at depth accredited by the degree of *Master of Science (MSc)*.
2) Specialized short courses (two to six weeks).

MAI either manage directly or participate in various programmes of research, training and development in southern and eastern Mediterranean countries particularly those of the European Commission.

HASSAN, Mohamed

Mohamed H.A. Hassan is Executive Director of the Third World Academy of Sciences (TWAS), President of the African Academy of Sciences (AAS), Secretary-General of the Third World Network of Scientific Organizations (TWNSO) and serves on a number of committees in other organizations worldwide. He was born in the Sudan in 1947, and holds a PhD in Plasma Physics from the University of Oxford, United Kingdom (1974). A former Professor and Dean of the School of Mathematical Sciences at the University of Khartoum, he received the Order of Scientific Merit of Brazil. He is a fellow of TWAS, AAS, and the Islamic Academy of Sciences as well as honorary member of the Colombian Academy of Exact, Physical and Natural Sciences, corresponding member of the Belgian Royal Overseas Academy of Sciences, and foreign fellow of the Pakistan Academy of Sciences. His research areas include theoretical plasma physics, physics of wind erosion and sand transport. He is married and has two daughters and a son.

HAUTEA, Randy

Randy A. Hautea obtained his PhD in Plant Breeding from Cornell University, and his MSc and BS degrees in Agronomy and Plant Breeding from the University of the Philippines Los Baños. He is currently the Global Coordinator of the International Service for the Acquisition of Agri-biotech Applications (ISAAA), and concurrently the Director of the ISAAA Southeast Asia Center. ISAAA is an international not-for-profit organization engaged in facilitating the assessment, acquisition, transfer, and management of biotechnology applications for the benefit of developing countries, and operates principally in Southeast Asia and East Africa. Prior to joining ISAAA in 1998, he served as Director of the Institute of Plant Breeding, University of the Philippines Los Baños. He has also consulted with various organizations, and has been involved in several program reviews and assessments of international agricultural research centers of the CGIAR.

Abstract

Transferring technology and knowledge to develop biotechnology-derived tropical crops for developing countries—ISAAA's Asia Program

Randy A. Hautea, International Service for the Acquisition of Agri-biotech Applications (ISAAA), SEAsiaCenter, c/o IRRI, DAPO Box 7777, Metro Manila, the Philippines

Rapid progress in crop biotechnology development and adoption of transgenic crops (or GM crops) has been achieved worldwide. During the eight-year period 1996 to 2003, global area of transgenic crops increased 40-fold, from 1.7 million hectares in 1996 to 67.7 million hectares in 2003. About one-third of the GM crops hectare in 2003 was grown by developing countries.

Despite the rapid global developments in crop biotechnology, knowledge of and access to the technology remains fairly limited, especially in developing countries. Equitable access to the technology and an open and broader exchange of information, knowledge and experiences on biotechnology can help provide the opportunity to link the needs of developing countries with an increasing array of crop biotechnology applications and innovations that could help enhance their capacity to harness and manage crop biotechnology in support of national development goals.

The International Service for the Acquisition of Agri-biotech Applications (ISAAA) facilitates the North-South and South-South transfer of proprietary biotechnology applications and responds to the needs of developing countries on all aspects of crop biotechnology. An example of ISAAA's technology transfer projects is the papaya biotechnology network of Southeast Asia, where significant progress has already been accomplished in enhancing biotechnology research capacities of national scientists from the public sector, complemented with capacity building on biosafety, intellectual property rights management and biotechnology communications and outreach.

ISAAA also implements a global effort to document, consolidate and disseminate authoritative information and knowledge about GM crops and biotechnology to developing countries, through its Knowledge Center on Crop Biotechnology (KC). The KC, based at the ISAAA Southeast Asia Center, is a science-based information network responding dynamically to the needs of developing countries on various aspects of crop biotechnology. It facilitates the flow of information and exchange of experiences on crop biotechnology between and among the North and the South, and promotes public understanding of crop biotechnology and its implications to food, feed and fiber security, and sustainable agriculture.

HELMY, Hassan Abbas

Hassan Abbas Helmy, Egyptian, born on 27 March 1933, married with two sons.

Education:
Faculty of Pharmacy, Alexandria University
Diploma of Industrial Pharmacy, 1958
Diploma of Hospital Pharmacy, 1957
BSc in Pharmacy and Pharmaceutical Chemistry, 1953

Present position:

1. Chairman of Pharco Pharmaceuticals Corporation.
2. Chairman of Pharco Impex Company for Pharmaceuticals, Bucharest, Romania.
3. Member of the Board of Directors of Mubarak City for Scientific Research and Technological Applications.
4. Board Member of the National Research Institute, Cairo.
5. Vice-President of the Board of Alexandria University Science Park.
6. Board Member of the Faculty of Pharmacy, Alexandria University.
7. Chairman of Alexandria Pharmacists Association.
8. Board Member of the Chamber of Commerce, Alexandria.
9. District Governor Nominee (Rotary International) for years 2006–2007, district 2450.

Foreign languages (English and French)

HOOGENDOORN, Coosje

Coosje Hoogendoorn (PhD) was trained as a plant geneticist/plant breeder at Wageningen University in the Netherlands, and the Plant Breeding Institute in Cambridge, the UK. She specialized in the genetics of stress tolerance. After working in the UK, in Mexico, and in the Netherlands, she joined the International Plant Genetic Resources Institute (IPGRI) in 2000 as DDG Programs. IPGRI's research program aims to reduce hunger and poverty and to protect the environment through the conservation and use of genetic diversity in agro-ecosystems.

Abstract

Agricultural Biodiversity for Sustainable Development: Strengthening the Knowledge Base

C. Hoogendoorn, T. Hodgkin, International Plant Genetic Resources Institute (IPGRI), Rome, Italy.

A fundamental challenge for developing countries over the next decades is to increase food production and improve livelihoods in a manner that is ecologically sustainable, does not increase vulnerability, and is profitable for farmers in these countries. This challenge, embedded in the Millennium Development Goals, will require that the biodiversity present in agro-ecosystems is maintained and used to increase productivity, resilience, and sustainability and to provide key ecosystem services in a profitable manner. Such an approach will need to recognize that the diversity of plant and animal species maintained in traditional farming systems in developing countries, and the knowledge associated with managing these resources, constitute key assets of the rural poor. Indeed, in marginal and difficult farming conditions these materials are especially important, and diversity management can become a central part of the livelihood strategies of farmers and communities in stress prone production areas. At IPGRI we aim to combine the knowledge base of traditional farming systems with state-of-the-art advances in biology, informatics and legal and social sciences to investigate options for productive and sustainable use of agricultural biodiversity in the future. Some of the most important issues for research that have been identified include: Developing methods for measuring amounts of, and changes in, agricultural biodiversity at different scales for different components; Investigating the linkages, interactions and associations between different components of agricultural biodiversity, i.e. between crops, animals, fish, agroforestry, pollinators, soil biota and other elements, including "natural" and "managed" components of the agro-ecosystem; Determining the ways in which diversity can contribute to stability, resilience and productivity in different kinds of production systems; Developing ways of ensuring that diversity in agricultural systems supports adaptation to change and for maintains production and ecosystem function under fluctuating environmental conditions (so-called sustainability); Fully recognizing linkages of agricultural biodiversity to the provision of ecosystem services and undertaking full economic analyses of these. These analyses should pay particular attention to the consequences for all different components of agricultural biodiversity of adopting so called environmentally friendly cultural practices (e.g. zero-tillage, IPM); Understanding how sustainability and agricultural biodiversity maintenance can be combined with intensification so that improved agricultural biodiversity maintenance produces tangible benefits to poor farmers in developing countries; Understanding how policy-making at the national and international levels can enhance the use and sustainability of agricultural biodiversity.

HUTTNER, Eric

Eric Huttner is a scientist and science manager in agricultural biotechnology. He graduated in 1986 with a "Docteur-Ingénieur" degree from Institut National Agronomique in Paris, and started his scientific career in INRA, studying molecular aspects of nitrogen assimilation in plants. While at INRA, he worked for 16 months (1987/88) as a post-doctoral scientist at the Shanghai Institute of Biochemistry (Shanghai, China). He joined the French seed company Groupe Limagrain in 1990. During an 11-year career with Limagrain and its subsidiary Biogemma, Eric Huttner had several missions including the establishment and management of a plant molecular biology research facility plus several private–public partnership research programs in Australia. From 1998 to 2001, he played a key role in the establishment and management of the French national plant genomics program Génoplante. He became chief scientific officer of Biogemma in 2000. In 2001, he joined CAMBIA, an Australia-based private not-for-profit research organization, developing and delivering tools to assist plant improvement in developing countries. Since 2002, he is the General Manager of Diversity Arrays Technology Pty Limited, a company developing a novel and cost–effective genotyping technology for domesticated and wild plants and animals. Eric Huttner is the author of several scientific publications and book chapters and an inventor of several technologies, patented or with patent pending internationally.

Abstract

Diversity arrays technology, a novel tool for harnessing the genetic potential of orphan crops

Eric Huttner[1,2], Peter Wenzl[2], Mona Akbari[2], Vanessa Caig[1], Jason Carling[1], Cyril Cayla[1], Damian Jaccoud[2], Kaiman Peng[2], Sujin Patarapuwadol[2], Grzegorz Uszynski[1], Ling Xia[1], Shiying Yang[2] and Andrzej Kilian[1,2]

Genetic diversity is the raw material available to plant breeders. By productively recombining genetic diversity, plant breeders have been successfully producing year after year improved cultivars of the major domesticated species used in the world's diverse agricultural systems. Molecular genetic markers offer a powerful tool to accelerate and refine this process. Existing genetic marker (genotyping) technologies, mostly developed for applications in human health, have been applied successfully to agricultural species too, but their cost remains prohibitive for most agricultural applications. This is particularly true for species for which no molecular data and very limited resources are available.

Because of the limitations of existing marker technologies, we have developed Diversity Arrays Technology (DArT), a novel method to discover and score genetic polymorphic markers. DArT is a sequence-independent, high-throughput method, able to discover hundreds of markers in a single experiment. DArT markers are typed in parallel, using high throughput platforms, with a low cost per data-point. With DArT, plant breeders, plant ecologists, as well as the managers of the germplasm collections, will be able to perform genetic analysis in a cost–effective and high throughput manner. DArT fingerprints will be useful for accelerating plant breeding, and for the characterization and management of genetic diversity in domesticated species as well as in their wild relatives.

We have developed DArT successfully for rice, barley, wheat and cassava. We have also produced a dedicated data management and analysis package, a key part of the technology, entirely built from Open Source components. Work is in progress to establish DArT for some species of importance to tropical agriculture: pigeon pea, sorghum and chickpea. We have a high interest in developing partnerships to establish DArT for many species, and we are developing a network model for the delivery of technology to users.

[1] Diversity Arrays Technology Pty Limited and
[2] CAMBIA (Center for the Application of Molecular Biology to International Agriculture)
GPO Box 3200, Canberra, ACT 2601, Australia.

JARRETT, Stephen

Mr. Stephen Jarrett is currently Deputy Director of the United Nations Children's Fund (UNICEF) Supply Division, overseeing the sourcing and management of vaccines, medicines and associated health products sent to over 100 developing countries and valued at $400 million annually. In this context, he maintains regular contact with executives of both vaccine and pharmaceutical manufacturers around the world. He regularly presents at international conferences and fora particularly on the challenges in developing countries to ensuring vaccine security—the uninterrupted sustained supply of quality affordable vaccines—and on the development of sourcing and managing anti-retroviral medicines in resource-poor settings.

Mr. Jarrett has a Bachelor's Degree in Civil Engineering from the University of Southampton, United Kingdom, and a Masters in Public Health from Columbia University, New York, USA. He has worked for UNICEF for over 30 years in various capacities, including developing and implementing programs in several countries in South and Central America, managing UNICEF's support to health programs in China, advising countries in Africa, Asia and South America on the development of community-based medicine supply systems prior to his current responsibilities which he assumed 7 years ago.

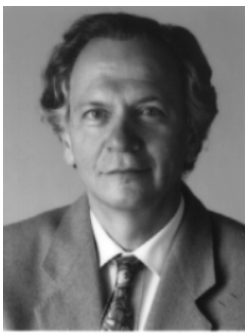
He has written extensively on health issues related to immunization and health systems strengthening in developing countries. He is a Member of the American Public Health Association and of the US National Committee on United States–China Relations.

Abstract

Vaccine Security: Ensuring the Uninterrupted Sustainable Supply of Affordable Vaccine to developing Countries

Stephen Jarrett, Deputy Director, UNICEF Supply Division

Vaccines are a critical requirement for the prevention of communicable diseases and one of the most cost–effective interventions in child health. Vaccines, however, are subject to long lead times in their production and have a narrow supply base, and the access of developing countries to this vital biotechnology is by no means a certainty. Vaccine shortages at the turn of the century are associated with several factors including a divergence in products used between industrialized and developing countries, consolidation and mergers in the pharmaceutical industry, and the low profitability of basic vaccines against childhood illnesses. In answer to this crisis, UNICEF, as the world's largest purchaser of vaccines, pioneered a vaccine security strategy with the objective of making firm commitments to vaccine purchases in order to ensure availability of vaccines needed by children. This has resulted in achieving in excess of 80% accuracy in its forecast of vaccine needs across 90 countries and firming near to half of its global vaccine purchase for the next 3 years. In ensuring supply from up to four producers, UNICEF has had to accept an increase in vaccine prices, thereby paying a premium for vaccine security. The main challenge to governments and donors is to mobilize increasing and sure future funding to guarantee access for all children to basic vaccines as well as new biotechnology. The main challenge to the vaccine industry is to ensure vaccine production even in the uncertainty of the situation of low income countries. National governments, donors and the vaccine industry have to work together to ensure the future funding and availability of vaccines needed by children around the world.



JASMIN, Claude

Claude Jasmin, MD, FACP, is Professor at the Paris University of Medicine and is Head of the Department of Oncology at Paul Brousse Hospital in Villejuif. Over 36 years of clinical and experimental research against cancer and leukemia and leadership responsibilities at the European and international levels. Claude Jasmin has published more than 400 scientific publications in major international journals, and 11 books. Claude Jasmin has been awarded numerous international distinctions throughout his career, including the Isaac Wistar Prize for Scientific Research (1983). He has also made significant contributions to the field of Ethics in Medicine and is the recipient of the Rambam Prize in Ethics (1996). He is recognized for pioneering contributions to the development of psychosomatic research in cancer, and is the recipient of the Pierre Marty Prize for Psychosomatic Research (2003). He is founding President of the International Council for Global Health Progress (ICGHP), a multidisciplinary group of leading international figures who address health-related issues of major importance for global policy decision-makers.

Abstract

Losing life, losing lives to cancer

Professor Claude Jasmin, Hôpital Paul Brousse VILLEJUIF, France

In 2000, ten million new cases and six million deaths were registered in the world. A 50% increase in incidence is expected in 2020, including 29% in developing countries.

The main causes of cancer in developing countries are tobacco, contaminated food and viruses. Tobacco alone is responsible for one million deaths worldwide per year. A substantial and increasing proportion affects poor populations.

Malnutrition and obesity are also important factors in carcinogenesis. Again, poor and less well educated people are disproportionately affected and the increasing number of overweight poor children is of concern.

Sexually transmitted cervical cancer is a great killer in South America and worldwide. HIV infection also provokes malignant diseases such as Kaposi sarcoma and lymphomas. AIDS epidemic has undermined the benefits achieved in health care in Africa, and life expectancy has now fallen by ten years because ninety per cent of HIV positive patients have no access to health care and standard treatment.

Liver cancer is linked to viral B and C hepatitis virus which could be aggravated by exposure to dietary carcinogens in some Asian regions.

A great majority of these cancers are preventable. A healthy world is in part dependent on our ability to put modern technology at the service of developing countries. Healthy societies can only grow with healthy populations.

In conclusion, health is a political issue, not a gift but something to be conquered. Health is an ethical obligation to ourselves as well to others.

JOHNSON, Brian

Dr. Brian Johnson is Senior Advisor on Biotechnology to the British Statutory Nature Conservation Agencies and is Head of the Agricultural Technologies Group at English Nature, one of the United Kingdom Government's advisors on nature conservation. He has been closely involved in the debate on potential effects of GMOs on biodiversity and other aspects of the environment. After pursuing academic research in population genetics and ecology, he has spent the past 20 years in nature conservation. He has written numerous articles in the scientific and popular press about conservation and the impact of biotechnology on the environment. Dr. Johnson sits on several advisory committees concerned with biological research, regulating the release of GMOs into the environment and the development of more sustainable farming methods. He chairs the study reviewing biosafety within CGIAR.

Abstract

Is biosafety only the first step towards more sustainable cropping systems?
Regulators need to look more widely and earlier in the development of transgenic crops.
Dr. Brian Johnson, Head of Biotechnology Advisory Unit, English Nature (United Kingdom)

Much of the debate about the use of transgenic crops has centered on biosafety issues. This is clearly an important issue for food and feed, agriculture and biodiversity, but examples will be presented where biosafety has in the past been assessed at a very late stage in the development of GM crops, leading to delays in their use, and in some cases to outright rejection by regulators. This means much lost investment and waste of research resources. Biosafety is not the only issue that has led to such loss; regulators are becoming increasingly concerned with the indirect impacts of transgenic crops, not only on agriculture and biodiversity but also on socio-economic sustainability in rural areas. These issues are especially acute in areas of high rural poverty, where relatively small adverse impacts can have severe consequences. A model is presented for earlier and wider consideration of the indirect impacts of transgenic crops that could not only lead to more efficient and effective regulation, but also influence research and development agendas.

LACHMANN, Sir Peter

Professor Sir Peter Lachmann (United Kingdom) is a medical immunologist with research interests in the complement system and in immunopathology. He is Emeritus Professor of Immunology in the University of Cambridge, Head of the Microbial Immunology Group at the Centre for Veterinary Science and a fellow of Christ's College. He is also president of the European Federation of Academies of Medicine.

He was President of the UK Academy of Medical Sciences from 1998 to 2002 and was previously Vice-President and Biological secretary of the Royal Society (1993–98) and President of the Royal College of Pathologists (1990–93). He is a Fellow of the Academia Europaea, a Foreign Fellow of the Indian National Science Academy and a Foreign Member of the Norwegian Academy of Science and Letters.

His other professional commitments include being National Patron of Lupus (UK) (since 1996), Chairman of the Scientific Advisory Board of Adprotech, Ltd. (since 1997), Trustee of Arthritis Research Campaign (since 2000). From 1993–98 he served on UNESCO's international bioethics committee. He was awarded the Gold Medal of the European Complement Network in 1997 and the Medicine and Europe Senior prize in 2003.

Abstract

Mankind has long been greatly afflicted by infectious diseases—a problem probably worse since the agricultural revolution some 10,000 years ago. Infectious diseases caused heavy mortality in early childhood; and for the survivors, death continued at a fairly steady rate throughout the human life span.

This situation began to improve markedly only after the discovery of the germ theory of disease in the mid 19th century with the introduction of public health measures for ensuring clean water and adequate hygienic sewage disposal; with the introduction of vaccination; and with the discovery of antimicrobial drugs.

It would however be a mistake to regard infectious diseases as an expensive threat to humanity. Indeed some features of modern life have exacerbated the problems of infectious diseases not least in the developing world. These problems include:

1. The increasing contact of man with animal species, such as humans colonize more and more habitats. This is probably responsible for many new and emerging infections which have a zoonotic origin. HIV is one spectacular example; SARS may become another.
2. Further pandemics of influenza, which have been so dangerous in the past, are probably inevitable. There is current concern about an epidemic of bird influenza in the Far East and the risk that this may acquire the capacity to transfer to humans. There is now a well-organized industrial effort to make new influenza vaccines as the need arises and it remains to be seen if this can be activated fast enough to stop a dangerous pandemic. There are however also now effective drugs that can be administered as a prophylactic against influenza by inhibiting the viral neuraminidase.
3. Changes affecting human lifestyles have also played a part. Sexual liberation and the increasing use of injected narcotic drugs have facilitated viral spread. In a very different way, air travel also makes the world wide spread of infections much more rapid.
4. Parasitic diseases, such as malaria, have yet to be effectively controlled. Vector control using DDT showed great promise some decades ago but was greatly set back by the withdrawal of DDT when no alternative was available. This is an example of the ever-increasing influence that pressure groups and they now have on public health policy.

   The movement of large numbers of non-immune subjects into endemic malarial areas, as occurred in modern warfare, has accelerated the development of resistance to anti-malarial drugs.
5. Public resistance to vaccination stimulated by vaccine scares remains a serious problem. Curiously, vaccine scares often occur in just one country. In the UK it is autism and MMR; in the USA it is autism and thiomersal (used as a preservative in vaccines); in France it is multiple sclerosis and Hepatitis B vaccine; and, most recently, in some parts of Africa there has been a scare that infertility in women may result from polio vaccination. There is no serious evidence for any of these scares.
6. Irresponsible prescribing of antibiotics and, in some countries, the availability of antibiotics over-the-counter both contribute to the growing incidence of antibiotic resistance in microorganisms. The threat of bacterial infections resistant to all chemotherapy is very real.

The price of freedom is eternal vigilance. This is also true for freedom from infectious diseases.

MacMILLAN, Whitney

Mr. Whitney MacMillan is the retired Chairman, CEO, and Director Emeritus of Cargill Incorporated, an international marketer, processor, and distributor of agricultural, food, financial, and industrial products and services around the world. He possesses a Bachelor of Arts degree from Yale University and has been a successful and productive member of the workforce for over 40 years.

Mr. MacMillan is a director of the Salzburg Seminar, Rural Development Institute, the American Assembly, the Trilateral Commission, Hubert H. Humphrey Institute of Public Affairs, International Peace Academy, Western NIS Enterprise Fund, Yale President's Council on International Activities, and a member of the National Academy of Sciences Board on Agriculture and Natural Resources.

MADKOUR, Magdy Ahmed

Professor Dr. Magdy Ahmed Madkour, currently holds the post of President of the Agricultural Research Centre (ARC) in Egypt. He obtained his PhD in Physiological Plant Pathology, from the Department of Botany and Microbiology, University College of Wales, Aberystwyth, United Kingdom. His career saw him rising through the ranks of academic posts, first as a young Demonstrator and, finally, as a Visiting Professor at the University of California from 1989 up to 1990. Currently, he holds the post of President of the Agricultural Research Centre (ARC) in Egypt.

Among his activities and achievements, he has designed and established the Agricultural Genetic Engineering Research Institute (AGERI), at the Agricultural Research Center (ARC) of the Ministry of Agriculture & Land Reclamation in Egypt. Today, AGERI is a center of excellence in biotechnology, molecular biology and genetic engineering research and product development in Africa, the West Asia–North Africa (WANA) region.

In the area of research, his main interest lies in the practical application of Biotechnology and Plant Genetic Engineering as providing modern tools for the production of environmentally safe transgenic plants with improved traits. Some of these applications would result in raising the tolerance to abiotic stress, resistance to biotic stress and the production of environmentally friendly Biopesticides.

He has been a member of several scientific organizations and societies and has served on several boards. Among which are the USA/EGYPT Science and Technology joint Governing Board, under the Gore/Mubarak Initiative-Academy for Scientific Research and Technology, the Editorial Board of the Journal of the International Association for Plant Tissue Culture and Biotechnology (IAPTC&B), USA, and the technical evaluation panel of AGROPOLIS, French Ministry of Research and Higher Education in conjunction with the "Commision de la Recherché agricole International".

His publications include more than 107 published refereed articles and papers in international, regional, and Egyptian journals.

MATTA, Chérif

Dr. Chérif Matta is a Post-Doctoral Research Fellow and a Chemistry Teaching Fellow at the University of Toronto, Canada. He holds a BSc of Pharmaceutical Sciences from Alexandria University and a Graduate Diploma in Health Management from the Sadat Academy (Egypt). He earned his PhD in 2002 in quantum, bio-theoretical and computational chemistry from McMaster University (Canada) with the world-renowned theorist Richard F. W. Bader. He has since been a PDF in the group of Nobel laureate John C. Polanyi at the University of Toronto. He has recently been awarded the prestigious Izaak Walton Killam Postdoctoral Fellowship tenable at Dalhousie University (Canada). Dr. Matta is a "full member" of the Chemical Institute of Canada and a member of the Canadian Society of Chemistry, the American Chemical Society (ACS), and the Protein Society. Dr. Matta has published more than 20 papers in high impact journals and has been featured five times as the cover theme. He developed two software distributed by the University of Indiana's Quantum Chemistry Program Exchange. During 2003, he has been an invited speaker, guest lecturer, and panelist 15 times in five countries. He serves as a referee for the Leverhulme Trust (UK) and for journals including: Organic Letters; Journal of Physical Chemistry A; Journal of Computational Chemistry; Journal of Computer-Aided Molecular Design. The research of Dr. Matta has been featured as the cover story of the ACS Chemical and Engineering News. The Faculty of 1000 Inc. has recently ranked his research as "EXCEPTIONAL: Top 1% of published biological literature". His awards include a 2003 American Association for the Advancement of Science's BioVision "Bio-Leaders of Tomorrow" Fellowship, the 2003–2004 Chemistry Teaching Fellowship Competition Award, and the Gordon Research Conference-International Union of Crystallography Travel Award. He commands mother tongue fluency in Arabic, English and French.

Abstract

Computational chemistry: A powerful and inexpensive tool for basic and applied research in the life sciences

Dr. Chérif Matta, Chemistry Department, University of Toronto (Canada)

With the advent of powerful computers and accurate *ab initio* electronic structure and density functional theory (DFT) methods, computational chemistry has become an established branch of modern chemistry. The 1998 Nobel Prize in Chemistry has been awarded to John Pople and Walter Kohn for their pioneering contributions to computational chemistry and DFT, respectively. In this talk, the significance of theoretical and computational chemistry to biological research will be illustrated. The talk will showcase some of the applications of computational chemistry in drug design, biophysical chemistry, and environmental chemistry. Some examples of the use of computational chemistry include: the prediction of drug action; the elucidation of the mechanisms of drug action; the study of the binding of a substrate to its receptor; the study of the energetics of enzyme-mediated biochemical reactions; the prediction and correlation of physicochemical properties of drugs with their electronic properties; establishing a link between the electronic properties of molecules such as the carcinogenic polycyclic aromatic hydrocarbons (PAH) with their carcinogenic potency; and the study of the effects of stray fields and other environmental pollutants on critical cellular molecules. The impact of such research on public health will be emphasized along with the particular suitability of computational chemistry as an academic activity for "the poor" (defined in this talk as those who cannot afford to bear the prohibitive costs of a typical modern biochemical research facility). For instance, a modern nuclear magnetic resonance (NMR) spectrometer may fetch up to $5 million. In sharp contrast, anyone equipped with a modest $3,000 PC (and a good brain!) can already perform state-of-the-art quantum chemical calculations and predict a host of properties for the molecule or system at hand. In view of its relatively low cost, computational and bio-theoretical chemistry are fields of research to which the developing world can, and should, contribute on an equal footing as the developed world. The establishment of schools of computational chemistry in the developing world should be seen within the wider context of achieving educational and academic reforms and the strive for excellence in these countries. The transfer of this technology between the two hemispheres is something that should be strongly encouraged and funded.

McCONNELL, David

David McConnell, BA, PhD (Caltech.), FTCD, MRIA, FZSI. He is Professor of Genetics, Smurfit Institute, Trinity College Dublin. Educated at Trinity College Dublin (1962–66) and the California Institute of Technology (1966–70), Professor McConnell is a molecular geneticist who has published more than 100 papers in the fields of gene expression and biotechnology. He is a member of the European Molecular Biology Organization and has been a member of staff of Trinity College since 1970. He advised UNIDO on the establishment of the International Centre for Genetic Engineering and Biotechnology. He has advised the Government of Egypt on the development of biotechnology. Appointed to the Irish Council for Science Technology and Innovation (1997–2003), he was a member of the Technology Foresight Task Force, which led the Irish Government to establish Science Foundation Ireland. He has been Vice-Provost of Trinity College, President of the Zoological Society of Ireland, Chairman of Fota Wildlife Park, President of the Adelaide Hospital Society, and is currently Chairman of the Irish Times Trust. He is a member of the Executive Board of European Federation of Biotechnology and Co-Vice Chairman of European Action on Global Life Sciences (EAGLES).

Abstract

European Action on Global Life Sciences European Action on Global Life Sciences (EAGLES) is a consortium of life scientists and humanists from Europe and developing countries who are dedicated to the application of knowledge of the life sciences to the great humanitarian challenges of hunger, thirst, disease and environmental degradation. EAGLES is a Task Group of European Federation of Biotechnology. The objective of EAGLES is to encourage Europe and Europeans to create more sensitive life science policies and stronger supporting programs that are focused on the needs of developing countries. These objectives are essentially political, with a small "p" and can only be realized by influencing public and political opinion in Europe. By far the greatest advocates for the life sciences in developing countries are the scientists and humanists from these countries who know from their own experience how the life sciences have been applied and are being applied to address problems of development. They know the problems at first hand and they know, broadly speaking, the range of solutions that ought to be tried. Many will have been disappointed by European attitudes to the life sciences that do not always seem to take account of the needs of the developing countries. EAGLES is developing a communication program which on the one hand will allow Europeans to explain life science policies and programs that are relevant to developing countries, and on the other will provide opportunities for scientists and humanists from developing countries to influence the way in which such policies and programs will expand in the future. The EAGLES strategy will be discussed.

MURPHY, Noel

Noel Murphy is a Lecturer at the Department of Genetics, Trinity College, and undertakes research on molecular interactions between African trypanosomes and their hosts to identify new ways to control the devastating diseases that these organisms cause for humans and animals. He received his PhD in Bacterial Molecular Genetics from Trinity College, Dublin, and was then awarded an EMBO postdoctoral fellowship in 1984 to undertake research on African trypanosomes at the Université Libre de Bruxelles. He devised a method of "gene walking" that resulted in the identification of a series of genes co-expressed with the major variant surface glycoprotein and work continues on this in Brussels and elsewhere as the functions of some co-expressed genes remains elusive. In 1987, he moved to the International Laboratory for Research on Animal Diseases (ILRAD) in Kenya that was later subsumed into the International Livestock Research Institute (ILRI). Early research focused on gaining an understanding of parasite differentiation and on mechanisms of drug resistance. Arising from this were practical approaches to trypanocidal drug usage, to integrated control measures and to parasite characterization tools. At ILRAD and ILRI he occupied a senior scientist position with responsibility for molecular studies of African trypanosomes and was head of the tsetse fly and cell culture units of ILRI. He established multiple collaborations between ILRI and laboratories worldwide and results from one such collaboration led to the elucidation of a mechanism of resistance to trypanosomiasis in African wildlife species and to the identification of acquired immunity to infection and disease in these species. By exploiting these findings he has achieved the induction of immunity against trypanosomiasis in susceptible cattle. His current research is involved in extending these findings with the goal of developing a field applicable vaccine that can alleviate the constraint of trypanosomiasis in developing regions.

Abstract

Delivering practical, sustainable solutions for problems of neglected diseases in the post genomics era

Noel Murphy, Department of Genetics, Smurfit Institute of Genetics, Trinity College (Ireland)

The genomic revolution has partially leveled the scientific "arena" as the data are publicly available worldwide for analysis. It is the potential for exploitation of that data where inequalities lie and it is this area that requires greater co-operation and collaboration between scientists of the South and North. Genomic projects for several of the intractable neglected pathogens of humans and their livestock are reaching completion. There are high expectations that this information will lead to practical and sustainable solutions in the form of affordable drugs and vaccines against the diseases that these organisms cause. Indeed, the scientific literature increasingly reports multiple potential targets for each organism under study, but nothing practical to show for these promising studies. There are significant constraints in moving from potential targets to practical applications mostly related to the different agendas of researchers, funding agencies and the private sector and to particular dogmas that have become established. How can the goodwill and information be best exploited in an inclusive manner that involves researchers South and North with the backing of funding agencies and policy-makers? This paper outlines some of the soluble constraints to achieving the goals of affordable and sustainable remedies to the problems of neglected diseases with a particular focus on trypanosomiasis research and will offer some approaches to overcoming those constraints.

NAGAYAMA, Osamu

Mr. Osamu Nagayama was born on 21 April 1947. His work and career have been associated mainly with the pharmaceutical industry, expect for a brief period in Banking at the Long-Term Credit Bank of Japan, both in Japan and the United Kingdom.

He joined Chugai Pharmaceutical Co., Ltd. in 1978 and has since worked in the Ethical Product Marketing Division, the International Division, the Research and Development Division, the Healthcare Division and the Corporate Planning Office. He has been a member of the Board of Directors since March 1985 before being nominated President of Chugai Pharmaceutical Co., Ltd. on 30 September 1992. Shortly after, he was elected Chairman of the Japan Pharmaceutical Manufacturers Association on 22 May 1998.

His four years in the United Kingdom have given him valuable experience and, at age 56, he is well known as an internationally minded executive and excellent English speaker among the Japanese pharmaceutical industry.

NAKHLA, Rafik

Rafik Nakhla a graduate pharmacist in 1982. He has received the following postgraduate qualifications: Postgraduate Diploma in Quality Management, 1998, University of Wolverhampton, United Kingdom. MA in Quality Management (2001) dissertation entitled: “Business Excellence” Model in the Egyptian Private Business Context. A Management Development Consultant, since 1990, where he has worked with Multinational Pharmaceutical companies as Astra Zeneca, Janssen–Cilag, Schering AG, MSD, Organon. A lecturer in Marketing with the Business Studies Division of the Center for Adult and Continuing Education in the AUC. A lecturer in Marketing and Logistics with the Arab Academy Graduate School of Business part of the Arab Academy for Science and Technology.
He is the Director of Personnel at the Bibliotheca Alexandrina and a member of several committees in BA.

NAWAR, Mohamed Helmi Ahmed

Professor Emeritus, Department of Rural Sociology & Agricultural Extension, College of Agriculture, Cairo University, Egypt. Born on 11 October 1941, married with two children. His PhD was in Sociology, December 1975, Prague, Czechoslovakia. He received several awards: 1994 (USA), 1987 (UK), 1971 (Czech Central Co-op Council) and 1962 (Egypt). He held numerous posts at various Scientific and Professional Associations. His experience in development research was with numerous countries. He is author and co-author of six books and 42 papers.

NUTTI, Marília Regini

Marília Regini Nutti is Food Engineer. She obtained her MSc in Food Science at the State University of Campinas, Brazil (1986), followed by Post-Graduate Course in Nutritional Planning at the University of Gent, Belgium (1980) and in Consumer Studies at the University of Guelph, Canada (1985). Full-time Researcher and Lecturer at the Department of Nutrition and Food Planning, State University of Campinas (1983–87), responsible for several courses and member of examination committees of several MSc theses. Technical Director of *Nutrícia S/A Produtos Dietéticos e Nutricionais*, leading a group of 40 researchers mainly oriented at R&D of Foods for Special Dietary Uses. Director of Embrapa Food Technology, a research unit with 140 employees, including 40 researchers with PhD or MSc (1996–2003). Brazilian delegate at the Codex Alimentarius Committee in Food Labeling (Canada) since 1997 and at the Codex Alimentarius ad hoc Task Force on Foods Derived from Biotechnology (Japan) since 2000. Member of the Interministerial Group for the Labeling of Genetically Modified Foods proposal, representing the Minister of Agriculture and Supply. Member of the FAO/WHO Expert Consultation "Safety Aspects of Genetically Modified Foods of Plant Origin", on the roster of experts of FAO/WHO in Biosafety. Coordinator of the Latin America and Brazilian activities for the Harvest Plus Project, that focus on Biofortification of crops in order to improve human nutrition and health. Responsible for the interface between breeding, biotechnology, food technology and nutrition activities Researcher at Embrapa, Brazilian Agricultural Research Corporation, in the areas of food safety, nutrition, biosafety and labeling of genetically modified foods.

OMI, Koji

Mr. Koji Omi was Japan's former Minister of State for Science and Technology Policy, former Minister of State for Okinawa and Northern Territories Affairs (Member of the House of Representatives). He was born on 14 December 1932, in Gunma Prefecture, Japan.

1956: Graduated from the Faculty of Commercial Science, Hitotsubashi University; 1956: Joined the Ministry of International Trade and Industry (MITI);
1970: served as Consul at the Japanese Consulate General in New York until 1974;
1981: served as Director-General, Guidance Department, Small and Medium Enterprise Agency until 1982;
1983: Elected to the House of Representatives (returned 7 times up to the present);
1990: Parliamentary Vice-Minister for Finance;
1995: Chairman Standing Committee on Finance, House of Representatives;
1995: Drafted and enacted "Science and Technology Fundamental Law";
1997: Minister of State for Economic Planning until 1998;
2000: Acting Secretary-General, Liberal Democratic Party (LDP) until 2001;
Minister of State for Science and Technology Policy;
Minister of State for Okinawa and Northern Territories Affairs until 2002;
Chairman, Research Council for the Promotion of Science and Technology-oriented nation, LDP (2002–to present).

PARDEY, Philip

Philip Pardey, an Australian native, is Professor of Science and Technology Policy in the Department of Applied Economics, University of Minnesota. Previously he was a senior research fellow at the International Food Policy Research Institute, Washington DC, where he led the Institute's Science and Technology Policy Program. Prior to 1994, he was at the International Service for National Agricultural Research in the Netherlands. He is a graduate of the University of Adelaide, Australia, and obtained a doctoral degree in agricultural economics from the University of Minnesota. Professor Pardey has considerable international experience, leading regional projects in Asia, sub-Saharan Africa and Latin America and the Caribbean, and country projects in Argentina, Australia, Brazil, China, Indonesia, Kenya, Niger and the United States. His research deals with the finance and conduct of R&D globally, methods for assessing the impacts of research, and the economic and policy (especially intellectual property) aspects of genetic resources and the biosciences. He has co/authored more than 160 books, articles, and papers and most recently, in 2003, the John Hopkins University Press volume *Ending Hunger in Our Lifetime: Food Security and Globalization*.

Abstract

Agricultural R&D and crop-related IPRs

Professor Philip Pardey, Science and Technology Policy, Department of Applied Economics, University of Minnesota (USA)

Proponents tout the positive incentive-to-innovate effects of intellectual property rights (IPRs), while others maintain that the expanding subject matter and geographical extent of IPRs are stifling crop research, especially research and development (R&D) dealing with developing country crop concerns. Much of this debate relies on anecdotes and misleading or incomplete evidence on the extent and nature of the IPRs pertaining to crop technologies, including the jurisdictional extent of the property rights and their practice. In this paper we review the evidence on the scope of agricultural R&D worldwide, provide new data on the structure of crop-related IPRs, and describe some of the institutional initiatives relating to the access of proprietary crop technologies.

PEACOCK, Jim

Dr. Jim Peacock, President of the Australian Academy of Science, is a Research Fellow of CSIRO Plant Industry in Canberra, Australia, one of the world's leading plant research institutes. His laboratory is recognized internationally in the field of plant molecular biology and its applications in agriculture. He was appointed a Companion of the Order of Australia, Australia's highest honor, for his contribution to the nation. Dr. Peacock is a Fellow of The Royal Society of London, and the Australian Academy of Technological Sciences and Engineering. In 1990, he was elected as a Foreign Associate of the US National Academy of Sciences and a Foreign Fellow of the Indian National Science Academy. In 2000, he was a co-recipient of the Inaugural Prime Minister's Science Prize. Jim Peacock has active research programs in the induction of flowering; in the molecular genetics of seed development; in plant hemoglobin; and in the molecular biology of stress responses in plants. Jim Peacock is prominent in the interfacing of plant science with modern agribusiness. He drives innovative communication efforts to extend research results and educate key decision-makers and the public as to the outcomes and value of modern science, particularly gene technology. He has brought the enthusiasm of biological research to a broad cross-section of the community and to a large population of Australian school students.

Abstract

The nexus between health and agriculture—targets of global significance

Dr. Jim Peacock, President of Australian Academy of Science (Australia)

In Asia, more than 2 billion people rely on rice as a staple food and in Africa, it is the most rapidly growing food source. More than 800 million people have inadequate total energy intake through their food, which is also characterized by inadequate nutritional properties. In many developing countries, there are significant micronutrient and vitamin disorders. All of these deficiencies can be remedied through the provision of a nutritionally balanced food supply. Improvement of the health and life expectancy of the people of developing countries is a prerequisite to their achievement of social and economic progress. Early morbidity and mortality place huge strains on these societies. Improved nutrition is a cost–effective and achievable means of meeting this challenge. The coincidence of recent advances in plant science, particularly for rice, with the increased knowledge we now have of the health and nutritional requirements of humans provides us with the opportunity to achieve modifications in the rice grain so that it will be a nutritionally optimized staple food. The rice grain has a low protein content, which is of poor quality for human nutrition, and it has a starch composition, which is sub-optimal for health requirements. These two major components of the grain need to be adjusted to produce grain with increased protein of higher quality and with starch of high health value. In addition, the bioavailable levels of vitamins A and E and the minerals iron, zinc and selenium need to be addressed. We will be able to stably maintain the pyramided desirable nutritional traits through the use of two key technologies, apomixis and heterosis. Heterosis, a gene control system for hybrid vigor will produce higher levels of individual gene products. Apomixis, clonal seed development, will lock in the pyramided traits and provide a farmer–friendly delivery system for the improved plant varieties. Without apomixis it would be extremely difficult to maintain the complex genotypes generated through pyramiding nutrient-relevant traits by either conventional breeding or biotechnology. Although the breakthroughs in the nutritional qualities of plant foods will be achieved by using the most powerful gene, protein and metabolite technologies, wherever possible, the improvements will be made through non-GMO, conventional breeding. In future years, when global societies are more accepting of the benefits of GM breeding, we will be able to combine gene technology and conventional breeding in the rice improvement programs.

PERSLEY, Gabrielle

Dr. Gabrielle Persley is the Chair of the Doyle Foundation, a Scottish-based charity established to advocate and support the role of science in international development.

Dr. Persley received her doctorate in microbiology at the University of Queensland, Australia. Her work is focused on the role of biotechnology in developing countries. She has published widely and is editor of a CAB International (CABI) published series of books on Agricultural Biotechnology. Her most recent publications are Meta review for the International Council for Science (ICSU) "New Genetics, Food and Agriculture-Scientific Discoveries—Societal Dilemmas" and "Biotechnology and Sustainable Development: Voices of the South and North", the book is the outcome of the first biotechnology conference held at the Library of Alexandria in 2002.

Dr. Persley spent several years in Washington DC as the biotechnology advisor to the World Bank, where she managed a number of biotechnology projects, in support of the applications of biotechnology in emerging economies. She is presently a member of the Steering Committee of the African Biosciences Facility, a NEPAD-sponsored center of excellence in biosciences, which is being established on the campus of the International Livestock Research Institute (ILRI), Nairobi, Kenya.

POORTMAN, Ysbrand

Ysbrand Poortman is a biologist by training.

He founded and directed various alliances of patient organizations such as the Dutch Alliance of Parent & Patient Organizations (VSOP, Soestdijk, the Netherlands), the Dutch National Platform for Patients & Consumers (NPCF, Utrecht, the Netherlands), European Alliance of Neuromuscular Disorder Associations (EAMDA, Malta), European Neuro-Muscular Center for the coordination and stimulation of international research (ENMC, Baarn, the Netherlands).

In 1994, he became one of the founding members of the European Platform for Patients Organizations, Science and Industry (EPPOSI, Brussels) of which he has been Chairman since 2000.

He is Vice-President of the World Alliance of Organizations for the Prevention and Treatment of Genetic Disease (WAOPBD, New York, USA) and since 1999 he is Vice-President of the International Genetic Alliance of Parent & Patient Organizations (IGA, Washington, USA) which was founded in 1999.

He is a member of various committees and boards, such as the Dutch National Health Council and the Medical Genetic Center of the Erasmus University in Rotterdam.

He is author of numerous publications, one of which is a *Handbook on Neuromuscular Diseases*; as well as author of several chapters in books, articles, teaching packages and information materials on genetics.

Abstract

Ysbrand Poortman, Vice-President, World Alliance Organizations for the Prevention and Treatment of Genetic and Congenital Conditions

A global partnership of scientists, doctors and patients' organizations working on prevention and management of genetic disease and birth defects.

Health is a prerequisite for well being and for economic growth.

Most of the common and the rare disorders have a genetic component which gives options for prevention and keys for (future) treatment.

In comparison with intercurrent diseases the burden of genetic disorders and birth defects have an extra dimension due to its specific characteristics such as lifelong, repetition in families, great demand for care, limited options for treatment, serious psycho social, physical and (often enormous) economical implications. Every year 7 million children are born with a genetic disease or birth defect in developing countries.

Thanks to scientific (genetic and bio molecular) progress and sophisticated (bio) technology the options for prevention and treatment have considerably increased. Some disease like sickle cell anemia does not occur any more in countries, such as Cyprus, which have appropriate preventive programs and genetic services.

The World Alliance of Organizations for prevention and treatment of genetic and congenital conditions (WAO) has a focus on perinatal healthcare in developing countries where 90% of the children of the world are born.

The March of Dimes in the United States, founder of the WAO, through its Global Programs is actively working in this field with focused programs and in partnership with WAO and others.

Parent and patient organizations are maturing and playing an increasing role in adequate self-care systems and in the prevention and management of disease. Moreover they engage in partnerships with academia and industry and influence policymaking in the political arena. An example is the European Platform Patient Organizations, Science & Industry.

The WAO has a track record of conferences throughout the world aiming at public and scientific awareness, political readiness and at capacity building in terms of facilities/ services and education and at establishing sustainable regional partnerships focusing on regional needs.

The Life Sciences provide a horizon for a considerable reduction in the incidence of genetic and congenital disorders, and also for a considerable improvement of the management of these conditions.

POTRYKUS, Ingo

Chairman, Humanitarian Golden Rice Board. Since retirement, devoted to Humanitarian Project on Golden Rice; Professor in Plant Sciences (ETH Zurich) 1986–99; research group leader Friedrich Miescher Institute Basel 1976–86; research group leader Max–Planck–Institute for Genetics, Heidelberg 1974–76; PhD Max–Planck–Institute for Breeding Research Cologne; since 1970 development and use of genetic engineering technology to contribute to food security in developing countries, focusing on rice, wheat, and cassava; approximately 350 publications in refereed journals and 70 IPRs.

Abstract

Nutritional enhancement of rice to fight malnutrition in vitamin A, iron and essential amino acids: Developments beyond "**Golden Rice**"

Ingo Potrykus, Professor Emeritus of Plant Sciences, Institute of Plant Sciences, Swiss Federal Institute of Technology (Switzerland)

Malnutrition is the cause for 24,000 deaths per day. Nutritional enhancement of major crops could reduce this outstanding medical problem. The introduction of three genes into the experimental Japonica variety TP309 provided proof of concept for biochemical pathway engineering leading to accumulation of provitamin A in the endosperm (X. Ye *et al*., Science 2000). The introduction of three further genes (phytase, ferritin and metallothionin) offered the opportunity to enhance bioavailability of iron (P. Lucca *et al*., TAG 2001), and the addition of a synthetic gene for a high quality storage protein (Asp-1) provides a balanced mixture of all nine essential amino acids. "Golden Rice" represents a humanitarian project based on public–private partnership. Being "GMO" Golden Rice has to pass numerous barriers before subsistence farmers and urban poor can benefit from it. These include: (1) intellectual property rights; (2) material transfer agreements; (3) freedom-to-operate; (4) GMO–competent partners; (5) transfer to *Indica* varieties; (6) adjustment at the onset of experiments to deregulation requirements; (7) development of "clean" events, (8) nutritional bioavailability studies; (9) biological, ecological, and socio-economic safety assessments; (10) needs assessments and *ex-ante* effect studies; (11) deregulation; (12) radical GMO opposition; (13) consumer acceptance; (14) public-funding (for 1 through 12). The project has, so far, passed the barriers (1 through 7), and (8) and (10) are in progress.

PRAKASH, C.S.

Dr. C.S. Prakash, Professor in Plant Molecular Genetics, and Director of Center for Plant Biotechnology Research at Tuskegee University, oversees the research on food crops of importance to developing countries and training of scientists and students in plant biotechnology. Dr. Prakash has also been actively involved in enhancing the societal awareness of food biotechnology issues around the world. His Internet website (www.agbioworld.org) has become an important portal disseminating information and promoting discussion on this subject among stakeholders such as scientists, policy makers, activists and journalists. He has recently served on the USDA Agricultural Biotechnology Advisory Committee and continues to serve on the Advisory Committee for the Department of Biotechnology of the Government of India. His outreach activities also include writing newspaper commentaries, delivering public lectures, providing media interviews, and moderating daily Internet discussion group/newsletter 'AgBioView' which is read by more than 4000 experts in 55 countries. The AgBioView is widely recognized as a premier news outlet on agbiotech issues because of its broad focus on technical, societal and ethical issues. Dr. Prakash, through his efforts, has had successful impact on decision-makers, media and the consumers in creating an awareness of agbiotech issues especially on the technology development and biosafety issues. He also has been very instrumental in catalyzing the scientific community in many countries to be more proactive in the biotechnology debate. Dr. Prakash has actively worked to promote biotechnology research in developing countries of Asia and Africa also through training of students and scholars, research collaboration and lectures. Dr. Prakash's contribution to agricultural biotechnology outreach was recently recognized by the "Man of the Year" award "in service to Alabama Agriculture" by the magazine Progressive Farmer.

RABBINGE, Rudy

Rudy Rabbinge is Chairman/Dean of Wageningen Graduate Schools and University Professor for Sustainable Development and Systems Innovation. Biologist by training he worked for the past 30 years in various functions on the ecologicalisation of agriculture. As professor of Theoretical Production Ecology (1978–98) he initiated different major programs in the application of basic knowledge and insight in innovative processes for primary production and systems approaches in agricultural research. He has led various missions and agricultural programs in developing countries, served as editor of several journals, published more than 100 scientific publications, five textbooks and more than 200 other publications. He served on the board of Trustees of six Centers of the group of International Agricultural Research and was Chairman of the IRRI's BOT (1995–2000), member of the Prime ministers Scientific Council for Government Policy (1988–98), senior advisor for the Minister of Agriculture, Fisheries and Nature (1992–99) and is at present member of the Senate of the Netherlands Parliament, Chairman of the Royal Institute of the Tropics and member of the Board of various international agribusiness firms.

RAMPHELE, Mamphela

Dr. Mamphela Ramphele is one of four Managing Directors at the World Bank. She oversees the Vice Presidencies of the World Bank Institute (WBI) and External Affairs (EXT). As Chair of the Board of Directors of the Development Gateway, she helps guide strategy formulation and implementation dedicated to using technology to enhance development, launched by the World Bank in 2001.

Furthermore, Dr. Ramphele leads formulation of the Bank's education and health policies. She also is responsible for monitoring and evaluating progress toward the attainment of the Millennium Development Goals (MDGs) to which the international community has committed itself, coordinating closely with the various UN agencies in supporting countries' efforts to achieve these goals. She has been appointed Co-Chair of the newly established Global Commission on International Migration.

A South African-born physician and anthropologist, Dr. Ramphele was the first woman and the first black South African to hold the position of Vice-Chancellor of the University of Cape Town. In addition to a medical degree and a PhD in social anthropology, she holds a BCom degree in Administration, and diplomas in Tropical Health & Hygiene and Public Health. As a student she played a key role in the Black Consciousness Movement in South Africa. She has received numerous national and international awards, eighteen honorary doctorates, and the Medal of Distinction from Barnard College. Her extensive books and articles, spanning the themes of education, health, and social development, have received numerous prizes and awards.

ROMEO–CASABONA, Carlos

Carlos M. Romeo–Casabona a graduate in Law (1974), obtained his PhD in Law (1980) and PhD in Medicine (1991) at the University of Zaragoza. He obtained a Higher Diploma in Criminology (1974) by the Complutense University of Madrid. He held Chair in Criminal Law (1988–96) at the University of La Laguna (Tenerife, Canary Islands), where he has also served as Dean of the Faculty of Law (1991–94), and as Head of the Centre for Criminology Studies (1990–96). He has been an Acting Judge in the Territorial High Court of Zaragoza (1987/88). At present, he is Professor in Criminal Law at the University of the Basque Country, and also Head of the Inter-University Chair BBVA Foundation–Provincial Government of Biscay in Law and the Human Genome, Universities of Deusto and of The Basque Country, where he is also the editor of the "Law and the Human Genome Review". He is also the editor of two collections published by Editorial Comares: "Library of Law and Life Sciences" and "Criminal Law Studies". He has received the following awards: University of Zaragoza (in his Doctorate of Law, 1981), Royal Academy of Medicine of Zaragoza (1983), International Award in the Science of Man (Letamendi–Forns Foundation, Barcelona, 1985), and the Fundesco Essay Award (Fundesco Foundation for the Development of the Social Function of Communications, Madrid, 1987). He is a corresponding member of the Royal Academy of Medicine of Zaragoza. He has taken part in numerous national and international conferences, seminars and symposia in Spain, Europe, Asia and North and Latin America, where he acted as organizer or director. He was, also, visiting and guest Lecturer in several European, Latin American and Asian Universities.

Abstract

Intellectual Property Rights and the controversy between developed and developing countries: Is it ethical to care for animals' suffering but to forget the needs for the survival of human beings?

Professor Carlos María Romeo–Casabona, LLD, MD

There was a dual purpose for the European rules concerning biopatents: on the one hand, to harmonize the European legislation on biotechnological patents, and on the other, to contribute to the development of biotechnological research in Europe so that it is not mainly relegated behind the North American and Japanese biotechnological market. During the 1990s, Europe was involved in a debate, where patenting life should be in accordance with ethical principles. The current directive is full of ethical considerations, to acquire a position devoted to solve the ethical questions related with the patentability of living matter, parts of the human body, as well as the human genes.

The Governments of some countries of Asia (India), Africa (South Africa) and Latin America (Brazil), among others, were confronted with the problem of providing some of the vital drugs (such as AIDS medication) for their populations. It was both an economic concern, as these countries are not complex drug inventors, and an ethical problem as the Governments could not sit back with their arms crossed and accept the death of thousands of infected persons.

SASSON, Albert

Albert Sasson is Agrégé of the University (1958) and Doctor of Natural Sciences (Microbiology) at the University of Paris (1967). His research work in microbiology has dealt with the microflora of arid lands, and with free and symbiotic nitrogen–fixing microorganisms. After a career at the Faculty of Science in Rabat (Morocco) from 1954 to 1973 (Dean of the Faculty, from 1963 to 1969), Dr. Sasson joined UNESCO in 1974.

As a member of the Division of Ecological Sciences, he participated in the activities of the Programme on Man and the Biosphere (MAB), notably those concerning arid and semi-arid zones, and prepared major state-of-knowledge reports on tropical forest and grazing land ecosystems of the world (Tropical Forest Ecosystems, 1978; Tropical Grazing Land Ecosystems, 1979: Ecosystèmes forestiers tropicaux d'Afrique, 1983).

From 1979 to 1985, he participated, within the Bureau of Studies and Programming of the Directorate of UNESCO, in the elaboration of the biennial programmes and Medium-term Plan of the Organization in Science and Technology. From 1985 to 1987, he was the Director of the Central Evaluation Unit of the Directorate of UNESCO. In 1988, he was appointed Director of the Bureau of Programme Planning and, in November 1990, Director of the Bureau of Studies**,** Programming and Evaluation (including the Division of Statistics). On 1 September 1993, he was promoted to the rank of Assistant Director-General. Retired on 1 April 1996, he was appointed Special Adviser to the Director-General (1996–99).

Albert Sasson is Associate Member of the Club of Rome. He was awarded the Honorary Degree in Science by De Montfort University (Leicester, United Kingdom). In May 2000, he has been elected Member of the Ben-Gurion University of the Negev (BGU, Beer-Sheva) Board of Governors. He is Visiting Professor of the United Nations University Institute of Advanced Studies (UNU/IAS, Tokyo) since 2003. Albert Sasson has been appointed by the King of Morocco, Member of the Human Rights Consultative Council, in 1990, when this body was created.

Since January 2000, Albert Sasson is carrying out the tasks as senior consultant, in particular to the UNESCO, Moroccan institutions and the company Publicis Dialog (Paris).

Among some 200 publications, including his research and popularization activities in soil microbiology, algology and agrobiology (le role des micro-organismes dans la biosphere et l'avenir de la microbiologie appliqué, 1970), Albert Sasson has published books and contributed to publications on biology teaching (Teacher's Study Guide on the Biology of Human Populations, 1975-75; New trends in Biology Education, 1977; Environmental Education: Teaching and Learning Principles, 1987); on environment and development issues (Développement et environnement–faits et perspectives dans les pays industrialisés et en voie de développement, 1974; Ingenieria y ambiante, formacion ambiental para ingenieros, 1982; New Technologies and Development, 1986); on food and nutrition (Feeding Tomorrow's World, 1990); and on biotechnologies (Biotechnologies: Challenges and Promises, 1984; Biotechnologies and Development, 1988; Plant Biotechnologies for Developing Countries, 1990; Biotechnologies in Perspective, 1991; Biotechnology: Economic and Social Aspects. Issues for Production, 1992; Biotechnologies in Developing Countries: Present and Future. Vol. 1: Regional and National Survey, 1993; Vol. 2: International Co-operation, 1997; Vol.3: Regional Co-operation and Joint Ventures, 2000; Microalgal Biotechnologies: Recent Developments and Prospects for Developing Countries, 1997; Plant Biotechnology-Derived Products: Market-Value Estimates and Public Acceptance, 1998).

SCHNEIDER, Cynthia

Georgetown University faculty since 1984 in Art History. Currently leading a University-wide "Life Sciences and Society Initiative" at Georgetown. Appointed Pfizer Medical Humanities Initiative Scholar in Residence (June 2004–June 2006), and working on a project on "Best Practices" in public–private partnerships to implant technology in the developing world, funded by Rockefeller Foundation. Organized two conferences on aspects of bioterrorism preparedness (March 2003 and June 2003). Organized the International Life Science Summit, October 2003 at GU. Also teach cultural diplomacy in the School of Foreign Service. Co-organizer of cultural diplomacy conference at Institute for Study of Diplomacy, Georgetown (30 April 2003). Non-resident Fellow at Brookings Institute and the Institute for the Study of Diplomacy; supervisory Board member of Royal Ahold. Publications on cultural diplomacy, bioterrorism and biopreparedenss, on Rembrandt and 17th century Dutch Art. As Ambassador to the Netherlands (1998–2001) was active in biotechnology, cultural diplomacy, military and business relations, international law, cyber security, education. Was awarded the Office of the Secretary of Defense Exceptional Public Service Order, the highest civilian award given by the Department of Defense.

SERAGELDIN, Ismail

Education
1964: BSc (First Class Honors) Cairo University
1968: MRP (With Distinction) Harvard University
1972: PhD Harvard University

Honorary degrees
1996 Doctor of Sociology, University of Bucharest, Romania
1996 Doctor of Agricultural Science, University of Melbourne, Australia
1997 Doctor of Science, Indian Agricultural Research Institute, India
1998 Doctor of International Affairs, American University, Washington, DC, USA
1998 Doctor of Science, Punjab Agricultural University, India
1998 Doctor of Science, Tamil Nadu Veterinary & Animal Sciences Univ., India
1998 Doctor of Natural Resources Management, Ohio State Univ., USA
1999 Doctor of Science, Tamil Nadu Agricultural University, Coimbatore, India
1999 Doctor of Science, ANGRAU, Hyderabad, India
1999 Doctor of Economics and Management, CNAM, Paris, France
1999 Doctor of Science, Egerton University, Kenya
1999 Doctor of Agricultural Science, University of Tuscia, Italy
2000 Doctor of Humane Letters, American University in Cairo, Egypt
2002 Doctor of Science, SNHU, Manchester NH, USA
2003 Doctor of Science, McGill University, Montreal, QC, Canada

Currently
Director, Library of Alexandria.
Distinguished University Professor, Wageningen University, the Netherlands
Also serves as chair and member of a number of advisory committees for academic, research, scientific and international institutions and civil society efforts.

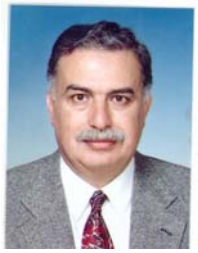
Previous appointments
- Special Advisor, the World Bank
- Distinguished Visiting Professor, American University in Cairo (AUC) (2000/2001)
- Advisor to the Egyptian Government on the New Library of Alexandria
- Vice President of the World Bank till July 2000, (for Environmentally and Socially Sustainable Development, from October 1992 to March 1998, and for Special Programs from March 1998 to July 2000)
- Chairman, Consultative Group on International Agricultural Research (CGIAR, 1994–2000)
- Chairman, Consultative Group to Assist the Poorest (CGAP), a microfinance program (1995–2000)
- Chairman of the Global Water Partnership (GWP, 1996–2000)
- Chairman, World Commission for Water in the 21st Century (August 1998–March 2000)

Worked in a number of capacities at the World Bank since joining in 1972. Economist in education and human resources (1972–76); Division Chief for Technical Assistance and Special Studies (1977–80), and for Urban Projects in Europe, the Middle East and North Africa (1980–83); Director for Programs in West Africa (1984–87), Country Director for Central and Occidental Africa (1987–89), Technical Director for all Sub-Saharan Africa (1990–92), and Vice-President for Environmentally and Socially Sustainable Development (1993–98). In addition, he was active in promoting NGO-Bank relations, and served as Co-Chairman of the NGO-Bank Committee (1997–99). Prior to joining the World Bank, worked as a consultant in city and regional planning, and taught at Cairo University and Harvard University.

Professional memberships
- Member, National Academy of Agricultural Sciences, India
- Member, European Academy of Sciences and Arts, Austria
- Member, Bangladesh Academy of Science, Dhaka
- American Institute of Certified Planners (AICP)
- Member, Third World Academy of Sciences, Italy
- Member, World Academy of Arts and Sciences, USA

Publications and speeches
Over 45 books and monographs (edited or authored) and 200 articles, book chapters, and technical papers on various topics, including: *Nurturing Development* (1995), *Sustainability and the Wealth of Nations* (1996), *Architecture of Empowerment* (1997), *Rural Well-Being*: *From Vision to Action* (1997, with David Steeds), *The Modernity of Shakespeare* (1998), *Biotechnology and Biosafety* (1999, with Wanda Collins), *Very Special Places* (1999) and *Promethean Science* (2000, with G. Persley).

Personal
Ismail Serageldin is an Egyptian national, born in Giza in 1944. He is married with one son. He is tri-lingual: Arabic, French and English.



SOLH, Mahmoud

Born in 1947 in Lebanon. Graduated in 1978 from the University of California at Davis, USA with a PhD in Genetics. Obtained BSc and MSc from the American University of Beirut, Lebanon. Worked as Project Assistant in Cereal Breeding with the Ford Foundation, Arid Land Agricultural Development (ALAD) Program, 1972–74, where he collected germplasm in the Near East region including Afghanistan; Lentil Breeder, 1978/79, at the International Center for Agricultural Research in the Dry Areas (ICARDA); Associate Professor at the American University of Beirut, 1980–86; ICARDA's Food Legumes Breeder in North Africa, 1986–90; Regional Program Coordinator of ICARDA's Nile Valley and Red Sea Regional Program 1990–97 and as Director/Assistant Director General for International Cooperation at ICARDA (1997–2002). Currently, occupying the position of Director of Plant Production and Protection Division (AGP) at FAO, Rome. Has earned (1978) a number of Awards, Honors and Scholarships including Penrose Award (1969), Phi Kappa Phi and Sigma Xi Honorary Awards (1981) and Rockefeller Foundation Scholarship. Author and editor of a considerable number of publications, including book chapters, books, articles in referee journals, and in proceedings of conferences and workshops.

Abstract

Agrobiodiversity, People and the Environment

Mahmoud Solh[1] and Peter Kenmore[2]

Food and Agriculture Organization; Viale delle Terme di Caracalla, Rome, Italy

The global challenges of conservation of agrobiodiversity and sustainable agricultural intensification have benefited from scientific advances in the past decade. These advances, however, too often automatically promote technological approaches without looking at the importance of community empowerment, education, and policy reform. Local empowerment and ownership are essential for sustainable natural resource management. Education—as opposed to message delivery—will make the expertise to solve new problems arising from environmental change available when and where needed. Policy reforms to change existing incentives will promote environmentally-friendly choices. Three cases are examined at different scales.

In Madagascar, agricultural conversion by local farmers is blamed for habitat fragmentation in a forested biodiversity hotspot. Rapid Rural Appraisals showed that traditional tenure and land use covenants concentrated rice farming on cleared land, mandated tree planting, proscribed the harvest of valuable rare plant species, and minimized destructive conversion. However, recent immigrant farmers from outside this local community do not abide by these covenants. Secondly, commercial logging interests, granted official permits to cut widely in the forest, remove valuable old trees. These actions, which local communities do not have the capability to oppose, undermine the traditional covenants further.

In Asia, agro-ecosystem analysis in rice and cotton was first done by researchers and now has been taken up by over a million participants in farmers' field schools. These farmers make decisions on insecticide use based on the relative proportions of herbivores and predators at each growth stage of their crops. This work has been extended in rice to illustrate how soil organic matter management can increase predator populations early in the crop season with better pest regulating capacity. In China, this work has been adapted by thousands of cotton farmers growing Bt transgenic varieties. This has further reduced insecticide applications and increased profits.

The UNDP/GEF/ICARDA Dryland Agrobiodiversity Project concentrates on crop genetic reservoirs in the cradle of agriculture biodiversity, i.e. the Fertile Crescent. It supports fieldwork in carefully selected pilot sites where threats to these reservoirs are identified. Participatory approaches to the management of these sites are followed including local added value processing to provide incentives to farmers. Complementary efforts towards education of the general public and school children are emphasized. In addition, review and modification of national policies by policy makers bring agro-biodiversity explicitly into the lives of many more people in the region.

[1] Director, Plant Production and Protection Division

[2] Chairman, Biodiversity Interdepartmental Working Group, FAO

SOLIMAN, Salah

Salah Ahmed Soliman, Professor of Pesticide Chemistry and Toxicology, Faculty of Agriculture, Alexandria University (1986–present).

Visiting Scientist, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina, USA (1979–82).

Visiting Professor, University of Texas Medical Branch, (UTMB), Galveston, Texas, USA (1987–88).

Visiting Professor, King Saud University, Saudi Arabia (1988–94).

Member, Final Review Boards (FRBs), International Program on Chemical Safety (IPCS), World Health Organization (WHO) since 1992.

Member, Joint Meeting on Pesticide Residues, WHO/FAO JMPR, since 1999.

Vice-Chairman, Steering Group on Risk Assessment (IPCS/SGRA, WHO), 1999–present.

More than 25 students obtained their MSc and/or PhD degrees under his supervision at Alexandria, and other Universities.

Has more than 70 scientific papers in areas of neurotoxicity, pesticides and heavy metals monitoring and mode of actions published mostly in international journals.

Wrote several chapters in international books.

Constructed a number of Research Laboratories at the Department of Pesticide Chemistry and Toxicology, Alex University through research projects funded by USEPA and other US and UN organizations.

Member, US Society of Toxicology; Society of Environmental Chemistry and Toxicology; Weed Science Society of America; and Egyptian Society of Toxicology.

Rewarded the National Award on Agricultural Sciences, 1980 and offered the First Level Medallion of Science and Art by Decree of the President of Egypt, 1981.

SWAMINATHAN, M.S.

Professor M.S. Swaminathan has been acclaimed by TIME magazine as one of the twenty most influential Asians of the 20th century and one of the only three from India, the other two being Mahatma Gandhi and Rabindranath Tagore. He has been described by the United Nations Environment Programme as "the Father of Economic Ecology" and by Javier Perez de Cuellar, Secretary General of the United Nations, as "a living legend who will go into the annals of history as a world scientist of rare distinction". He was Chairman of the UN Science Advisory Committee set up in 1980 to take follow-up action on the Vienna Plan of Action. He has also served as Independent Chairman of the FAO Council and President of the International Union for the Conservation of Nature and Natural Resources.

A plant geneticist by training, Professor Swaminathan's contributions to the agricultural renaissance of India have led to his being widely referred to as the scientific leader of the green revolution movement. His advocacy of sustainable agriculture leading to an evergreen revolution makes him an acknowledged world leader in the field of sustainable food security. The International Association of Women and Development conferred on him the first international award for significant contributions to promoting the knowledge, skill, and technological empowerment of women in agriculture and for his pioneering role in mainstreaming gender considerations in agriculture and rural development. Professor Swaminathan was awarded the Ramon Magsaysay Award for Community Leadership in 1971, the Albert Einstein World Science Award in 1986, the first World Food Prize in 1987, Volvo Environment Prize in 1999, and the Franklin D. Roosevelt Four Freedoms Award in 2000.

Professor Swaminathan is a Fellow of many of the leading scientific academies of India and the world, including the Royal Society of London and the US National Academy of Sciences. He has received 43 honorary doctorate degrees from universities around the world. Recently, he has been elected as the President of Pugwash Conferences on Science and World Affairs. He currently holds the UNESCO Chair in Ecotechnology at the M.S. Swaminathan Research Foundation in Chennai (Madras), India.

Abstracts

The New Biology: A survey of the Issues about Food Security
Ever-green Revolution and Bio-happiness

M S Swaminathan, UNESCO Chair in Ecotechnology; M.S. Swaminathan Research Foundation (India)

Food security is best defined as "physical, economic, social and ecological access to balanced diet and clean drinking water for all and for ever". Physical access relates to production issues and have to be addressed by fostering an *evergreen revolution* designed to enhance farm productivity in perpetuity without associated ecological harm. This is where ecotechnologies developed by blending frontier science and technology with traditional ecological prudence play a significant role. Economic access is a function of purchasing power. In population rich countries, economic access can be achieved only through job-led economic growth. Social access relates to the gender dimensions of household food security. Finally, ecological access will necessitate attention to conserving and enhancing the environmental foundations of sustainable productivity and production.

Programs designed to eliminate poverty induced endemic hunger will have to be based on the skill and technological empowerment of resource poor families. The new biology involving various aspects of biotechnology including genomics and bioinformatics offers uncommon opportunities for helping to bridge the genetic and gender divides now occurring in rural areas. Similarly, the new biology offers opportunities for the rapid elimination of hidden hunger caused by the deficiency of micronutrients in the diet. We will be entering an era of bio-happiness if we make conscious efforts to ensure that the new biology becomes a blessing for all—rich or poor, man or woman and black or white.

Biodiversity and Environment: Promise and delivery towards an Era of Symbiotic Biopartnerhsips

M S Swaminathan

Biodiversity is the feedstock of the breeding and biotechnology enterprises. The green revolution was the result of an intelligent use of genetic material capable of enabling crop plants like wheat and rice to make effective use of sunlight, water and nutrients. Recombinant DNA technology, if used with public good as the sole aim, can open up uncommon opportunities for improving both the human and natural environment. Potential beneficial effects include mitigating the adverse impact of climate change and sea level rise, and minimizing the use of chemical pesticides. Examples will be cited from the work of MSSRF in the use of genes from species of Mangroves and from *Prosopis juliflora* in breeding crop varieties tolerant to seawater and to drought. To get full benefits from biodiversity for enriching the human environment, there is need for symbiotic biopartnerships between biodiversity-rich developing countries and technology-rich industrialized countries.

THORNSTRÖM, Carl–Gustaf

Professor Carl–Gustaf Thornström, PhD, Associate Professor in Social and Economic Geography with emphasis on agricultural issues and political geography. He is, at present, part-seconded as guest researcher in genetic policies at the Swedish Biodiversity Centre and as adviser to the Swedish University of Agricultural Sciences, Sida and as referee to the Swedish Government office regarding genetic policy issues. Thornström has, for over 20 years, worked with policy issues related to international agricultural research at SAREC, which today is a department for research cooperation within Sida. He participates as technical adviser in Swedish delegations to CBD, FAO, CGIAR, WIPO and other international negotiations related to Research and Development (R&D). Thornström's research focus is on the policy level mainly: genetic resources, intellectual property rights and subsequent coherence issues across international agreements and processes; such as life patents, GMOs, protection of traditional knowledge, enclosure of biological/genetic commons, access to genetic resources and proprietary science.

VAN MONTAGU, Marc

Professor Marc Van Montagu was Professor and Director of the Laboratory of Genetics, Faculty of Sciences, Ghent University and Scientific Director of the Genetics Department, Flanders Interuniversity Institute for Biotechnology (VIB). He was part-time professor at the Free University of Brussels (VUB) for the courses cell biology, nucleic acid chemistry, and virology. He was Scientific Director and member of the board of Directors of Plant Genetic Systems Inc. (Belgium). Together with his colleague Professor Jeff Schell, Marc Van Montagu discovered the gene transfer mechanism between Agrobacterium and plants, which resulted in the development of methods to alter Agrobacterium into an efficient delivery system for gene engineering in plants. He developed plant molecular genetics, in particular molecular mechanisms for cell proliferation and differentiation and response to abiotic stresses (high light, ozone, cold, salt and drought) and constructed transgenic crops (tobacco, rape seed, corn) resistant to insect pest and tolerant to novel herbicides. His work with poplar trees resulted in engineering of trees with improved pulping qualities. He has received numerous outstanding awards for his pioneering work, including the prestigious "Japan Prize". He is foreign associate of the National Academy of Science (USA) since 1986 and the Agricultural Academy of Russia and France. He holds 6 Doctor Honoris Causa degrees. In 1990, he was granted the title of "Baron" by H.M. Baudouin I, King of Belgium.

Von der OSTEN, Alexander

Alexander von der Osten, German national, born in 1938. Degree in Economics from the University of Heidelberg in Germany. During most of his career he worked in international agricultural research and development, in both public and private sector organizations. In the public sector he worked at: (a) the Institute for International Agrarian Policy Research at Heidelberg University (1964); (b) UN Food and Agriculture Organization (FAO) in Rome (1965–72): as Research Fellow (1965); as Economist/ Project Analyst in the Economic Analysis Division (1966–68); and as Assistant Chef de Cabinet in the Office of the Director General (1968–72); (c) The German Agency for Technical Cooperation (GTZ) in Eschborn, Germany as Senior Advisor to the Head of the Agriculture Department (1979/80). In the private sector, he was Managing Director of a major agribusiness enterprise in Germany (1972–79). From 1980 to 2001, he served the Consultative Group on International Agricultural Research (CGIAR), as: (a) Executive Officer of the International Service for National Agricultural Research (ISNAR) in the Netherlands, (1980–83); (b) Executive Secretary of the Technical Advisory Committee (TAC) to the CGIAR, based at FAO, Rome (1983–85); (c) Director-General of the International Service for National Agricultural Research, ISNAR (1985–89); and (d) Executive Secretary of the CGIAR based at the World Bank in Washington, DC (1989–2001). Throughout his career he traveled extensively and spent substantial periods abroad. His work took him to some 130 countries throughout the world. He speaks English, French, Italian and Spanish, besides his mother language German. Since his retirement from the CGIAR/World Bank in 2001 he has been working as a consultant.

YANG, Huanming

Dr. Huanming Yang is Professor, and Director of Beijing Genomics Institute, Chinese Academy of Sciences, Beijing, China. His interests span from the mapping and cloning of human genes, sequencing and analysis of the human genome, human genome diversity and evolution, to the ethical, legal, and social issues related to genome research. As coordinator-in-China of the International Human Genome Sequencing Consortium, Dr. Yang is one of the main players in China's effort in human genome sequencing. Dr. Yang is also Coordinator-in-China of the International HapMap Consortium, Chief Coordinator of the Chinese Hybrid Rice Genome Consortium. Dr. Yang is Secretary-General of the Chinese Human Genome Project (CHGP), Secretary-General of the Human Genome Diversity Committee, and Secretary-General of the Committee of Ethical, Legal, and Social Issues (ELSI), CHGP. He is a member of the Expert Panel of the National Office for Administration on Genetic Materials, and the Expert Committee of Field of Life Sciences, National Programs on High-tech ("863"), China. Dr. Yang has a PhD from the University of Copenhagen, Denmark, and has his post-doctoral trainings in Europe (CIML, INSERM/CNRS, Marseille, France, 1988–90) and USA (Harvard Medical School and UCLA, 1990–94).