

Monday 28 May 2007, 4.00- 6.00 p.m. University of Trieste Building H3, Lecture Room 1A (first floor) Special International Presentation;

HIGHLIGHTS of the G8-UNESCO World Forum on 'Education, Research and Innovation: New Partnership for Sustainable Development', held in Trieste, May 2007 (In English) All students, researchers, lecturers are cordially invited

Program

- 16,00 Introduction: Education-Research-Innovation Gianrossano GIANNINI (TS/Italy) (10')
- 16,10 Why UNESCO? Why Africa? Why Trieste?- Paolo ALESSI (TS/Italy+UNESCO) (10')
- 16,20 Education in the Knowledge-Based Society Gabriele GARBIN (TS/Italy+UNESCO)(10')
- 16,30 Environment: Global Challenges Gianrossano GIANNINI (TS/Italy) (10')
- 16,40 Innovation and Society Rachel OBED (Nigeria+ICTP) (10')
- 16,50 Sustainable Development and Health Omer A. Ali (Sudan+ICTP) (10')
- 17,00 Sustainable Development and Energy Gabriele GARBIN (TS/Italy+UNESCO) (10')
 & Anna Maria Novello (TS/Italy) (5')
- 17,15 Research and Innovation: Role of Governments-Patrizia TIBERI VIPRAIO (UD/Italy))(5') & Rachel OBED (Nigeria+ICTP))(5')
- 17,25 Knowledge and Sustainable Development Gianrossano GIANNINI (TS/Italy) (10')
- 17,35 Science/Technology/Innovation: Perspectives for Africa-Elie SIMO (Cameroon+ICTP) (15')
- 17,50 Knowledge for Sustainable Development: The future Patrizia TIBERI VIPRAIO(UD/Italy)(10

18,00 End





G8-UNESCO World Forum on 'Education, Research and Innovation: New Partnership for Sustainable Development' **Trieste, Italy, 10-12 May 2007**

Under the High Patronage of the President of the Republic of Italy

Organization





in collaboration with









With support of the Scientific Institutions in Trieste









the Local Authorities





and Media Partner HOADBR

Thursday, 10 May

Opening Session

Chair:



Professor Katepalli R. SREENIVASAN Director ICTP TRIESTE



Welcome Remarks

Hon. Mr. Koïchiro MATSUURA Director-General of UNESCO



Hon. Mr. Romano PRODI President of the Council of Ministers ITALY



Hon. Mr. Giuseppe FIORONI Minister of Education ITALY



Hon. Mr. Riccardo ILLY President Regione Friuli-Venezia Giulia



Dr. Hamadoun TOURÉ Secretary-General International Telecommunication Union



Alain Giorgio Maria ECONOMIDES Director-General Ministry of Foreign Affairs for Development Co-operation



Dr. Panitchpakdi SUPACHAI Secretary-General United Nations Conference on Trade and Development (UNCTAD)



Dr. Lamya Ahmad AL-SAQQAF Permanent Representative of the State of Kuwait to FAO and Chairperson of the G77 Rome Chapter



Professor Katepalli R. SREENIVASAN Director ICTP TRIESTE

Forum originated from discussions that took place at the July-2006 G8 Summit in <u>St. Petersburg</u>.

Focus on the three components of the <u>"Triangle of Knowledge"</u>

– <u>Education, Research and Innovation</u> – and their mutual dependence.

Particular attention paid to <u>developing countries</u> and <u>sustainable</u> <u>development</u>.

UNESCO (United Nations Educational Scientific Cultural Organization) is a partner in the Forum within the framework of the <u>Decade of Education for Sustainable Development (2005-14).</u>

Discussion presented by <u>speakers of the highest level</u> from the <u>educational</u>, <u>scientific and entrepreneurial worlds</u>, from G8 countries as well as <u>developing countries</u>.

Forum as opportunity for <u>discussion</u> and no final document foreseen. (...)



Sustainable Development:

'Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.' (Brundtland Commission, 1987 Report: Our Common Future)



Gro Harlem Brundtland, Norway

Developing Countries $\rightarrow \sim 70$ % of land, $\sim 80\%$ population Global Economy \rightarrow Global Vulnerability: environment degradation, natural resources depletion, spread of diseases, poverty, starvation and illiteracy affect All: GW (World) \supseteq G8.

➔ Global Partnership

Now Dartnarchin for Suctainable Development



W/ by K. R. Sreenivasan, Abdul Salam Research Professor and Director, ICTP



Hon. Mr. Koïchiro MATSUURA Science, Technology and Innovation for all Director-General of UNESCO

> ...how to better utilize the synergies created by education, research and innovation as part of the global efforts to build a <u>more prosperous</u>, <u>equitable and peaceful world</u> ?

...generate knowledge, produce innovation and then apply at least a portion of it to addressing <u>critical human needs</u>.

...Science and technology, not only to satisfy human curiosity, but also to help satisfy the <u>basic needs</u> of our most marginalized citizens.

...Focus on promoting <u>global reforms</u>:

- 1. to achieve high quality basic education, literacy and gender equality
- 2. to build human/institutional <u>capacity</u> for science/technology/innovation
- 3. to protect and promote <u>indigenous knowledge</u>
- 4. to embrace knowledge as a public asset <u>accessible to all</u> (best cure)
- 5. to nurture broad institutional free information exchange <u>networks</u>

"Science is the common heritage of all humankind." (Abdus Salam) Science, research and innovation: common elements of our future.



Hon. Mr. Giuseppe FIORONI Minister of Education

MINISTER OF EC



Hon. Mr. Riccardo ILLY President Regione Friuli-Venezia Giulia



Dr. Hamadoun TOURÉ Secretary-General International Telecommunication Union



Dr. Panitchpakdi SUPACHAI Secretary-General United Nations Conference on Trade and Development (UNCTAD)



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Hon. Mr. Romano PRODI President of the Council of Ministers ITALY

- Education strategic against <u>fragmentation</u> of knowledge
- No separation between scientific//humanistic
- Continuos learning
- Scientific experimental method \rightarrow laboratories
- Welcome to Trieste, "<u>City of Science</u>", and Friuli Venezia Giulia, "<u>Region for Innovation</u>".
- "Development occurs via innovation, based on research".
- Sustainable development requires particular attention to the issues: <u>environment</u> and <u>energy</u>.
- By 2015 ICT connections in every hospital, school,etc.
- We do not need new <u>resolutions</u>, we need to <u>implement</u> those that we <u>already have</u>.
- Development programmes must come from the <u>developing</u> <u>nations themselves.</u>
- <u>Access to knowledge</u> noted as a <u>divider</u> between developing and developed countries.
- Technology and innovation need to be indigenous.
- To stop the <u>brain drain</u> create a "critical mass" of scientists and researchers.

-<u>Technology</u> almost <u>divider</u> rather than a bridger of the gap between developed and undeveloped countries.

- Need for human resource training, <u>centres of excellence</u> and development partnership.

-There is always a new "hot point" but the difficult part is the follow-up, we know the problems, where & how to act first ?

- Concrete actions: action plan on sustainable development.

-Produce 1-2 pages of priorities to send to Heiligendamm G8.

Thursday, 10 May

University, Research Institutions and Industry: What Partnership to Develop

in Global Innovation Society?

What is the role of universities in developing innovation and entrepreneurship? How to develop best practices on knowledge-based development and private-public partnership to facilitate global knowledge dissemination?

How to identify barriers among relevant sectors and ways to overcome them to promote combined investments in education, research and innovation?

Chair



Professor Hans N. WEILER Professor Emeritus of Education and Political Science Stanford University U.S.A.

Keynote Speakers



Mr. Pasquale PISTORIO Vice President for Innovation and Research Confindustria



Professor Pier Ugo CALZOLARI Rector University of Bologna Italy

Rapporteur



Professor Carlo RIZZUTO President Sincrotrone Trieste



Dr. Dmitry Viktorovich LIVANOV Director Department of Science, Innovation and Intellectual Property



Hon. Mr. Zhang XINSHENG Vice-Minister of Education PEOPLE'S REPUBLIC OF CHINA



Professor Hans N. WEILER

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Stanford University U.S.A.

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Hon. Mr. Zhang XINSHENG Vice-Minister of Education PEOPLE'S REPUBLIC OF CHINA



Professor Carlo RIZZUTO President Sincrotrone Trieste

- University, Institution, Industry: Competition → Cooperation
- Improve Cultural Affinity, Mutual Respect, No Suspicion
- Individual vs. team work
- Compatibility: Search for Truth Search for Profit
- Importance of Innovation ST-Microelectronics example.
- Recommendations to accelerate cooperation between Universities and Small/Large Companies.
- Universities need a clear understanding of the role of knowledge transfer.
- Distinction between private and public research.
- Government is a less successful investor compared to businesses but is good at large multidisciplinary projects.
- "Knowledge-based society" implies much thought and effort.
 In China e.g. government willing to lose a few % GNP in order to promote massive education reform.
 Need for south-south, south-north cooperation.
- Improve: Education, Knowledge Sharing, Knowledge Transfer.
- Positive feedback. Knowledge Production $\leftarrow \rightarrow$ Knowledge Use.
 - Increase: Evaluation, Excellence, Increased Affinity.
 - Excellent Industries meet excellent Universities.
- Overcome barriers among disciplines.



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United Nations Educational, Scientific and Cultural Organization



WHY UNESCO WHY AFRICA WHY TRIESTE ? PAOLO ALESSI





UNESCO, United Nations Educational, Scientific and Cultural Organization.

Its <u>constitution</u> was adopted by the London Conference in November 1945, and entered into effect on the 4th of November 1946 when <u>20 states</u> had deposited instruments of acceptance. It currently has <u>188 Member States</u> (as of 19 October 1999).

The *main objective* of UNESCO is:

to contribute to peace and security in the world by promoting collaboration among nations through education, science, culture and communication in order to further universal respect for justice, for the rule of law and for the human rights and fundamental freedoms without distinction of race, sex, language or religion, by the Charter of the United Nations.



UNESCO performs five principal functions :

Prospective Studies : what forms of education, science, culture and communication for tomorrow's world?

The advancement, transfer and sharing of knowledge : relying primarily on research, training and teaching activities.

Standard –setting action: the preparation and adoption of international instruments and statutory recommendations.

Expertise : provided to Member States for their development policies and projects in the form of "technical co-operation".

Exchange of specialized information.



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The Organization

GOVERNING BODIES : General Conference and Executive Board DIRECTOR-GENERAL

SECRETARIAT : Field Offices & Institutes UNESCO Networks

•<u>Themes</u> •Education Natural Sciences Social & Human Sciences •<u>Communities</u> •<u>Member States</u> •<u>Member States</u> –<u>Permanent Delegations National Commissions</u> –<u>Ministries National Institutions Cities and Local Authorities</u> •<u>United Nations System</u> •Intergovernmental and <u>Non-Governmental Organizations</u>



Some of the themes

Cultural & Linguistic Diversity in Education Peace & Human Rights Education for Sustainable Development **Education Plans & Policies** Global Initiative on Education and HIV/AIDS - EDUCAIDS Literacy Initiative for Empowerment - LIFE Initiative for Teacher Education in Sub-Saharan Africa -TTISSA Primary Education Right to Education School Health Secondary, Technical & Science Education **Teacher Education**



UNESCO Institutes and Centres

UNESCO European Centre for Higher Education CEPES, Bucarest (Romania) **International Centre for Theoretical Physics ICTP**, Trieste (Italy) **UNESCO-IHE Institute for Water Education Delft, Netherlands UNESCO International Institute for Capacity-Building in Africa IICBA**, Addis Ababa (Ethiopia) **UNESCO Institute for Lifelong Learning UIL, Hamburg (Germany) UNESCO International Institute for Educational Planning IIEP, Paris (France) and Buenos Aires (Argentina) UNESCO International Institute for Higher Education in Latin America and the Caribbean IESALC, Caracas (Venezuela) UNESCO International Bureau of Education IBE, Geneva, (Switzerland) UNESCO Institute for Information Technologies in Education IITE, Moscow (Russian Federation) UNESCO International Centre for Technical and Vocational Education and Training UNEVOC, Bonn (Germany) UNESCO Institute for Statistics UIS, Montreal (Canada)**



UNESCO CLUBS

The UNESCO associations, centers and clubs are made up of groups of people of all ages and socio-professional backgrounds, who share the ideals of UNESCO, seek to popularize them and support the work of the Organization by carrying out their own activities that are inspired directly from those of UNESCO. The movement spontaneously developed immediately after the creation of UNESCO. The first-ever UNESCO Club was created in Sendaï, Japan, on 19 July 1947.

The movement grew gradually and now includes some

5,000 UNESCO Associations, Centers and Clubs in over 120 countries.

- UNITWIN/UNESCO Chairs projects deal with training and research activities and cover all major fields of knowledge within UNESCO's competence such as Education, Human Rights, Cultural Development, Environment, Basic and Engineering Sciences, Communication, etc.
- The principal beneficiaries of this programme are institutions of higher learning in developing countries and countries in transition and hundreds of other organizations, foundations and companies are partners.
- UNITWIN is the abbreviation for the UNIversity education WINning and networking scheme.
- The Programme operates through the establishment of UNESCO chairs, and UNESCO networks which are also designated as UNITWIN projects. The UNITWIN Program was launched in 1992, this Program is UNESCO's most important inter sectoral downstream activity in the field of higher education with
- 635 UNESCO Chairs and Networks established in 124 Member States.

This UNESCO Programme serves as a prime means of *capacity building through the exchange of knowledge and sharing in a spirit of solidarity*. Thus it promotes north-south and south-south cooperation as a strategy to enrich institutions.

UNITWIN opens avenues for the higher education community to join forces with UNESCO to achieve the objectives of the global agenda.

UNITWIN projects have proven useful in establishing new teaching programmes, generate new ideas through research and reflection and have facilitated enrichment of existing university programmes through *integration of cultural diversity*.



UNESCO Interdisciplinary Chair in Biotechnology (112), established in 1998 at "Tor Vergata" Rome

UNESCO Chair in Human Rights, Democracy and Peace (450), 1999 at Univ. Padova

UNESCO Chair in Peace, Cultural Development and Cultural Policies (475), 1999 at the Jacques Maritain International Institute

UNESCO Chair in Management of the Cultural Heritage in the Balkan and Danubian Region (523), established in 2000 at the University of Trieste

Community of Mediterranean Universities (CMU) (333), 1992 at University of Bari

UNESCO Chair on Human Rights and Ethics of international Cooperation (625), 2003 at the University of Bergamo

UNESCO Chair in Cultural and Comparative Studies on the Imaginary (726), 2006 at Libera Università di Lingue e Comunicazione IULM, Milano

UNESCO Chair in Human Development and Culture of Peace (730), established in 2006 at Università degli Studi di Firenze

Mediterranean Basin UNITWIN Network for Green Chemistry (MEGREC UNITWIN Network) (731), 2006 at The Interuniversity Consortium Chemistry for the Environment –INCA, Venice

UNESCO Chair in Environmental Sciences and Management(114), 1995 at Cà Foscari University of Venice

X	UNESCO SYSTEM IN TRIESTE
	THE ABDUS SALAM INTERNATIONAL CENTRE FOR THEORETICAL PHYSICS the mission of ICTP is to foster studies and research, especially in developing countries STRADA COSTIERA 11 - TRIESTE - ITALIA
	THE ACADEMY OF SCIENCES FOR THE DEVEOLPING WORLD promotes scientific excellence for sustainable development in the south VIA BEIRUT 6 - TRIESTE - ITALIA
	INTERNATIONAL INSTITUTE FOR HUMAN RIGHTS STUDIES supports projects and activities related to Human Rights, Culture for Peace, Social Communication and Security VIA MURAT 1 - TRIESTE - ITALIA
	UNITWIN/UNESCO CHAIR IN MANAGEMENT OF THE CUITURAL MENTAGE IN THE BALCAN AND DANUBLAN REGION promotes an integrated system of research, training and information in the field of cultural heritage management FACOLTA' DI ARCHITETTURA, UNIVERSITA' DI TRIESTE - P.LE EUROPA 1 - TRIESTE - ITALIA
	UNESCO CENTRE OF TRIESTE promotes development and research policy and disseminates information on higher education

The Science and Technology Education Programme (STE)

In a world where every aspect of life is increasingly dependent upon science & technology (S&T), promoting capacity-building and education is indispensable for all nations in order to create a scientifically and technologically literate citizenry in the interests of ensuring true democracy. In the coming years, an increasing number of political decisions (in economy, environment, socio-cultural issues, etc) will be based on S&T. The increasing disaffection of children and youth for science and technology worldwide is a cause of major concern as the children of today will be the citizens and decision makers of tomorrow.

STE Actions

GenderDICTs in EducationRSustainable development

Disadvantaged groups Reforming learning content

WHY AFRICA

The main concern for African countries is to meet the needs for basic education of all young people by offering them a chance to receive quality teaching and to acquire skills crucial to the life

- Basic Education
- Early Childhood
- Primary Teaching
- Integrative Education
- <u>Secondary Education and Technical and</u> <u>Vocational Training</u>
- <u>Reforms in Secondary Education</u>
- <u>Science and technology</u>
 <u>Capacity Building</u>
- <u>Scientific, Technical and Vocational Training for</u> <u>Girls</u>

- Children on the Street
- Non formal Education

Higher Education

- Politics and Reforms
 - •<u>University Co-operation</u>
 - •<u>Teacher Training</u>
 - •<u>New Technologies</u>
 - •Capacity Building in Research

The Promotion of Women Teaching at University Statutes of Teachers

Distance Learning

Orientations and Strategies in Education

- Missions and objectives
- •<u>SCHOOLCONSEM IV Regional consultation on how to raise quality</u>
- in terms of buildings, equipment and teaching materials for schools
- •<u>Development of Centres for Educational Resources (CER) in Sub-</u> Saharan Africa (Co-Action Project – UNESCO Clubs – UNESCO)

Preventive Education

- •HIV/AIDS Prevention in Education
 - **Education on Population Issues and Family Life**

Gender

It is in the social interest *to eliminate gender inequalities in education and training*. All people have a right to education. Significant gains it can be made at the *secondary-school level and in technical and vocational education and training*. Through education and training, girls and women can become more empowered as they acquire the range of skills, knowledge, attitudes and values critical for negotiating their place in society. As predicted by the GMR 2003/4, 60% of the countries have not reached gender equality in basic education and 40% percent of countries will not achieve gender parity at either primary or secondary level.

Projects

Girls into Science Careers Gender inclusive science and technology education Rural Girls and Secondary Education Scientific, Technical and Vocational Education of Girls in Africa in 12 African countries (Burkina Faso, Cameroon, Ghana, Kenya, Malawi, Mali, Mozambique, Senegal, Swaziland, Tanzania, Uganda).

TEACHING AT UNIVERSITY

Ways to improve and renovate higher education in Africa in the following areas:

reinforcing research capacities;
modernizing the structures and systems of higher education;
promoting university teaching.

National and/or regional training workshops for teachers on university teaching aimed at:

- Testing and improving the relevance and the quality of the guide project.
 Enriching and reviewing the guide project in order to address the concerns and the expectations of the whole higher education system in Africa.
- Proceeding to the training of trainers.

UNIVERSITY CO-OPERATION

Reinforcement of regional co-operation, especially in :

- •Student, teacher and researcher exchanges
- •**Production of teaching materials**

Co-operation programmes, Activities and strategies :

- Promotion , reinforcement and updating of a database of UNESCO professorships and university networks on the techniques of education and distance-learning
 Implementation of a regional convention for the recognition of study programmes and certificates, degrees ..., across African states.
 Reinforcement co-operation with Santander Group.
- •Reinforcement of research and post-graduate education in the UNESCO professorships in Africa.
- •Organisation of training workshop on the recognition of programmes of study and diplomas.
- •The preparation of a regional African mechanism of accreditation of training programmes

TEACHER TRAINING

UNESCO dedicated an important part of its resources to training of primary school teachers in order to widen access to quality basic education.

•Setting up of a regional African network of institutions offering pedagogical training for the promotion of the exchange of information, experiences and good practices on policies, programmes and use of new technologies in teacher training. DISTANCE EDUCATION

Promotion of open and distance learning in Sub-Saharan Africa.

NEW TECHNOLOGIES

To reinforce the science and mathematics syllabuses, it is important the

production of a multimedia virtual network aimed at strengthening the learning of Science, Mathematics and Technology in Sub-Saharan Africa.

The network will allow the teaching institutions to train the teachers and the learners to work together on determining study levels, producing multimedia learning materials ... Activities : Creation and training of a group of specialists in multimedia production in each of the countries belonging to the network



WHY TRIESTE

The First G-77 Summit held in Havana, April 2000 decided to establish "The Consortium on Science Technology and Innovation for the South (COSTIS)" which was launched during the Meeting of the Ministers of Science and Technology of the Group of 77 Member States held in Angra dos Reis, Rio de Janeiro, Brazil, September 2006, following the decision adopted by the Third World Network of Scientific Organizations (TWNSO) to transform itself into the Consortium. The Secretariat for COSTIS was based in Trieste, Italy.



MESSAGE FROM H.E. AMBASSADOR MUNIR AKRAM, PERMANENT REPRESENTATIVE OF PAKISTAN TO THE UNITED NATIONS AND CHAIRMAN OF THE GROUP OF 77, TO THE TASK FORCE MEETING OF THE CONSORTIUM COSTIS (Rome, 19 January 2007)

1 I would like to take this opportunity to express my appreciation to the Government of Italy as well as to the Trieste System, and the Academy of Sciences for the Developing World (TWAS), for hosting this meeting.

5..... I wish to seize this opportunity to express our deep appreciation for the pivotal role the Trieste System has played in this endeavour. Institutions, such as the Trieste System, have demonstrated through their work that the only viable and proven way to achieve the Millennium Development Goals (MDGs) is through the efficient application of science and technology. We commend the significant role the Trieste System, especially TWAS, has played in the establishment of COSTIS. We are confident that COSTIS will build up on the experience that TWNSO has accumulated over the years in developing its own scientific programmes.

COSTIS MISSION

To promote science-driven economic development and South-South and South-North cooperation in the *development and application of science and technology in developing countries;*

To encourage developing country governments to take appropriate actions and develop their scientific enterprise through *adequate allocation of resources and other necessary support;*

To promote the *integration of science and technology into the national development plans* of developing countries with a view to facilitating the solution of national problems;

COSTIS MISSION

To further the South's contribution to and involvement in *frontier science and technology programmes*, which can have a *strong impact upon the economic and social development of developing countries*;

To support the establishment of *cooperation among international centers of excellence and scientific institutions* for a sustainable development

To promote the development of collaborative programmes between members of the Consortium and scientific institutions and organizations of the South, and their counterparts in the North and the development of bilateral links and cooperative programmes in areas of science, technology and the environment.

Thursday, 10 May

Education in the Knowledge-Based Society

How to innovate education systems up to the requirements of a global knowledge-based society?

Identify the best models of education governance, teaching and management. Identify (voluntary) guidelines for quality provisions in education across the world. The challenges of implementing the Education for All (EFA) agenda at the country level: the role of the Global Action Plan.

Chair



Professor Lynn MEEK

Director Centre for Higher Education Management and Policy (CHEMP)

School of Professional Development and Leadership - University of New England AUSTRALIA

Rapporteur



Dr. Hebe VESSURI G Senior Researcher and Head of the Department of Science Studies Venezuelan Institute

of Scientific Research (IVIC) VENEZUELA

Keynote Speakers

Professor Mark BRAY



Director International Institute for Educational Planning (IIEP) 7-9, rue Eugène Delacroix 75116 Paris FRANCE



Mr. Ludger VIEHOFF Deputy Head of Division Basic Policy Issues of International and Multilateral Cooperation

Federal Ministry of Education and Research Germany



Professor Stefano FANTONI Director

International School for Advanced Studies (SISSA) TRIESTE



Professor Furio HONSELL Rector University of Udine Italy


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Education in the Knowledge-Based Society

(Education for All – EFA – Plan) The Role of the Global Action Plan



People who have access to more information resources often represent themselves more happy than people who have not

Knowledge doesn't make you more intelligent, but it helps taking decisions in your life

Knowledge has a cost, but ignorance costs much (much!) more.

EFA goals to achieve by 2015

- 1. Expanded and improved early childhood care and education
- 2. All children complete free and compulsory primary education of good quality
- 3. Learning needs of all young people and adults are met
- 4. 50% improvement in adult literacy
- 5. Eliminate gender disparities in primary and secondary education by 2005, and achieve gender equality by 2015
- 6. Improve all aspects of quality of education and ensuring excellence of all

Why EFA?

- One fifth of the world's adult population – 771 million people – remains illiterate
- 86 countries are at risk of not achieving gender parity even by 2015

77 million children still not in school



- Half in sub-Saharan Africa
- One-third in India, Nigeria, Pakistan, and Ethiopia
- Drop of 20 million since 1999, mainly in South Asia

Who is out-of-school? Rural, poor, uneducated mother



Distribution of out-of-school children (percentage)



Strategies include recognition that

- Low enrolments may reflect low demand for education as well as inadequate supply
- Policies must tackle relevance, household costs, and usefulness of school qualifications in the labour market
- Different strategies are needed in different settings

The Plan is:

- a platform for international cooperation, showing areas of action and responsibility
- a reference point for coordinated action at national level among EFA partners, so that support to national leadership is relevant, effective and efficient

What kind of coordination?

Six key areas:

- Promoting national leadership
- Capacity development
- Communication and advocacy
- Resource mobilisation
- Effective use of aid
- Monitoring and evaluation

What will be needed?

- 1. Focus on specific sectors should be within the broader context, which shapes
 - Government policies
 - Household responses
- 2. Education for the marginalised is as important as education for the elite
- 3. One country, one plan
- 4. Government-led

Negroponte's "100\$ PC" - will actually cost 175\$

-Microsoft is giving old Office for 3\$ as for free (times 250.000 pieces)

- Battery needed

Further information:

www.unesco.org



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18,00 End

Thursday, 10 May

Environment: Global Challenges

How to develop an integrated approach for research, education and innovation to meet global environmental challenges, including impacts of climate change, air and water pollution, acid rain, rain forest destruction, hazardous waste and overpopulation?

Italy

Chair



Professor Walter R. ERDELEN Assistant Director-General for Natural Sciences, UNESCO PARIS



Professor Laura MARCHETTI Under-Secretary

Keynote Speakers

Ministry of the Environment and Protection of Land and Sea



Mr. Michael W. OBORNE

Director of the International **Futures Programme and** the Global Science Forum **Organisation for Economic**

Co-operation and Development (OECD) FRANCE



Mr. Giuseppe MORSILLO Head of the Director's General **Policy Office** European Space Agency (ESA) PARIS

Rapporteur



Professor Sverker SÖRLIN Professor of Environmental History

Division of History of Science and Technology

School of Architecture and the Built Environment Royal Institute of Technology SWEDEN



Lord Julian Hunt of Chesterton, CB, FRS **Professor of Climate Modelling** Former Director-General and Chief Executive of the Meteorological Office U.K.



Professor Walter R. ERDELEN Assistant Director-General for Natural Sciences, UNESCO PARIS

Professor Laura MARCHETTI Under-Secretary Ministry of the Environment and Protection of Land and Sea Italv



Mr. Michael W. OBORNE Director of the International Futures Programme and the Global Science Forum Organisation for Economic

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Professor Sverker SÖRLIN Professor of Environmental History Division of History of Science and Technology

School of Architecture and the Built Environment

Royal Institute of Technology SWEDEN

UN multidimensional action for Environment: S&T cooperation, natural resources management, environ. policies, assistance, climate change, health, contamination, energy, capacity building, financial assistance. Impact of human activities.

A fourth element in the triangle of knowledge – the concept of preservation – preservation of local knowledge, cultural heritage diversity, biodiversity, etc. \rightarrow 3R's: Recover, Recycle, Reuse.

Integrated approach to global challenges through knowledge management. Holistic, interdisciplinary scientific approach to global challenges: climate, energy, population, poverty, health, economic growth, national security. Importance of Ethics.

A distinction should be made between hazard (natural severity) and vulnerability (impact on community). Integrated responses to climate changes must be developed. Start mitigation (~30 y). **Risk Warning /Reduction/Adaptation. Network with Insurances.**

Connection between Space and the Triangle of Knowledge; space-based science can have many human benefits (see slide).

To invest in Education/Science is to invest in the Environment. Urban parks study in Stockholm: best for environment is to be populated by active, well educated citizens, well organized, belonging to civic groups. Worldwide network: Stockholm, Capetown, New York, Delhi, Helsinki, New Orleans, Istambul. **Key: Motivated Citizens**



Mr. Giuseppe MORSILLO Head of the Director's General Policy Office European Space Agency (ESA) PARIS

Environment: Global challenges, the role of space (Giuseppe Morsillo)

Space provides global responses to today's environmental challenges

- S&T for environment / climate change
- Space-based Earth observation
- Monitoring climate change from space



Global Concentration of Methane (Envisat, courtesy KNMI)







Collapse of the Larsen Ice Shelf (Envisat, court. Univ. Innsbruck)





Prost-insumation images on Accelin Coast including Town on Galange The device of the only of the constrained and the insummand acceleration of the constrained and the insummand acceleration of the constrained and the insummand acceleration of the constrained acceleration of the constrained acceleration of the constrained the insum of the constrained acceleration of the other acceleration of the constrained acceleration of the constrained acceleration of the constrained acceleration of the constrained acceleration of the other acceleration of the constrained acceleration of the other constrained acceleration of the constrained acceleration of the other constrained acceleration of the constrained acceleration of the other constrained acceleration of the constrained acceleration of the other constrained acceleration of the constrained acceleration of the other constrained acceleration of the constrained acceleration of the constrained acceleration of the other constrained acceleration of the constrained accele







Friday, 11 May Innovation and Society How to strengthen the innovation culture in our society? What role can the public sector play to accelerate innovation changes in our society and raise the level of citizens' inclusion and participation? What kind of governance is necessary at national and international level to make innovation policies more effective in our societies? Chair Keynote Speakers



Ing. Giancarlo MICHELLONE President AREA Science Park Trieste ITALY



Hon. Mr. Luigi NICOLAIS Minister for Reform and Innovation ITALY



Dr. Mihail C. ROCO Senior Advisor for Nanotechnology The National Science Foundation U.S.A.



Professor Goolam T. G. MOHAMEDBHAI President International Association of Universities, UNESCO PARIS



Dr. Bruno LANVIN Advisor Global Information & Communication Technologies World Bank



Umberto PAOLUCCI

Senior Chairman, Microsoft EMEA Vice President for Corporate and Government Strategy,

Microsoft Corporation

Dr. Robert AYMAR CERN Director General GENEVA

Rapporteur



Monday 28 May 2007, 4.00- 6.00 p.m. University of Trieste Building H3, Lecture Room 1A (first floor) Special International Presentation;

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Innovation and Society

Rachel I. OBED ICTP, Associate

HIGHLIGHTS of the G8 – UNESCO World Forum – University of Trieste, 28 May 2007

OUTLINE

- Introduction
- Governance of Emerging Technologies to Enhance Innovation (Milhail C. ROCO, NSF)
- Science and Innovation (Robert AYMAR, CERN)
- Innovation, knowledge competitiveness and development (Bruno LANVIN, WORLD BANK)
- Conclusion

Introduction

- Research is the transformation of money into knowledge; Innovation is the transformation of knowledge into money – Geoff Nicholson/ 3M
- Need technology scientific discovery
- Skilled people interactive scientific and industrial environment
- A significant number of today's big industries are relative newcomers

Governance of Emerging Technologies to Enhance Innovation (Milhail C. ROCO, NSF)



Converging New Technologies Implications

- Expanding human cognition and communication
- Improving human health and physical capabilities
- Enhancing societal (individual, group) outcomes, including new products and services
- Changing societal relationships, including reshaping
 - policies for R&D investments and infrastructure,
 - models for organizations and business
 - risk governance for innovative technologies
- Personal security
- Unifying science and education

INNOVATION AND SOCIETY

- SPECIFIC RISKS INDUCED BY EMERGING TECHNOLOGIES:
 - Increased <u>technology complexity and uncertainty</u> in comparison with traditional technologies

- Increased <u>importance of societal implications</u> which may not be known at the release of the technology etc.

• HOW TO STRENGTHEN THE INNOVATION CULTURE?

- Support "foundations": knowledge, tools, education, organizations, partnerships

- "Bridging" diverse ideas: converging technologies, fostering R&D platforms etc.

 HOW TO ACCELERATE INNOVATION AND RAISE CITIZENS' INCLUSION AND PARTICIPATION?

- Citizen participation in international debates and decisions etc.

Great Challenges in Science and Innovation (Robert AYMAR, CERN)

- Fundamental science attracts the best scientists from everywhere
- Particle Physics at CERN, a data-intensive science requiring novel technologies
- WWW 15 years ago, Data Grids, e-Science now revolutionary technologies
- "Open Access", networked e-Repositories: realising today's library of Alexandria?

Innovation in Industry

- A new idea, device realised and exploited
- Catalysts:
 - Customer needs, competition, science base
- Recipe of "innovation leaders":
 - Excellent research
 - Promote, support interaction of science and industry
- "Greater" challenges (climate, food, health...)?
 - Governments prefer national or local challenges
 - Industry's interest is short -term and profit-driven

Innovation, knowledge competitiveness and development (Bruno LANVIN, WORLD BANK)

Main conclusions

- Information is the core engine of globalization
- The digital divide is less about equipment and technology than about content and value
- In a global information economy, winners will be 'permanent innovators' and 'continuous learners'
- All economies (not just the most advanced) will strive to be knowledge economies
- This phenomenon will put human resources back at the center of competition and development
- In this new world, all stakeholders will need to consider accepting new roles (private/public, producers/consumers, importers/exporters) and fundamental concepts will need to be revisited (usage/property, e.g.)

The ABC of e-competition

- Access
- Basic skills
- Content
- Desire
- Excellence

- Infrastructure, costs, competition/regulation
- Basic education, vocational training, entrepreneurship
- Local value, languages
- Local will to reform, adapt and change
- In-source knowledge, outsource high costs, retain excellence

Conclusions

- Innovation follows scientific discovery
- Information and Communication Technologies:
 - Enhance collaboration
- Improve the science/engineering base in less developed countries:
 - collaboration with G8 universities using ICT
 - Address common goals, share knowledge
- G8 and less developed countries together:
 - Bridge the digital divide!

Thank you for your attention!

Grazie mille

Friday, 11 May

Sustainable Development and Health

How to develop integrated healthcare approaches that can meet the challenges of the 21st century, arising from aging populations, environment deterioration and possible global pandemics?

Identify issues related to intellectual property and health care, including impact on developing countries. Identify critical areas of research, e.g. bio-nanotechnology, biomolecular medicine, genetic engineering, telemedicine and new cancer therapies.

President

U.S.A.

Chair



Professor Phyllis PITT-MILLER Dean Faculty of Medical Sciences THE UNIVERSITY OF THE WEST

Keynote Speakers

Dr. Aristides PATRINOS

Synthetic Genomics. Inc.



Dr. Pratap C. REDDY Founder and Executive Chairman **Appolo Hospitals Group** INDIA

INDIFS **Eric Williams Medical Sciences Campus TRINIDAD & TOBAGO**

Rapporteur



Prof. Dr. Nouria LAKHDAR-GHAZAL Head Neuroscience Unit and

Group of Research on Biological Rhythms - Faculty of Science

Mohammed-V University MOROCCO



Dr. Giorgio TAMBURLINI, MD **Research Director** and Paediatrician Institute of Child Health IRCCS "Burlo Garofolo" TRIESTE



Dr. Francisco E. BARALLE Director-General International Centre for Genetic Engineering and Biotechnology (ICGEB) TRIESTE





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18,00 End

Session on Sustainable Development and Health

Summarize by: Omer A. ALI Radiation and Isotopes Center Dep. of Medical Physics SUDAN PITT-MILLER (CHAIR)

"A healthy population is essential perquisite for economic growth and stability for the Caribbean" The diseases in Caribbean are typical ones of developing countries.

They have exhibited also the developed countries disease.
The aim of these session

 How to developed integrated health care approach that can meet the challenges of 21 century arising from ageing population, environmental degradation and possible pandemic.

 Identify intellectuals properties including impact on developing countries.

Prof. Pratap C. Reddy

Noble goal to be "to bring healthcare of international standards within the reach of every individual. We are committed to the achievement and maintenance of excellence in education, research and healthcare for the benefit of humanity". They have done 59,000 heart surgeries with out standing success rate, "last year our success rate was 99.6 %, which consider the second in the world."

Prevention.

Tel-medicine.

Prof. Francisco E. BARALLE ICGEB

 Structural and functional genomics and related biotechnologies are keys for the development of healthcare and agricultural innovations over the coming decades.

Biopharmaceuticals

- A biopharmaceutical is a naturally occurring or modified polypeptide, DNA or RNA molecule, produced by recombinant DNA technology.
- The biological systems for production can be bacteria, eukaryotic cell lines, transgenic animals or plants.
 They can be used for therapy, prophylaxis or diagnostics.

Biogenerics

The first recombinant biopharmaceuticals patents are now over 20 years old
 and a 13.5 billion generics market is now being opened. The biopharmaceutical industries in countries such as Argentina, Brazil, China, Cuba, India, Korea, etc.
 are in a position to take a considerable share of this market.

The essential raw material needed are the scientist with adequate knowledge of the scientific method, skilled in biotechnological techniques and with as wide as possible scientific culture. There is a need to simplify technology and adapt it to developing world needs and possibilities. The meaning of this statement is not to lower the quality of the scientific questions but to avoid unnecessary sophistication. There is the need to avoid prestige only projects, based on automated repetitive procedures. These type of projects have very little added value in terms of capacity building and skills gained. "From the point of view of the wide political guidelines on project selection, there is no need to restrict this action to the so-called third world diseases. More people die in the developing world from Cardiovascular Diseases than from Parasitosis. Basic research should be actively encouraged because its social value goes beyond the hypothetical economic return of a given project. The fundamental value of basic research is the creation of a collective scientific competence that promotes the acquisition and diffusion of innovation in the social fabric".

Health status at global level: highlights Prof Tamburlini

The health status of the majority of the population in many developing countries is daunting and represents an increasingly unsustainable burden for development and a threat to global security

 There is a sense of progress, but in many countries (almost all of them belonging to sub-Saharan Africa) there is stagnation or worsening of the main health indicators (WHO Health Report, 2006)

child health

10.7 million children die every year
Main causes of death:

prematurity and neonatal infections
diarrhoea
pneumonia
malaria

malnutrition is an underlying cause of over 50% of deaths

Maternal health

529 000 annual maternal deaths, including 68 000 deaths attributable to unsafe abortion

 over 300 million women suffer from long-term or short-term illness brought about by pregnancy or childbirth

There is lack of reliable information on the fate of mothers in many countries – and on that of their newborns

we need new health programmes and more more health workers.

Integrated approaches to health care are necessary.

We should have strategies for sustainable development and health.

Friday, 11 May **Sustainable Development and Energy** What possible energy scenario exists for the world of the 21st century? How to develop an integrated approach involving education, research and innovation to solve the energy challenges of the 21st century?

Chair



Dr David LINDLEY, OBE. FREng, FRSA Director Ocean Power Delivery Ltd. U.K.



Welcome Remarks



Keynote Speakers



Dr. Lawrence L. KAZMERSKI **Director National Centre** for Photovoltaics U.S.A.

Rapporteur



Professor Ali SAYIGH Chairman of World Renewable **Energy Congress Director General of World Renewable Energy Network**

Editor-in-chief of Renewable Energy Journal Brighton U.K.



Dr. Isao YUKAWA President **Kyocera Solar Corporation** JAPAN



Dr. Evgeny P. VELIKHOV President of Russian Research Centre Kurchatov Institute RUSSIAN FEDERATION



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18,00 End

Sustainable Development and Energy

(Thanks to Lindley, Manfredi, Kazmerski, Yukawa, Velikhov)



Energy consumption growth in 20th century



Minimal requirements in energy resources



Possible dynamic of oil production in 21st century



Possible dynamic of natural gas production in 21st century

30000 25000 20000 15000 10000 5000 0 1930 1940 1950 1960 1970 1980 1990 2000 2010 2020 2030 2040 2050 📕 Oil 🔄 Gas 🔄 Coal 📑 Hydro 📑 Biomass and Waste Other Renewable Nuclear Backlog demand **Total primary energy supply**



Mil toe

In the meanwhile...

U.S. inhabitants: 250.000.000 E.U. inhabitants 320.000.000

U.S. cars use as much as 4 times the fuel used by EU cars



4. PV Technology Innovation: On-Grid



6. BASIC HUMAN NEEDS: Off-Grid





www.unesco.org

(Thank you)





http://dfp.units.it/unesco/



GAUNESCO World Forum

ucation, Research and Innovation'

Sustainal

At Trieste, Italy

May. 11th, 2007

velopment

for The People for The Earth

Adviser and Past-President Kyocera Solar Group ISAO YUKAWA

Menu



Company Confidential Property





Source: KC Modified

Company Confidential Property



2. Research: Cell Production



2. Research: PV Cumulative [MW] **PV Installation (1993~2005)** 500 3,822MW Japan)00 ROW Japan Germany Increased **534MW** 1,424MW 500 USA USA 2005)00 ROW 470MW 3,822MW 500 3900 → Total Germany)00 Mer 1,424MW 1.394MW 500 1,394MW)00 **534MW** 500 **470MW** 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005

Source: IEA / Marketbuzz 2006 / KOn Modified roperty


2. Research: Mission and Responsibility for The olar 3 Environmen **2. Energy** 10 Education **3. Human Contribution 115 million children** A child dies every 3 seconds from lack water, electricity and vaccine. NO Electricity **1.6 billion** people **Clean Wate** n people

1.6 billion people
115 million children
1 billion people

1.2 billion people

to Modern Electricity to basic Education to clean Water to improved Sanitation

Source: JBIC

Company Confidential Property





4. PV Education: Off-Grid

What a wonderful School in



4. BASIC HUMAN NEEDS: Off-Grid Vietnam



4. BASIC HUMAN NEEDS: Off-Grid



DC/AC inverter*(none)

Controller

Storage battery 24V DC,

670Ah (250Ah)

600W(360W)

Solar panel and mounting frame

a/Clinics

Conserving vaccine and other sensitive medical supplies is crucial to the health of rural people.

Kyocera has been a global leader and earned a World Health 18W x 4 (18W x 2)* **Organization (WHO)** and UNICEF designation as a **Qualified System** Holds 30L of vaccine.

Company Confiden. T. F. S. et,

Fluorescent lamp

53L refrigerator.



4. BASIC HUMAN NEEDS: Off-Grid Tunisia Solar Reirigerator Noving Hospital

Els Carried

The Vital





Preserve the spirit to work fairly and honorably Kazuo Inamori respecting people, our work, our company and our global community. Founder and Chairman Emeritus

Management Philosophy

To coexist harmoniously with nature and society.

Harmonious coexistence is the underlying foundation of all our business activities as we work to create a world of abundance and peace.

Kyocera considers sustainable development to be one of society's most critical issues. Renewable energy could be an answer to sustainable development.

Kyocera's Corporate Motto



Wonderful Smiles ! ワット ア ワンダフル ジョブ !

for The People

The

THE NEW VALUE FRONTIER

Friday, 11 May

Research and Innovation: The Role of Governments (ROUND TABLE) How to leverage public expenditure in attracting private funding for university research, and enhance cooperation between universities and industry? How can governments cooperate with the private sector in the development of innovative, high quality education, research and innovation systems? How can governments promote dialogue and synergies with business, higher education and labour to articulate sound policies and develop needed resources for higher education?

Keynote Speakers

Chair



Professor Flaine FL-KHAWAS Department of Educational Leadership Graduate School of Education and Human Development

The George Washington University U.S.A.

Rapporteur



Professor Miguel NUSSBAUM VOEHL Head **Computer Science Department College of Engineering**

Catholic University of Chile CHILE



Hon, Mr. Fabio MUSSI Minister of the University and Research ITALY



Hon, Dr. Mosibudi MANGENA Minister of Science & Technology SOUTH AFRICA

Professor Carlo RUBBIA Nobel Laureate CERN **GENEVA**



Hon. Min. Andrei Aleksandrovich FURSENKO Minister of Education and Science RUSSIAN FEDERATION



Professor Martin L. PERL Nobel Laureate Department of Stanford Linear Accelerator Center Stanford University U.S.A.







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18,00 End



Special session on research and innovation: the role of government

Patrizia Tiberi Vipraio Università di Udine

G8 - UNESCO World Forum - Trieste, 11 May 2007

Politics in general

Fabio Mussi:

Awareness of the need of bridging the gap between Science and Politics

Reasons for optimism:

R&D expenditure tripled in 15 years

Italian researchers ranked third in performance by a Survey but...

Lisbona development goals not met...

....More N/S cooperation

A developmental approach: South Africa

Mangena: democracy has brought innovation and innovative thinking

Selective policies in key sectors

Industry/University links

Tax incentives

Facilities & infrastructures

Start-up or Seed policies

The Foundation for Technological Innovation

Third component of ICGB

Biotechnology, Nanotechnology, ITC, Space science, Infectious diseaes

Research Chairs from 55 in 2008 to 210 in 2010

Collaboration (TRIP) between students and industry for research: subsidize research for 2400 PhD students to work in industries p.y.

Claim 130% R&D and accelerated depreciation Center for High Performance Computing: cutting edge research for key sectors above

Innovation Fund: addressing problems that impede development or don't allow the country to compete

Cooperation for high risk projects; SME's skill/ technology upgrading; target sectors (auto, food, electronics, metals, chemicals, molded plastic)

Science application to Health, Agriculture, Water and related fields....Need to tackle malaria

An institutional approach: the EU

Potocnik: how to support the creation of technology markets

Countries agendas

Intellectual property rights European Institute of technology

Taxation

Regulation

Subsidies

Risk financing facility

Reforming the Institutions to better cope with coordination Better coordination of tax incentives throughout EU

How to increase funding from Major Foundations

Campaign on Less and Better Regulation (some already dropped)

Financial support to R&D (55b€ in 7 years just one Program) on key sectors (nanotech, ICT, biotech) and factors (health, environment, energy)

Problem of knowledge loss (not created, not appropriated)

Little difference between USA and EU in basic knowledge financing and production; much difference in knowledge development and commercialization, both from differences in patenting and SME's presence

A change of attitude both in industries and universities

Few Knowledge Transfer Departments in the Universities

Knowledge production and application need a critical mass of talents: how to pool resources?

A key-sector approach: the Nobel laureate

Rubbia: high tech is key, Italy is lagging behind



Strategic framework

Picking the Sectors

Choosing the actions

Inhibiting mechanisms for Italy

The laggard Italy in EU and the world...let's invest in high tech/high skill...new vision... A list of economic considerations: some "facts" and some "opinions"

Global competition irreversible; knowledge more important than capital for competition; lack of continuity; fast acceleration of processes; country R&D to attract FDI; high correlation between R&D and innovation/productivity

Italy little present in high tech/fast growing sectors; 4/100 top firms;

Key sectors: energy, transport, logistics, health, pharmaceuticals, electronics, robotics, etc

Sectors drive technologies....not the other way around

It is the way technology is used in a sector that is important, not isolated technologies

A strong support is needed for key sectors, with funding and scope for decisions



Research and Innovation-Role of Government

Rachel I. OBED ICTP, Associate

HIGHLIGHTS of the G8 – UNESCO World Forum University of Trieste, 28 May 2007

OUTLINE

- Introduction
- SA Govt. encourages innovation (Hon. Mosibudi MANGENA)
- Stimulating Creativity in Engineering and Science (Prof. Martin PERL)
- Conclusion

Introduction

Govt. play a formative role in research and innovation through:

- Developing and approving policy
- Legislation and regulatory frameworks
- Setting the overall national agenda
- Creating an enabling environment for research and innovation to thrive

SA Govt. Encourages Research Innovation

• **Private sector**(56% of R&D performance)

• Govt. research institutes sector(21% of R&D performance)

Higher education sector (21% of R&D performance)
 <u>Note</u>: Increase in SA's R&D expenditure from 0.68% in 1997 to approxly.0.87% in 2004.

Stimulating Creativity in Engineering and Science

- Personal Creativity
- Creativity in Technical Education

Personal Creativity

- Take account of your personality and temperament
- Mathematical ability is important
- Use patience and fortitude* in looking for good ideas
- In the modern world the highly productive lone engineer or inventor or scientist is rare
- Find colleagues who are smarter than you and know more.
- *Motto of Fiorello LaGuardia New York Mayor in 1930's

- Avoid colleagues who are fast and loud talkers. In fact, it is best to avoid such people in general
- Obsession is important when you have a good idea in computing, engineering or science



Problems faced by technical students and technical professionals:

- Engineering and science keep changing
- More and more to learn
- Competing with established technical centers

Responsibilities to local and world needs

- 9 PROPOSALS to help solve these problems
- Reduce stress on students and reduce competitiveness between students.
- Reduce requirements for degrees.
- Rework laboratories so that there is an emphasis on process and problem solving rather than finishing prescribed experiments.

 Teach students to look for new directions in science and engineering, particularly directions that will fill local needs







Proposal: Teach students to learn as they go in their work or in new work.

You don't have to do extensive study to move into new technical areas. You can learn a subject or a technology as you need it. You can learn quickly from colleagues or books or journals and WEB sites. Learn by doing.

Proposal: There is an over emphasis on 'original research' as a requirement for a Ph. D. The work is usually part of a larger, ongoing research program. It is primarily training in R&D. This time should be limited to three

years or less.

Personal Creativity

Above all, you must enjoy your engineering or science and like the people in that world.*



*At least like most of them

Conclusion

- Government should create an enabling environment for research and innovation to thrive
- Government should find ways of solving the problems faced by technical students and professionals because Engineering and Science keep changing
- Personal creativity is very important for government's role to be effective.

Thank you for your attention! Grazie mille



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18,00 End

Saturday, 12 May

Knowledge and Sustainable Development

How to place research and innovation on the national, as well on the international agenda for development?

How to enhance scientific capacity in developing countries in order to generate appropriate technologies and to base political decisions on the best available information?

Chair



Professor Jacob PALIS President TWAS

Trieste



Keynote Speakers

Professor Hans VAN GINKEL Rector, United Nations University TOKYO



Professor ATTA-UR-RAHMAN, FRS Adviser to the Prime Minister on Science & Technology PAKISTAN

Rapporteur



Professor Teboho MDJA Department of Administration Leadership and Technology The Steinhardt School of Education U.S.A.



Dr. Dimitri PISKOUNOV Deputy Director-General Managing Director Programme Development and Technical Cooperation Division

UNIDO Vienna Austria



Professor Jacob PALIS President TWAS Trieste Hope to change the map of the illuminated world Every person has the right to be happy Questions →



Professor Hans VAN GINKEL Rector, United Nations University TOKYO

Our Shared Future ->



Professor ATTA-UR-RAHMAN, FRS Adviser to the Prime Minister on Science & Technology PAKISTAN

The working example of Pakistan ->



Dr. Dimitri PISKOUNOV Deputy Director-General Managing Director Programme Development and Technical Cooperation Division

UNIDO Vienna Austria

UNIDO, United Nations Industrial Development Organization (+I.C.S. International Center for Science & High Technology, @Trieste Area Science Park) -Investments not for assistance but for industrial growth, infrastractures



Professor Teboho MDJA Department of Administration Leadership and Technology The Steinhardt School of Education U.S.A.

...If you want to be seen, you stand up; if you want to be heard, you speak up; if you want to be liked you are brief.

Knowledge→ Electricity of Information Economy Higher Education→ Power source (M.Castels)



ERSI.

UNIVI

NATIONS

UNITED

Professor Hans VAN GINKEL Rector, United Nations University TOKYO

Towards A Shared Future: On Knowledge and Sustainable Development (Hans van Ginkel, Rector of United Nations University, Tokyo Under-Secretary-General of United Nations)




Our Shared Future

and Development Peace Security, NATIONS UNIVERSIT for Human Knowledge Advancing UNITED

Shortening "Business Cost Distance" in Asia





Land Degradation

- Affects 23% of the landscape under human use, including about 60% of the area of Africa and Asia
- Each year an additional 20 million hectares of agricultural land becomes too degraded for crop production or is lost to other uses
- Human-induced land degradation adversely affects the livelihoods of close to *one billion* of the poorest people and disrupts the structural and functional integrity of ecosystems; leading to loss of bio-diversity and carbon sinks of global value



Dimensions of Sustainable Development

- Environmental / ecological
- Economic
 - Social, incl. Cultural and political
- . Scientific knowledge includes knowledge from social sciences and humanities
- . Innovation includes technological and social innovations



Professor ATTA-UR-RAHMAN, FRS Adviser to the Prime Minister on Science & Technology PAKISTAN

Requirements for Sustainable Development

Human capital with knowledge and skills Technology (Innovation/Entrepreneurship) Correct government vision, strategy, action plan, policies

Bi-Modal Approach

- Bottom-Up
 - Basic Health, Primary Education, Water...
- Top-Down
 - Higher Education
 - Emphasis on Science & Technology
 - Industrial Linkages

STRATEGY

1) BASIC SCIENCES

Physics, Chemistry, Mathematics, Biology)

- 2) APPLIED SCIENCES
 - (Engineering, Agricultural sciences, Biotecnology, Information Technology, Pharmaceuticals, New Materials, Communications, Renewable Energy)
- **3) SOCIAL SCIENCES**
- 4) ECONOMICS, FINANCE, MANAGEMENT
- 5) LINKAGES WITH INDUSTRY

Education & Sustainable Development Attracting the Brightest Training the Brightest Using Technology to Leap Frog Curriculum (Problem Solving Approach) Enhancing Access Distance Learning

Attracting the Brightest!

- Change in Salary Structures----under "Tenure Track" system salaries of Professors raised to 3 times of Federal Ministers in government!
- Research Productivity Allowance----based on Cumulative Impact Factors during the preceding year
- Reversing the Brain Drain----under "Foreign Faculty Hiring Program" over 500 eminent expatriate/other scientists attracted to return to Pakistan
- Research Funding (up to US\$ 600,000 per international linkage program)
- Guaranteed Jobs to fresh Ph.D.s with higher salary structures under tenure track system
- 75% Reduction of Income Tax for all academics

Training the Brightest!

- Massive Foreign scholarship programs initiated---500-1000 students being sent abroad annually to top universities in Europe, USA, China with guaranteed high salary jobs and research grants of US \$ 100,000
- Indigenous Ph.D. programs---expansion of the existing Ph.D. output to 1500 per year
- Huge Local Scholarship Programs for Undergraduate level studies initiated----Rs.1 Billion to be spent!
- Local Ph.D.s being offered opportunities for postdoctoral training (hundreds being sent)
- Linkages with top Western Institutions----50 with British Universities alone, many others
- US\$ 150 million Fulbright program for MS/Ph.D. level training in top universities with USA---largest in world!

Partner Countries

- France
- Sweden
- Germany x 2
- Austria
- Italy
- Ohina
- South Korea
- <mark>)</mark> Japan

New Science & Technology Universities (UESTP Concept)

- Consortium of leading Universities with one as lead university----4,500 of our brightest students being sent for MS/PhD
- Rectors, Deans, Heads of Departments and 75%-25% faculty from partner country
- Examination /Quality assurance controlled by European universities
- Complete equivalence
- Degrees from top European Universities in Pakistan !!!
- Classes commence in 2007/2008 !!

Information Technology Spread of Internet Services in Cities & Towns of Pakistan



Internet user growth

JUNE 2000: 130,000

OCT 2006: >12 MILLION



Bandwidth Available

AUGUST 2000: 32 MB/S

MAR 2002: 265 MB/S 2006: 10 GB/S LOOPS





Pakistan Education & Research Network



Digital Library

- 22,000 full text journals—nation-wide,free-ofcharge!!!
- Over 12 million articles downloaded in 2006 !!
- Almost 300,000 end users trained nationwide
- One Window Search Engine
- Web of Science, Scifinder Scholar, EMBASE, IEEE, Chem/Biol.Abstracts etc.

Virtual University

- 4 Digital Satellite (PAKSAT-1) TV Channels for content delivery (License for 2 granted)
 Satellite Earth Station
 2 Recording Studios
- Potential for providing high quality training in remote areas of Pakistan

Paksat 1



Distance Learning

MIT Open Courseware
University of California Television
E-Books Program
Virtual University

Supporting Private Sector Education

Matching grants for new institutions
Major funds for development
Land on long term lease
Sharing faculty salaries
Access to Digital Library
Access to Research Funding

Approach: Focus, Focus, Focus

- Prepare a prioritized list of "Doable" projects of National importance in each sector
- Clearly identify
 - What is to be done?
 - Who will do it?
 - Implementation timeframe ?
 - Human Resource Requirements ?
 - Cost of Project ?
 - Where possible, "Impact on National Economy" ?

Areas

- Agriculture
- Biotechnology
- New Materials
- Chemicals and Pharmaceuticals
- Engineering Goods
- Electronics

- Energy / Power
- Telecommunications
- Information Technology
- Transportation
- Strategic Industries / Technologies

Results

- 330% in ISI abstracted publications over last 4 years----rate of increase highest in Islamic world
- Young men and women have started opting to adopt careers in S&T subjects as first choice
- Landscape of Universities has begun to change

Independent Review of HEC (World Bank)

• "A Silent Revolution"

• "The successful track record of HEC is a good omen for the future"

 "Since its inception it has been startlingly active and has shaken up the world of universities"



- Our Children----with a population of 156 million, about a 100 million below the age of 25, Pakistan is blessed with a huge pool of creativity
- Challenge is to empower them with quality education and skills----and provide them opportunities to contribute to the process of socio-economic development

Message to Developing World
 Stop looking to others to help you !
 You must rise and develop yourself !

Every country acts in its own self-interest!

Political Will in Leadership !

 Courage to dream great dreams---and work—to make them come true

Question Time

Kenia:

- we need infrastructure,
- many have no electricity, no computers
- Education OK, but children go to school and by 11 they are hungry.
- Night Light World Map. Look at dark african areas. Only sleep at night

Paolo Budinich : 40 years of the Trieste System. Now \rightarrow COSTIS



Congratulation to Pakistan from India, USA, Nigeria (was it difficult to convince your government?) and Saudi Arabia (difficult to change the pyramid base). What's wrong with 40W for 1TV+4lamps? No entertainment?



Saturday, 12 May

"Science, Technology and Innovation: Perspectives for Africa" The continued interest of G8 countries and UNESCO in the economic development of Africa is well known. The scientific and technological development represents an important part of the economic development. This session focuses on opportunities of scientific cooperation, at both the North-South and the South-South levels.

Chair



Professor Mohammed HASSAN Executive Director The Academy of Sciences for the Developing World (TWAS)

President, African Academy of Sciences TRIESTE

Rapporteur



Hon. Min. Patrizia SENTINELLI Deputy Minister Ministry of Foreign Affairs ITALY

Keynote Speakers



Professor Nagia ESSAYED Commissioner for Human Resources, Science & Technology AFRICAN UNION ADDIS ABABA



Hon. Min. Mr. Hany Mahfouz HELAL Minister of Higher Education and Scientific Research Egypt



Hon. Dr. Noah M. WEKESA Minister of Science and Technology KENYA



Hon. Prof. Romain MURENZI Minister of Science, Technology and Scientific Research RWANDA



Hon. Min. Professor Yaye Kene GASSAME DIA Minister of Scientific Research SENEGAL



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Science, Technology and Innovation: Perspective for Africa

Dr. Elie SIMO Faculty of Sciences, Department of Physics, University of Yaounde I - ICTP CAMEROON

- I ZOOM ON AFRICA: THE SAD REALITY
- II SCIENCES TECHNOLOGY: THE LINK
- III PERSPECTIVES FOR AFRICA/ PROPOSALS
 IV – FINAL WORDS

I - ZOOM ON AFRICA: THE SAD REALITY

- Africa is a large continent (size) of about 700 M inhabitants exposed to a severe poverty
- Half of its population lives on less than 1 Euro per day
- 169 M inhabitants live in islands
- 42% has no access to drinkable water
- 73% has no access to electricity

- Malaria kills 900 000 Africans each year
- Africa is the most vulnerable continent to climate change, because of its fragile ecosystem

II - SCIENCES – TECHNOLOGY: THE LINK

- **Sciences** referee to
- conception
- Theory
- definition of concepts
- Sometime long term actions. Sciences are divided into two groups:
- The **macro-science**, accessible to a large number of scientists and dealing with

Construction of roads, houses, buildings, bridges Food production...

- The **micro science**; For high resolution. This category of science includes:
- The microstructure of the matter involving
 - fine structure
 - atom and radiation
 - laser production
 - nuclear physics
 - Astrophysics ...

This category is reserved mostly to developed countries.

The quality of the research and the productivity of the scientists in Africa is very low: 1,37%

Reasons:

- Sciences of creativity and originality is very costly
- Brain drain is a critical problem: best Africans' scientists, best talents, best students are attracted by the best universities in the world.

Technology

 Technology on its part referees to: practical phase implementation of concepts "touchable" aspect of sciences
 "physical" aspect of sciences

III -PERSPECTIVES FOR AFRICA/ PROPOSALS

• The training program in technology should be able to overcome all these crucial problems facing by Africans. We must recognize that, most of the time these program primarily need a lot of investments; infrastructures that African government can not afford without the contribution of developed countries.

- 1)First of all Africa needs a vaccine against malaria: 900 000 deaths/year is enough. The contribution of scientists from developed countries is urgently awaited.
- 2)Africa needs mechanized farming to feed is population. No archaic farming with hoes, hand-crafted fishing: Those practices belong to antiquity. We are in 2007!

- 3) The technology program should be adapted to the transformation of their natural resources in Africa before exporting them.
- 4) **INDUSTRIALISATION**: There must be a strong correlation between the technology's training program and the needs of industries. Africa must urgently imagine new strategies for jobs.
- At the time being, you can find a number of young people well trained, well qualified, with professional certificates,
- Nurses, medical doctors, engineers
- GCE, Bachelors, Masters....seeking for a job!
- One of the serious Africa's problem is the unemployment. No program of sciences and technology can work if we don't think seriously about **EMPLOYMENT**.

- Primarily, by the years 70s, sending a child to school meant that at the end of the training, he shall be employed by the government. Today, the situation is completely different. All our respective administrations experience a quasisaturation. They can not more recruit people!
- Developed countries: why not come in Africa and create new industries. All what attract you in China can be found in Africa...

- 5) African scientists must improve their productivity in sciences of creativity, innovation, production of original ideas.
- We can not continue supporting the idea that African's science should lead to production of food, buildings, construction of roads, bridges....FULL STOP
- African scientists must go beyond such considerations, involving themselves very strongly to sciences of high resolution. Despite their extremely difficult conditions, African scientists must dare.
- Really speaking, to succeed they need to be connected to some laboratories in developed countries !!!

- 6) Communication: Africa should start thinking seriously about a system of communication thoroughly on its control.
- Africans see exactly what western media want them to see !
- Africans hear exactly what western media want them to hear !
- We don't have a total control of our destiny

- We don't belong to ourselves
- We belong to others
 - A SATELLITE.....

IV - FINAL WORDS

- I urgently ask to our respective governments in Africa to:
- STOP with CORRUPTIONS and
- MISAPPROPRIATION OF FUNDS
- These two diseases kill more than malaria and HIV/AIDS
- FINALLY
- Let's recall that, G8-Forum was under the High Patronage of the President of Italy.
- I want to seize this opportunity to kindly ask to President Romano PRODI, to invite its Colleagues of the G8countries to
- CHOOSE AFRICA AS THEIR NEXT INDUSTRIALISATION DESTINATION.

Saturday, 12 May

Knowledge for Sustainable Development: The Future This session will focus on outstanding issues for the future, taking into account, in part, the past perspectives and developments.

Chair

Keynote Speakers



Professor Werner BURKART

Deputy Director General International Atomic Energy Agency VIENNA



Professor Édouard BRÉZIN

Former President of French Academy of Sciences Département de Physique

Laboratoire de physique théorique de l'École normale supérieure FRANCE

Rapporteur



Sir David KING, KB ScD FRS Chief Scientific Advisor to H.M. Government and Head of the Office of Science and Technology U.K.



Hon. Mr. Roger H. SCHJERVA Deputy Minister Ministry of Finance Norway



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18,00 End



Closing session Knowledge for sustainable development The future

Patrizia Tiberi Vipraio Università di Udine

G8 - UNESCO World Forum - Trieste, 11 May 2007

Knowledge to ease up the trade-off between population growth and environment



Brèzin Science & Society

We can talk about sustainability because the population bomb did not explode (we shall reach a maximum of 9 billion)

The *knowledge based economy* means that the « golden triangle » is relevant to the whole planet

Importance of "leap-frogging" advances such as cell-phone, internet Energy double challenge : exhaustion of fossil fuels (coming 'oil peak'), greenhouse gases, solar, wind , biomass, nuclear (gen IV) Megapoles require concentrated forms of energy

Sci & Tech will be very important to reduce energy needs: examples Lack of agreements among Governments and among people We need social sciences to help science to address society's needs Education before innovation; Basic science training is essential

SESAME: Proposed in 1997. 2.5 GeV synchroton light source of 3rd generation, sponsored by UNESCO, to be installed near Aman.

Schjerva Policies for sustainable development

Definition of SD: to maximize wealth in the long run (FK, HK, EK)

Policies

International cooperation to promote sustainable development and combat poverty Address climate change, the ozone layer and long-range air pollution Biological diversity and the cultural heritage Sustainable economic and social development Sami perspectives on environmental and natural resource management

Ethical Investments

Shares in close to 3 500 companies Long term perspective Petroleum wealth should benefit future generations A sound return in the long term Investments should not contribute to unethical acts including severe environmental damages

Targets

Limit the increase in global temperature to 2 degrees Work for a broader more ambitious agreement Exceed Kyoto obligation by 10 pst Reduce emissions with 30 pst by 2020 Curbe emissions both "at home" and abroad Achieve carbon neutrality by 2050 Develop technology for capture and storage of CO2&CCS

Oil for development

Oil revenues do not always improve people's lives Norway has 40 years of experience with oil income Revenues benefit the whole people Norway wants to share the experiences to help reduce poverty and improve living conditions for the population

King

Technologies for sustainable development

Help demographic transition from high birth rate to low death rate up to 9 billion people
Technologies to impact on food, health, water, climate change
But we are to re-gear our efforts towards future needs
Global agreement on climate is necessary but difficult: free riders, huge country differences, fairness first, time mismatch
The obstacles are not economical but political and cultural

Science, modern medicine and technology have, since the industrial revolution, provided us with societies in which we can live longer healthier lives than in the pre-industrial period….

.... now we need to use our wealth and technology not only to manage our economies within finite natural resources but also to adapt to a warming planet while reducing the extent of that warming by drastically reducing CO2 emissions

up to 2030

Global cost curve of GHG abatement opportunities beyond business as usual





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G8-UNESCO World Forum on 'Education, Research and Innovation: New Partnership for Sustainable Development'

Trieste, Italy, 10-12 May 2007

Under the High Patronage of the President of the Republic of Italy

BRIEF BIOGRAPHIES



`Education' \rightarrow all levels `Research' \rightarrow all scientific knowledge, incl. from social sciences and humanities `Innovation' \rightarrow all technological and social innovations





Organization







G8-UNESCO World Forum on 'Education, Research and Innovation: New Partnership for Sustainable Development'

Trieste, Italy, 10-12 May 2007

The Forum builds on the discussion launched at the St. Petersburg summit on the interconnections between the three components of the triangle of knowledge—education, scientific research and technological innovation—from the perspective of sustainable development, and seeks to identify risks and opportunities for industrialized countries as well as developing and low-income countries.

The discussion will be presented by speakers of the highest level from the educational, scientific and entrepreneurial worlds, drawn from G8 countries as well as developing countries. Attention to developing countries will augment the Italian initiative with respect to discussions within the G8 framework. The Forum is intended as an opportunity for discussion and no final document is foreseen. SIZE OF THE AFRICAN CONTINENT COMPARED TO OTHER LAND MASSES

IBRD 32162 NOVEMBER 2002

	SQUARE MILES	SQUARE KILOMETERS
BRAZIL	3,300,161	8,547,378
JAPAN	377,727	978,308
USTRALIA	2,966,189	7,682,394
EUROPE	1,905,731	4,935,820
U.S.A. (Continental)	3,120,066	8,080,934
TOTAL	11,669,874	30,224,835
AFRICA (including MADAGASCAR)	11,715,721	30,343,578

AUSTRALIA

U.S.A.

This map was produced by the Map Design Unit of The World Bank. The boundaries, colors, denominations and any other information shown on this map do not imply, on the part of The World Bank Group, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries.

19

А



73% of Africans have no access to electricity

"In countries for which data are available around 27 percent of the population has access to electricity." Source: *African Development Indicators 2006*. World Bank



Malaria kills 900,000 Africans each year



"Each year, it kills more than 1 million people around the world — 90 percent of them in Africa." Source: *African Development Indicators 2006*. World Bank



Source: Worldmapper. PLoS Medicine | www.plosmedicine.org



25 million Africans carry HIV

Source: African Development Indicators 2006. World Bank





Source: Worldmapper. PLoS Medicine | www.plosmedicine.org



North-South Disparities

World's top 25 countries, ranked by their share of world's papers in science, medicine and engineering

Average 2005-2006

Source: SCI, January 2007

Country/Territory	Share of papers %
USA	28.32%
China	6.60%
Japan	6.23%
Germany	6.15%
United Kingdom	5.80%
France	4.45%
Italy	3.38%
Canada	3.38%
Spain	2.59%
South Korea	2.36%
India	2.23%
Australia	2.11%
Russia	1.98%
Netherlands	1.86%
Brazil	1.50%
Taiwan, China	1.44%
Sweden	1.39%
Switzerland	1.39%
Turkey	1.24%
Poland	1.22%
Belgium	1.05%
Israel	0.84%
Denmark	0.74%
Austria	0.72%
Finland	0.70%



South-South Disparities



20

Disparities in STI

	AFRICA	Share of World
1	South Africa	0.37%
2	Egypt	0.26%
3	Tunisia	0.11%
4	Morocco	0.09%
5	Nigeria	0.08%
6	Algeria	0.08%
7	Kenya	0.05%
8	Cameroon	0.03%
9	Tanzania	0.03%
10	Ethiopia	0.03%
11	Uganda	0.02%
12	Ghana	0.02%
13	Senegal	0.02%
14	Zimbabwe	0.02%
	Rest of Africa (39 c.)	0.16%
	Total Africa	1.37%

African countries contributing ≥ 0.02% of world share of ISIlisted S&E papers

Average 2005-2006

Source: SCI, January 2007

Rajiv Gandhi:



"Better brain drain than brain in the drain"



Challenge 3

How to convert brain drain into brain gain and brain circulation?



Source: The Economist, 2005

Opportunity 2: Clean energy from African deserts

- Solar power plants in the Sahara desert can supply Europe with vast quantities of energy
- Each square kilometre of African desert every year receives solar energy equivalent to 1.5 million barrels of oil
- Solar energy received by deserts worldwide is nearly 1,000 times the world's entire annual energy consumption









"4P's" Concept



Ministry of Scientific Research

