



UNESCO/1.3  
15<sup>th</sup> June 2009

**Presentation by Martin Lees  
Secretary General of the Club of Rome  
to  
The UNESCO Natural Sciences Sector Retreat**

***“Facing the Connected Challenges of the 21<sup>st</sup> Century.”***

It is a great honour for me to address this remarkable gathering of scientists, experts and officials from all over the world. The practical knowledge and the scientific expertise gathered in this room tonight is remarkable: I hope that my remarks nevertheless will be of interest in outlining the immense challenges of the 21<sup>st</sup> Century and suggesting some lines of action in response.

I would particularly like to thank Assistant Director General Dr. Walter Erdelen for extending this invitation. We in the Club of Rome have had a long relationship with UNESCO. We look forward to developing our future collaboration so that we can advance our understanding and cooperation to promote action on the critical global issues which will determine the future of us all at this difficult moment in history.

I will first sketch some of the key global challenges confronting humanity at the start of the 21<sup>st</sup> Century.

I will then outline the underlying causes of the threats and crises we face today in three fields: climate, environment and resources; poverty and world development; and in the world financial and economic systems.

I will then suggest some broad lines of strategy to face these challenges so as to achieve a world of progress, justice and peace.

And finally, I will give some views on the important role which UNESCO can play in mobilising the potentials of science and education to resolve the issues which threaten the future, and also in improving our understanding of the ethical, cultural and behavioural drivers on which our purposes, attitudes and actions rest.

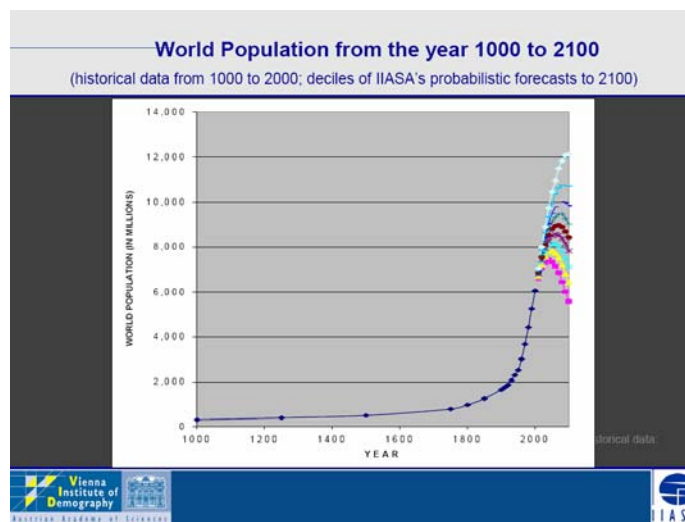
Let me, by way of introduction, present a perspective to provide a context for my remarks:



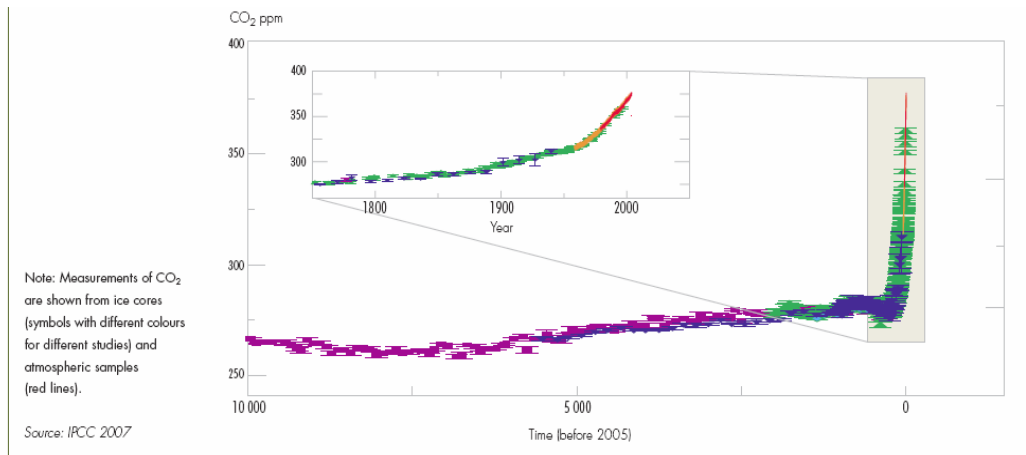
*Picture 1. Rings of Saturn taken from the European space vehicle in 2004 (Source: NASA)*

This picture demonstrates how small and fragile is our planet Earth. The conditions which have allowed human life to develop and survive are delicately balanced. It would be irresponsible to destroy the extraordinary, complex and beautiful web of species and ecosystems on which our existence depends, and it would be short-sighted and disastrous to destabilise the delicate balance of the climate and the oceans which have allowed our civilisation to prosper. But this is what we are doing, and at an accelerating rate.

These two pictures, (3 and 4), simply show that we are in uncharted territory. The pressures of world population on the environment are unprecedented as is the level of concentration of greenhouse gases in the atmosphere. We are gambling with our future.



*Picture 2. Dynamics of world population from the year 1000 to 2100 (Source: Vienna Institute of Demography)*



*Picture 3. Atmospheric Concentration of CO<sub>2</sub> over the last 10 000 years (IPCC 2007)*

I can already draw two obvious conclusions:

- first, we, who inhabit together this small planet must collaborate in a spirit of **solidarity for survival** to resolve the threats to the future;
- second, the fact that we have grown so far and so fast does not guarantee that we can continue to grow indefinitely on a finite planet. We are dealing with systems and processes which are non-linear. We cannot rely on them to adapt gradually to the injuries we are inflicting on them: they may change dramatically in unexpected ways, as they have in the past. (Scientists know that changes in scale do affect the behaviour of systems.)

Yet, subject to recovery from the current financial crisis, the business-as-usual outlook is for the world economy to double in size in the coming two decades. This would mean that some 2 billion people would join the world's middle class with the changes in consumption patterns and life styles that this would imply. This is simply not feasible on the present basis of consumption-driven growth. And, in spite of all negotiations and efforts to date, greenhouse gas emissions continue to increase.

We must find a new path for world development which is less environmentally devastating, more inclusive and fair – in short, which is more equitable and sustainable. This is the focus of the new programme of the Club of Rome on “A New Path for World Development.”

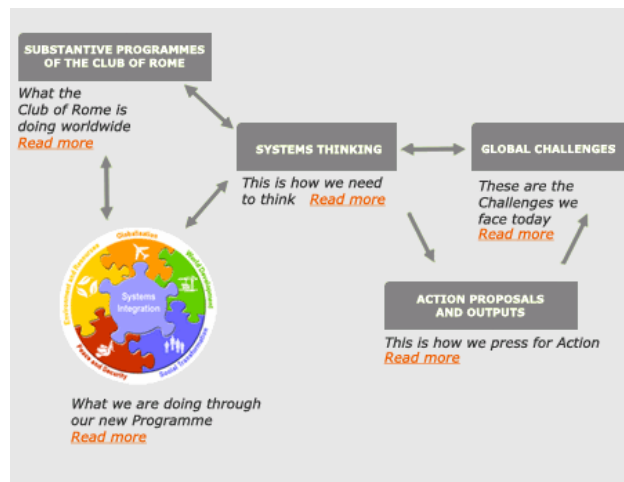
### ***I. The Club of Rome***

I have been asked to say a few words about the activities and plans of the Club of Rome. Over the past forty years, the Club has been concerned to understand and to evaluate longer term challenges and opportunities and to take account of their inter-relationships, within a systemic view of the realities of today and of the prospects for future generations. In a new phase of its activities, approved at its 40<sup>th</sup> Anniversary Assembly in Rome in June 2008, the Club has launched a three year, international programme of collaborative research and consultation to define the elements of “A New Path for World Development.”



*Picture 4. The Programme of the Club of Rome*

Picture 5 shows schematically the structure of the Club of Rome Programme of international research and collaboration on a New Path for World Development. This combines a systematic focus on five areas of interest, “clusters” of connected issues within an integrated programme. The Programme engages brains and expertise from all over the world in an “open systems” framework. It takes account of the complexity and interconnectedness of critical global challenges by focusing its analysis on the five manageable “clusters” of interconnected issues within a coherent systems framework.



*Picture 5. From thinking to action*

Picture 6 shows schematically how the mainstream programmes of the Club and its 33 National Associations combine with the NPWD Programme to apply systems thinking to the analysis of global issues.

The Club is convening five small, high-level meetings of international experts over a three year period, each on one of the clusters of interconnected issues: Climate, Environment and Resources; Economic Restructuring, Finance and Globalisation; International Development; Social Transformation; and Peace and Security.

Its purposes are to improve our understanding of the systemic relationships, to clarify prospects, choices and opportunities and to propose practical lines of action on critical global issues. (*For further information see website: [www.clubofrome.org](http://www.clubofrome.org)*)

As the Programme proceeds, the insights and knowledge gained from each meeting will provide a clear context of perspectives, constraints and opportunities for the next. By recognising such linkages, the knowledge acquired will be cumulative and will lead to a better understanding of the complex systemic challenges we face.

The Programme is well under way. As the first step, the Club convened a small, high-level expert conference in November 2008 on “*Managing the Interconnected Challenges of Climate Change, Energy Security, Ecosystems and Water*” in Winterthur – where its international secretariat is now located – drawing on its independent status, its worldwide networks and the expertise of its independent, international and interdisciplinary membership.

The analysis and proposals developed at the Winterthur Conference were then used as inputs into a Policy Dialogue convened by GLOBE International and the Club of Rome in the Palace of Westminster, London in January. (*GLOBE was set up by the G8 at their summit in Gleneagles to engage senior legislators of the G8 and the G5 in support for the negotiations towards a post Kyoto Treaty.*) Adding an economic dimension, the Dialogue focused on the topic: “*Framing 2009’s Global Challenges in the Context of Global Economic Crisis: Developing a Response to the Interconnected Challenges of Climate Change, Energy Security, Ecosystems and Water.*” The Chairman’s Summary was presented to Prime Minister Gordon Brown in his capacity as Chairman of the meeting of the G20 held on 2<sup>nd</sup> April.

Within this context, the Club of Rome convened a high level conference in Vienna in April, under the patronage of H. E. Dr. Heinz Fischer, Federal President of Austria on the topic: “*Concerted Strategies to meet the Environmental and Economic Challenges of the 21<sup>st</sup> Century.*” This conference brought together experts from three distinct fields who rarely meet, climate and environment, finance and economics and international development.

On 12<sup>th</sup> June, drawing on this preparatory work, the Club of Rome has the privilege to present its conclusions and proposals on “*Concerted Strategies to meet the Environmental, Economic and Development Challenges of the 21<sup>st</sup> Century*” to the Annual Assembly of the G8 + 5 GLOBE Legislators Forum in Rome on 12<sup>th</sup> June. You will see that the Club is not only concerned to understand the issues but is now focused on delivering the insights of science and analysis directly into the policy process.

In October 2009, we will focus at our Annual General Assembly in Amsterdam on “*Environment, Energy and Economic Recovery*” focused on the key issues for the Copenhagen Climate Conference. In February 2010 we will tackle Cluster Three, on International Development. In April 2010 we will focus on Cluster Four, Social Transformation and in July 2010, on Peace and Security. The Programme will conclude with a major event in November 2010.

Some major outputs will be: multimedia briefing materials for leaders in all walks of life; materials and methodologies for education; information for outreach to the general public; and outputs to motivate young people on the issues which will affect their future. We hope that, through its integrated analysis and policy access, the Club of Rome will contribute to international reflection and debate on a positive vision for the future of world development, around which the immense potentials of human motivation, creativity and action can be mobilised.

As the Programme proceeds, the Club of Rome is developing partnerships to engage the capacities of respected institutions worldwide. We would be honored to collaborate with UNESCO if this should be possible.

## ***II. An Overview of the Critical Issues which will Determine the Future.***

The world community confronts three profound and interconnected crises: the worst financial and economic crisis since the 1930s, the accelerating threat of irreversible climate change and a crisis of poverty, hunger and underdevelopment. We face an array of interconnected challenges on an unprecedented scale: if the current path of world development continues on a business as usual basis, the ecological and environmental systems of the planet will break down under the impacts of human activity.

In this perspective, the goal of policy cannot simply be to recover to the previous path of economic growth and globalisation as this has proved to be unstable, unfair and environmentally unsustainable. New approaches are needed: we have reached a turning point in world affairs where previously entrenched ideas and policies are no longer effective.

I will now sketch some of the most important issues which will determine the future, and then summarise the key features of the situation we face.

### ***The challenges ahead:***

#### ***1. International Development:***

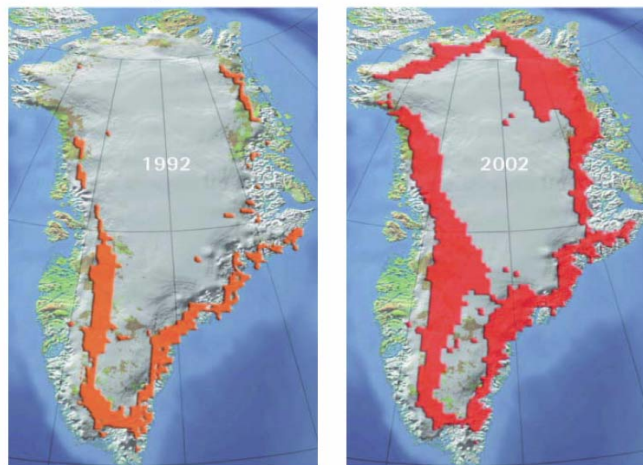
- Around 2 Billion people today are living on less than \$2 per day, with their basic needs for security, employment, health, food and nutrition unmet. An additional 2.3 Billion people will arrive over the next forty years on this planet. In the absence of effective action, will aggravate poverty, reduce political stability and accelerate environmental degradation.
- If, as is commonly assumed, the global economy should double in size over the coming 20 years, this would imply that an additional 2 billion people would attain the living standards of the middle class, with the corresponding patterns of consumption and waste.
- Escalating demand and increased prices for food and energy have already provoked a food crisis across the world.

#### ***2. Climate and Environment:***

##### *Climate*

- Scientists now understand much better the fundamental systems dynamics of the processes which drive climate change. Even if international agreement in Copenhagen and follow up action can ensure that concentrations of greenhouse gases in the atmosphere are contained at 450 ppm, this does not guarantee that the rise in global average temperature will be limited to 2°C. It in fact only offers a 50% chance.

- A rise in average global temperature of 2°C implies, in many regions of the world, a rise of 4°C, for example in the Alpine regions of Switzerland and at the Greenland ice sheet with major potential consequences for sea level rise.

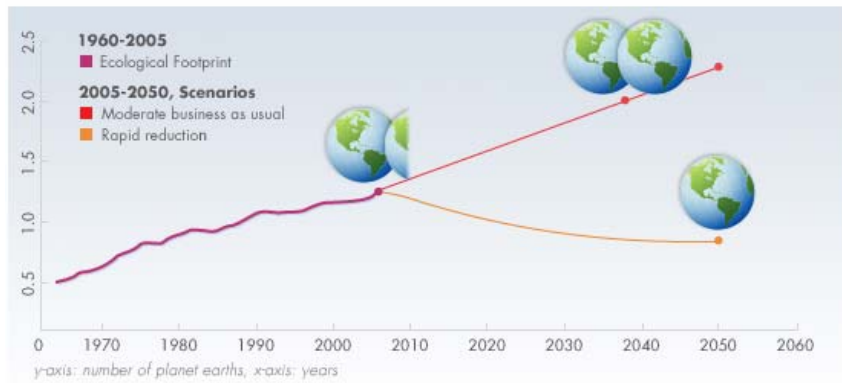


Picture 6. Seasonal melting of the Greenland ice sheet (Source: Steffen and Hull, 2005)

- As the systems dynamics of climate change have been better understood, there is growing concern in the scientific and expert community, that global warming, induced by anthropogenic emissions, will trigger positive feedback loops which will then drive “runaway” climate change. These processes, such as the albedo effect from the loss of reflecting ice, the degradation of ecosystems as carbon sinks, the release of methane from clathrates in the oceans and from melting permafrost and the effects on plankton of the acidification of oceans are now beginning to operate. Once we pass a tipping point where these positive feedback loops take over, reductions in emissions would be ineffective.
- Through the intrinsic nature of the processes at work, and through the interactions between them, climate change will not be a gradual linear process as we implicitly assume. We must anticipate sudden changes and must therefore focus on urgent action to avert the risk of catastrophic climate change.

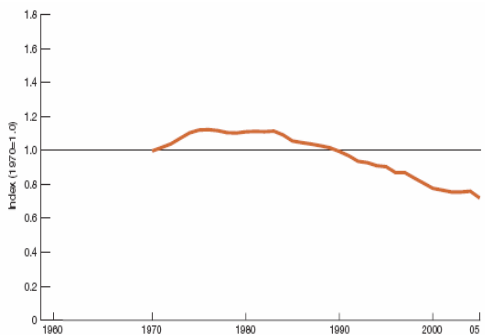
### *Ecosystems*

- Humanity is overusing the biological resources of the planet by some 35%: we are using up our biological capital not only our revenue and this is unsustainable. This overuse is however expected to increase as population rises from 6.7 to 9 billion.
- Forests, oceans, productive land and fresh water are under intense stress and degrading now under the pressure of human activities.
- The connections between ecosystems and climate are vital in both directions: the rate of temperature rise influences the extinction of species and degrades ecosystems, while ecosystems act as carbon sinks, absorbing around 45% of man-made emissions.
- As temperatures rise, rainfall patterns change and water resources are increasingly stressed. Food production in critical regions will fall while the needs of a growing population will increase. This will intensify competition for vital resources and trigger migration and instability.

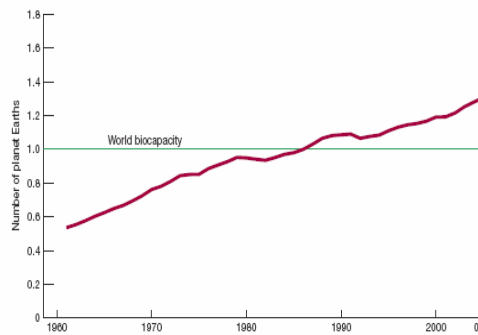


Picture 7. The use of ecological resources (Source: WWF)

#### LIVING PLANET INDEX, 1970–2005



#### HUMANITY'S ECOLOGICAL FOOTPRINT, 1961-2005

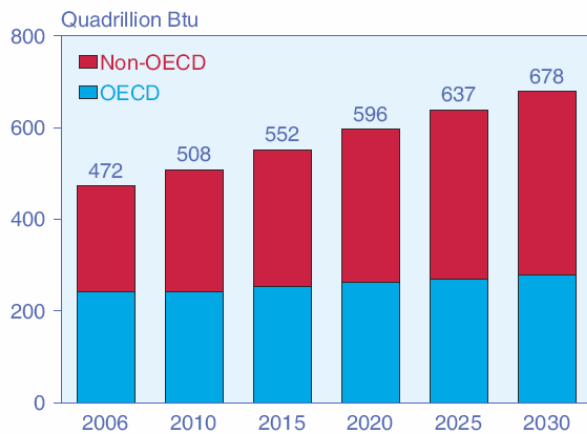


Picture 8. Ecological footprint of humanity (Source: WWF).

#### Energy

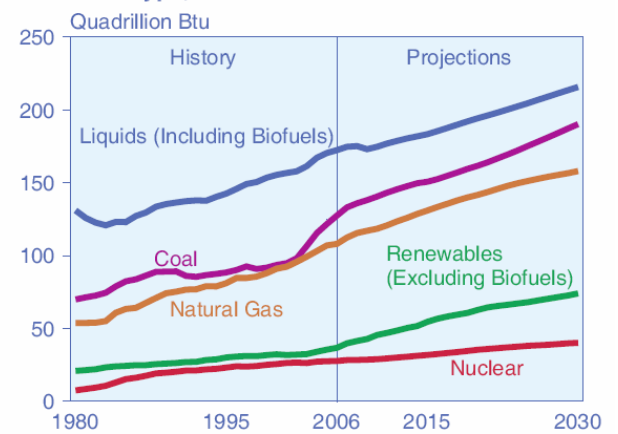
- We are approaching the end of the era of cheap oil on which Western civilisation and growth are based.
- When economic growth resumes, escalating demand will outpace supplies as we move into the period of peak oil. This does not mean that there is no more oil, but that, for a variety of technical, political and practical reasons, supply cannot meet escalating demand. The consequent rise in the price of oil will impact on the prospects for development, particularly of the poorest countries.
- Policies to improve energy security can be incompatible with policies to reduce climate change emissions, by for example converting forest land for biofuels production or stimulating increased reliance on coal or tar sands.
- The long term issue can be seen thus: over the period to 2050, global energy demand is set to double, at a time when emissions must be drastically cut to avert irreversible climate change. This dilemma can only be resolved by breakthroughs in science, derived from basic research, and the innovative solutions must be found soon, not in 2049!

**Figure 1. World Marketed Energy Consumption, 2006-2030**



Sources: **2006:** Energy Information Administration (EIA), *International Energy Annual 2006* (June-December 2008), web site [www.eia.doe.gov/iea](http://www.eia.doe.gov/iea). **Projections:** EIA, *World Energy Projections Plus* (2009).

**Figure 2. World Marketed Energy Use by Fuel Type, 1980-2030**

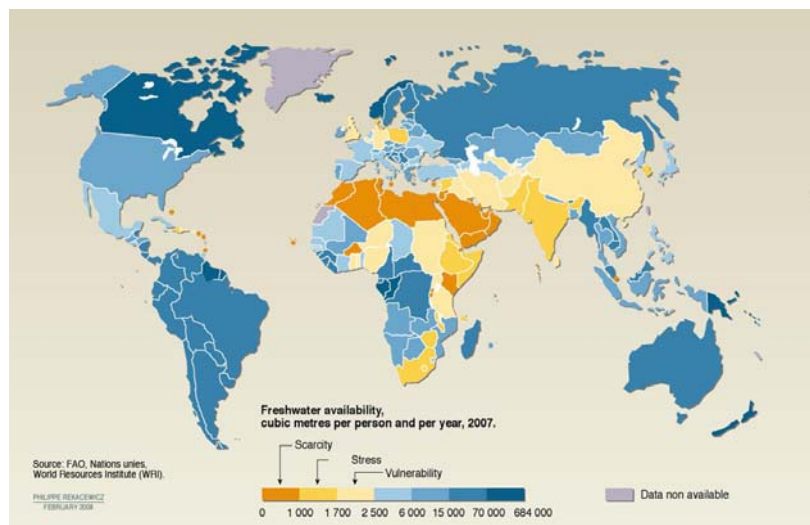


Sources: **2006:** Energy Information Administration (EIA), *International Energy Annual 2006* (June-December 2008), web site [www.eia.doe.gov/iea](http://www.eia.doe.gov/iea). **Projections:** EIA, *World Energy Projections Plus* (2009).

*Picture 9. World primary energy demand (Source: OECD/IAE Energy Outlook, 2007)*

## Water

- The fresh water, vital to human life and to the ecosystems on which humanity depends is under increasing stress across the world, through overuse, contamination, climate change and mismanagement.

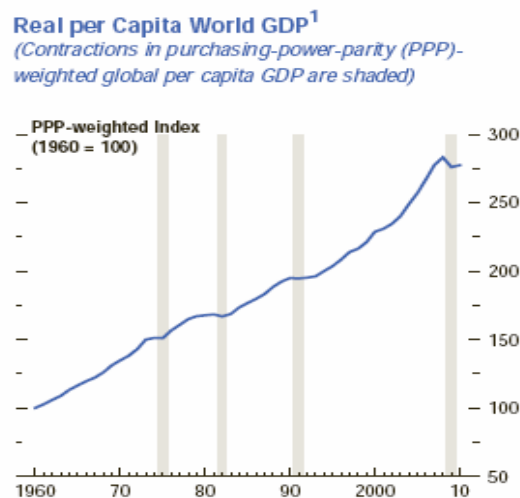


*Picture 10. Water stress and scarcity (Source: FAO)*

- The impacts of climate change through widening desertification, the contamination of aquifers through sea level rise, the increased variability of rainfall patterns, floods, drought and extreme weather events, will all impact on water security and intensify competition for limited supplies.

### 3. *The Financial and Economic Systems*

- The increasing imbalances and vulnerabilities in the global economy and the widening inequalities in the distribution of income, wealth and opportunity had demonstrated pre-crisis that the path of world economic development was unsustainable. A US current account deficit of \$700 billion per year and the transfer of \$1.7 trillion annually from oil consumer to producers were clearly not sustainable.
- The massive and sudden financial crisis, now coupled with a deep economic recession has destroyed confidence in long-established policies, relationships and institutional arrangements.
- The world is entering a period of transformation in the structure of power and influence and in the underlying concepts, relationships and mechanisms which drive the world economy.



Picture 11. World economic growth (Source: IMF World Report 2009).

Although there is inevitable uncertainty associated with any attempt to assess future trends, I believe that this swift overview of present and future challenges makes the basic imbalances and vulnerabilities clear. It demonstrates a number of simple truths:

- We cannot continue on the present path of world development and of consumer-driven economic growth without running into massive and potentially irreversible problems in the near future.
- We have understood that business-as-usual is not a viable path in relation to climate change. We must now recognise that business-as-usual is not a viable way forward in many other areas because of the scale and intensity of future problems if left uncorrected.
- The problems which we face today are interconnected and immediate. But the urgency of new policies and early action becomes even more clear and pressing when we assess the scale of the challenges ahead.
- We face an array of systemic issues which are interconnected and non-linear: we must learn to manage their interdependencies for they will not be managed through ad hoc, sectoral measures. In this respect, climate change is the prototype of the emerging global issues of the 21st Century.
- To provide for the needs of a growing world population, new policies for economic growth and equitable world development must be framed within a coherent strategy which respects the environmental imperatives of a fragile planet.

- On the positive side, we can choose a new path for progress and move towards a new economy which can be environmentally responsible and resource efficient while providing increases in welfare, with enormous opportunities for new jobs, productive economic activities and equitable and inclusive development.

We are, in fact, at a turning point in human affairs: the present model and path of growth, based on the stimulation of demand and on continuous increase in consumption and waste, is not sustainable and must be changed.

The central dilemma of humanity in the 21<sup>st</sup> Century can be framed as follows: economic progress will be essential to generate the investment and other resources required to meet the needs of a growing world population, but sustained growth on the present basis will destroy the global environment on which humanity relies. This dilemma can be resolved only by re-orienting world development onto a sustainable and equitable path.

Ladies and Gentlemen,

As people across the world are suffering from the consequences of the financial and economic crisis. Let me say a few word about its underlying causes. This will help to clarify the lines of action which could lead to a more stable, fair, inclusive and sustainable economy.

The massive and sudden financial crisis, now coupled with a deep economic recession, has destroyed confidence in long-established policies, power relationships and institutional arrangements. Different societies manage their economies in very different ways and the models of business management are also widely diverse. It is the “Anglo-Saxon” model of free market capitalism which lies at the heart of the present crises. This model has dominated global economic thinking for almost thirty years and has been disseminated throughout the world, in large part through the education of élites from emerging economies and by the strong pressures of the international financial institutions.

The underlying causes of the crises we face can be summarised as follows:

- (i) **Excessive belief in the “magic of the marketplace”.** This has led to an excessive focus on material consumption, over-reliance on market prices, and the dominance in policy making of economic and financial considerations.
- (ii) **Determination to cut back the role of government.** This has reduced the scope and effectiveness of government and of the framework of international cooperation on which international cooperation and action depend. The deregulation and the failure of supervision of financial markets which led to the present deep crisis was the result of explicit policy to weaken the regulatory capacities of government.
- (iii) **A damaging concept of economic growth.** The models and strategies on which growth has been based do not take proper account of “externalities” or of the value of public goods and natural capital, or of the interests of future generations. And they have failed to deliver fair and inclusive societies.
- (iv) **Counterproductive values and assumptions.** The values and assumptions on which consumption-based growth has been based will have to change if humanity is to surmount the risks and threats ahead: here, the roles of culture and of education and of public information and participation are central.

The task ahead is no less than to define a new, sustainable and equitable global economy for the 21<sup>st</sup> Century. This is an exciting challenge. And here I must make one key point.

Strong vested interests in the present economy often claim that measures to reduce environmental pollution and emissions or to improve energy and resource efficiency are simply an additional cost, a negative burden on the economy, negative for growth. But experience and many examples demonstrate that this is not the case. We can and we must choose a path of growth through which environmental responsibility, resource efficiency and social justice can be combined to achieve advances in real welfare and sustainable development within the real environmental constraints of our fragile planet.

The reform of the financial system – which should be seen as a tool for higher purposes, not as an end in itself – should, in this perspective, be designed to achieve four major related goals:

- to stabilize and support the global economy and to correct major imbalances and vulnerabilities so as to create a sound basis for future sustainable growth.
- to stimulate and support the restructuring of economies and societies onto a low-carbon, environmentally sustainable path;
- to stimulate the substantial flows of essential investment required to accelerate the progress of the developing countries so that they can meet the needs and aspirations of their growing populations.
- to assist developing countries both to adapt to the impacts of climate change and also to undertake programmes for mitigation.

Substantial flows of finance will be needed to support the move towards a path of equitable and sustainable world development. These flows must be guided by analysis and policies which correctly evaluate risk and reflect real costs, including environmental, social and human costs, and the real costs of energy and resources. They must cease to pass on the costs to future generations.

In this perspective, the clear need to reform the financial and economic systems is a remarkable opportunity to establish the foundations of a new world economy: it would be tragic if this opportunity should again be lost under the pressures of special interests to revert to the previous system which has so badly failed.

### ***III. The Way Ahead: New Approaches to Salvage the Future***

If the world is to achieve a path of development which is equitable, inclusive and environmentally sustainable, the underlying models and concepts of economic growth, of development and of globalisation will have to be re-thought.

The perception in large parts of society and public opinion that the benefits of globalization are not fairly shared drives a strong backlash in many countries. A further reason for deep concern about globalization is that, if the present consumer-driven patterns of economic growth continue unchanged and are further extended to vast numbers of additional consumers, the environmental, ecological and social consequences will be disastrous.

An integrated approach must be developed to the economic, environmental and development crises so as to achieve low-carbon, sustainable growth and employment within the wider purposes of equitable world development. We must move from a concept which equates growth with an exponential increase in material consumption to a concept of progress based on improving the quality of life and real welfare. And we must move from a concept which accepts that growth inevitably implies vast increases in the wealth of a few combined with exclusion and stagnation of the livelihoods of the many to a concept which promotes fairness and inclusion.

In this perspective it is clear that the present focus of international recovery programmes and of national economic policies, which is to re-ignite consumer demand and consumption so as to return as quickly as possible to the previous path of pre-crisis growth, may improve short term conditions but, if not accompanied by other measures, it will lead to further crises in the medium term for the reasons I have shown. The “greening” of recovery packages is necessary and useful, but by no means sufficient.

The threats to the future arise largely from excessive demand and consumption: the stimulation of demand will not therefore resolve the fundamental problems. In the long term, it will increase scale of the risks. Short term measures to stimulate recovery should therefore be framed within a broader strategy to lay the foundations for a new economy which will be sustainable, inclusive and fair.

It is essential and urgent that the present strategies and policies for economic growth be radically changed. This has major implications, far beyond the methodology of the calculus of GDP, although this must be substantially revised. The failures of the present models of growth must be corrected: the analysis of choices, risks and opportunities must take proper account of externalities; the real value of public goods must be integrated into policy analysis; the interests of future generations and the longer-term consequences of policies must be integrated into the consideration of policy options; and fairness in the distribution of costs and benefits, of income and opportunity must be reflected in the consideration and execution of policy.

The three major crises confronting humanity – the financial and economic crisis, the development crisis and the environmental and climate crisis – have common roots in the values and choices which drive economic growth. It follows that they cannot be resolved separately. They must be understood and managed together towards a motivating vision of a better world.

This poses difficult challenges of policy integration at every stage, from the definition of indicators and multidisciplinary analysis through consultation with civil society to coordinated implementation. The values, attitudes and concepts which are driving the present path of world development must also change so as to establish the foundations of a new coherent, integrated strategy to manage the systemic issues of the 21st Century.

### *A time of opportunity*

This is the context within which the financial and economic crises have now created an opportunity to lay the foundations for a new world economy. And this is a unique moment in history, when the conditions are positive to initiate the major transformation required, for at least four reasons:

1. There is a wide and deep global consciousness that we face dangerous problems and that the present path of world development is unsustainable.

2. The model of growth based on material consumption and excessive reliance on market forces has broken down, making possible the introduction of new ideas and a new balance and partnership between market, government and civil society.
3. There is a new political constellation emerging at the international level which will facilitate cooperation on the critical issues we face in an interdependent world.
4. And, the financial and economic crisis has created a new and unexpected opportunity to reconsider the fundamental purposes of growth, development and globalisation and to reorient human progress onto a more stable and secure path.

We must not waste this opportunity to avert the threats to the future. And we have little time.

The fact that the challenges in the fields of development, environment and economic growth are essentially connected presents a further important opportunity. Rather than trying to build support for single issues, such as action on climate change, it should be possible to build broad coalitions across a number of fields in support of an explicit, integrated strategy to achieve multiple objectives:

- To reduce inequality and increase opportunity within and between countries.
- To generate new employment through the innovative activities which build the future.
- To achieve real increases in welfare and contentment.
- To move towards a healthy and sustainable environment.
- To avert the threats of catastrophic climate change.
- To improve the prospects for stability, security and peace.

After this brief review of the global context and of the critical issues we face, let me summarise the key insights and conclusions from the analysis so far:

*Key points of the argument so far.*

- The world is headed into a perfect storm of interconnected economic, environmental and development challenges. A forward assessment demonstrates that recovery to a business-as-usual growth path for the world economy is not a viable option. It would lead to irreversible climate, ecological, humanitarian, development and security problems.
- Evidence from across the world demands that radical measures must be taken urgently to avert the risks of runaway climate change and ecosystems collapse. The threats are imminent and profound: action cannot be delayed. Besides negotiating longer term targets, strategies and mechanisms must therefore be established to achieve early action.
- The needs and aspirations of a growing world population are putting added demands on resources and the environment which are already under great stress. Immediate efforts will be needed if the present trends in population increase and rising living standards are not to have devastating and irreversible impacts on the ecosystems and environment of the planet and on the poor and vulnerable.
- The underlying causes of the financial, economic, environmental and development crises are rooted in the concepts and strategies for economic growth which have driven the world economy for the past thirty years. These can and must change.
- A new path of economic and social progress must be adopted which is compatible with the environmental imperatives and limits of the planet. Respect for the conservation of the natural world, greater efficiency in the use of energy and

resources, and a concern for fairness and inclusion of the most vulnerable are indeed compatible with improved levels of wellbeing and security for rich and poor alike.

- Strategies to stabilise and reform financial and economic systems must be mutually reinforcing and consistent with strategies to respond to the fundamental threats to the future of humanity and the environment.
- The financial crisis and the consequent economic slowdown provide an exceptional opportunity to restructure economic and financial systems so as to achieve new patterns of environmentally sound and equitable progress.
- Humanity has the resources and capabilities needed to salvage the future, if international action can be agreed upon and taken in time. Effective leadership, new ideas and policies, reformed institutions and new values and behaviour must emerge if we are to assure a decent world for present and future generations.

After outlining the challenges, I will now suggest how we can act to choose a better future.

#### *IV. Defining a Framework for Action*

To be clear about the problems we face is not a sign of negativism but a pre-condition for effective action to restructure economies and societies onto a new path. Humanity has achieved such major transitions in the past: from agriculture to industry; from industry to services; from horses and carts to automobiles, and from typewriters to computers. In each case, there have been fears for the future and resistance to change from known and established ways. But the benefits of the process of “creative destruction” have far outweighed the costs.

The challenges ahead are on such a scale that we cannot rely on ad hoc and gradual, incremental change. We cannot simply “muddle through.” We must define and implement explicit, coherent strategies at both the international and the national levels to stimulate and guide the energies and processes of transformation. These strategies can:

- Restructure national economies, the international economy and the financial system to achieve stable, equitable and inclusive progress towards improved welfare and quality of life;
- Integrate the real value of natural capital and public goods, of environment and resources into models and strategies for economic growth to avert the risks of climate change, to preserve and restore the ecological systems of the planet and to assure the prospects of future generations.
- Integrate the eradication of poverty and equitable development as central goals of a balanced global economic strategy to meet the needs and aspirations of a growing world population.

To generate the intellectual and social energies needed, a coherent and positive vision of the future which integrates economic, environmental and development goals must be elaborated to provide a convincing framework for collaboration and action. Such a vision could rally the energies and aspirations of the nations and peoples of the world in a concerted effort to build a better future of prosperity and peace. And, in an interdependent world where security is indivisible, leadership will be a determining factor as societies struggle to respond at this critical time in human affairs when deep transformations in ideas, in behaviour, in policy and in social and economic relationships are demanded to adapt to the needs of a new world.

There is in fact, at this moment in history, an intellectual, political and practical opportunity to transform the policies, relationships and institutional structures of the world community to

achieve a new path for world development. Incremental change will not resolve the deep and complex problems we face. Radical change is required in the values and behaviour, the models and strategies, and the policies and structures which drive social and economic progress. The time available to change course is limited. We must rapidly move from an age of specialisation to an age of integration.

Substantial policy and institutional reforms will be needed and public support must be generated if governments are to manage rapidly-changing, interconnected issues more successfully, to reconcile the demands of global interdependence with the demands of individual and local identity, and to anticipate the major changes which will occur within and beyond the nation-state at this time of massive transformation.

In this perspective, the critical negotiations in Copenhagen on a post-Kyoto Treaty should be framed within a broad context, properly related to the present and future challenges of world development and the environment, and integrated with new strategies for economic restructuring, financial system reform and globalisation. While high level negotiations continue, there are many productive opportunities for action in parallel to move towards low-carbon, equitable and sustainable development. Innovative programmes are already under way in communities, cities, states and nations across the world and a great deal of practical experience has been accumulated. There are many opportunities for immediate action and for the wide dissemination of knowledge, technology, lessons-learned and best practice which could rapidly make an impact on a significant scale.

As I have explained, the economic and financial crises, the climate and environmental crises and the crises of poverty and development have common roots in the values, models and strategies which drive the present path of consumption-based economic growth and globalisation. It is therefore evident that, to address these crises, fundamental changes in the models and strategies of economic growth and globalisation are essential. This is a core intellectual challenge.

A holistic, systems-oriented approach is needed which can recognise the important connections between issues and can establish a conceptual framework within which the contributions of different disciplines and sectors can combine in the formulation, the implementation and the evaluation of policy. New approaches to education and training will be fundamental to generate the values, attitudes, openness and skills needed to understand and resolve the complex, interconnected issues of the modern world. As new strategies are developed to restructure economies to low-carbon, sustainable development, the education and training of the human resources required in every field should be the focus of explicit policies, in developed and particularly in developing countries.

## **VI. The Role of UNESCO**

Let me conclude with some observations on the role of the United Nations and of UNESCO in addressing the critical global issues in the new world of the 21<sup>st</sup> Century.

The financial and economic crises have demonstrated that there is an urgent need for a radical restructuring of global governance, in particular, an overhaul of the global framework to assure transparency, supervision and regulation of the financial system. However, the reform of international financial institutions and policies can only address one component of the systemic challenges facing the world community. Added resources for the IMF and the World Bank will

do little to change current models and strategies for growth, to achieve sustainable development or to promote greater fairness and inclusion in the processes of globalisation and world development.

As it becomes clear that the threats of climate change and ecosystems collapse are real and imminent and that an inequitable and polarised world of rich and poor is morally unacceptable and presents major dangers of conflict, then it will be evident that the connected challenges of the 21<sup>st</sup> Century will only be contained and resolved through a radical redesign and reform of the architecture of global governance. The complex, systemic challenges of the 21<sup>st</sup> century cannot be managed with the ideas and the institutional tools of the 20<sup>th</sup> Century.

We must move towards a new institutional architecture which must be more balanced, more participatory and more democratic if it is to recognise the realities of interdependence and the tectonic shifts which are occurring in the distribution of power and influence in the world community. It must mobilise and guide international cooperation and support for a coherent strategy which integrates economic, environmental and development goals into a programme to achieve a new path for world development. Issue- and sector-oriented programmes can then be made consistent and mutually-reinforcing within this integrating framework.

Issues of international governance and institutional architecture will be critical in particular to the effective implementation of a post-Kyoto Treaty. To address the underlying drivers of climate change, institutional mechanisms must be introduced or adapted to implement and coordinate new policies in key areas of concentration such as: finance; science and technology; human resource development; information and communications; and capacity building. And the issue of “climate justice” will be central to achieving any agreement and to the acceptance of any treaty.

The United Nations, in common with leaders and institutions in government, civil society and the private sector across the world, is confronted by an array of critical global issues which have reached such a scale and intensity as to risk the destabilization of the systems on which humanity and our fragile planet depend. As I have outlined, the many issues which threaten the future are interconnected in profound ways, they are evolving fast and, while they are of global extent, they are perceived and experienced differently by different groups, countries and interests.

Climate change is in fact only one of a number of connected global issues which are now reaching a critical phase. In its scale, its global extent and its acceleration, it is perhaps the prototype of the issues which confront the world community in the 21<sup>st</sup> Century. The ecosystems crisis and the overuse of the biological resources of the planet, increasing competition for scarce but vital resources, instabilities and vulnerabilities in the world financial and economic systems, growing resistance and rising inequities in the processes of globalization and the abiding poverty, deprivation and exclusion of an increasing world population are all issues which will determine the prospects for peace and progress in the 21<sup>st</sup> century.

On the positive side, humanity has enormous capabilities and resources to resolve the challenges which threaten the future. And we have seen that vast financial resources can be mobilised in a few months, where the threats are considered to be sufficiently acute. The question is whether we have the will, the imagination and the organisational capacities to agree together and to act in time to salvage the future.

Thus it is a central challenge to the United Nations, and an important opportunity, to stimulate new thinking, new partnerships and new approaches and to promote consensus and urgent action to contain and resolve these critical challenges.

In effect, organisations will have to become cybernetic, learning systems, to meet the rapidly evolving demands of the modern interconnected world. They must become flexible, with the capability to respond rapidly and effectively to change and the resilience to absorb inevitable shocks. This requires a different type of organisational structure from that which has often developed in institutions which have grown steadily over decades.

I believe that you will agree that this is particularly a challenge for governmental and international organisations. Their structures, internal organisation and procedures were designed decades or even centuries ago. It will be a crucial objective, for example in response to the financial crisis and the need to move towards low-carbon economies, not only to rethink the “architecture” and competences of public and international institutions but also to modernise their internal organisation and to extend the skills of their staff.

### *The role of UNESCO*

The mandate of UNESCO is focused on three substantive areas which will be of vital importance as the world community adapts to the new challenges ahead.

#### (i) Science

The major factor in the growth of a modern economy is technological progress, brought about by the advance of science and technology and the increasing knowledge and skills of the work force. Thus, science and education can immediately be seen as critical to the restructuring of economies onto a new sustainable path. And technological progress itself is driven by values and social choices, in effect by culture: it can therefore be directed towards the goals of society.

To manage the threats and vulnerabilities ahead, and in particular to achieve the rapid re-orientation of economies onto the energy-efficient, low-carbon basis which is essential to avert the risks of irreversible climate change, the explicit, and considered direction of science, technology and innovation will be critical in four broad areas:

- **The application and wide dissemination of existing technologies.** This can be undertaken rapidly both within national economies and through the international exchange of technologies, best practice and knowhow.
- **The adaptation of technologies to meet defined needs and objectives.** Targeted programmes of research and development can rapidly produce major improvements, for example in agriculture, water conservation and energy conservation and efficiency.
- **Radical new solutions from basic research.** The scale of the challenges ahead is such that the dissemination and adaptation of existing technologies will not be sufficient. Radically new solutions are required which must be achieved through “breakthroughs” in basic science. But the lead time between basic research and the widespread application of new solutions is long. “Crash programmes” of research are urgently needed on a substantial scale to develop radically new solutions soon, particularly in the fields of new and renewable energy production with low or zero emissions and of systems efficiency..
- **Focusing R&D on the needs of developing countries and the poor.** As some 90% of world R&D is carried out in developed countries, scientists in the developing countries find it hard to focus their research on issues which may be of vital importance at home but which are not of interest to the international scientific community. Special efforts are

needed to encourage developing country scientists to make their careers by focusing their efforts on the core problems of development.

## **(ii) Education**

The successful implementation of all the programmes needed to reorient national economies onto a low-carbon, sustainable and socially inclusive path depends in large part on the knowledge, skills and commitment of the men and women concerned in every area of society. The skills and attitudes of the past are not suited to the new context of today and even more so, to mastering the challenges ahead.

The challenges facing humanity are intimately linked and the pervasive interactions between them can only be understood through integrated, systemic analysis. Also, strategies and action to address them will require concerted decision-making and implementation across sectors, fields of expertise, specialised institutions and interest groups. Methods of analysis and policy-making must evolve gradually from the narrow, discipline-based approaches of today towards the more integrated systems approaches needed for tomorrow's world. This constitutes a major challenge to educational institutions which must adapt their curricula and methodologies accordingly to generate the values, attitudes, openness and skills needed to understand and resolve the complex, interconnected issues of the modern world. And, as the issues of climate, energy, resources and environment become more severe, public understanding and wide "environmental literacy" will be essential to support corrective policies.

A related, long-standing issue which has never been adequately resolved is that of the "brain drain" of talent from the poor world to the rich world. This constitutes a massive flow of invested resources from South to North. It must be resolved if the skilled talent, educated in the developing countries, is to be retained where it is so desperately needed.

Humanity is confronted with major threats and problems, but it has enormous capabilities to surmount them. Among these is the vast potential of information and communications technologies in every sphere, from the dissemination of knowledge, through the monitoring and analysis of problems, to the generation of creative new solutions and the empowerment of individuals to improve their lives. A targeted international programme to mobilise the potentials of ICT for sustainable development in both industrialised and in developing countries could bring enormous and rapid benefits.

It is of course true, as underlined by the G20, that global problems demand global solutions, and that international cooperation and effective national policies are key to addressing critical global issues. However, the fundamental changes required can only come about through the efforts and behaviour of communities and individuals at the local level. In many regions of the world, the underlying capacities to build new sustainable societies and economies are critically weak or non-existent. Foreign experts and investments and international projects are valuable, but they cannot create the basis of successful economies in the absence of the endogenous human, institutional, political and physical capacities required.

Explicit policies and international support must be therefore be directed to capacity building so that less-developed societies can use the potentials of science and knowledge to conserve resources, to protect the environment, to achieve low-carbon, equitable development and to provide employment and decent livelihoods to their peoples.

It is sad to point out that strengthening of the endogenous capacities of developing countries to use the potentials of science and technology to accelerate their development was a major objective of international negotiations in the 1970's, leading to the creation of the United Nations Financing System for Science and Technology for Development in 1979. However, the free-market dogma of the early eighties destroyed these efforts. This key issue of capacity building for science and technology must become again the focus of explicit and expanded international programmes of cooperation.

### **(iii) Culture.**

Concepts, strategies and behaviour are, of course, driven by the fundamental values, culture, assumptions and aspirations of individuals, groups and societies. The beliefs, values and behaviour which have brought the world to the present crisis will have to change if a new more equitable and environmentally sustainable path for human progress is to be found.

If humanity is to surmount the risks and threats ahead there must be a major transformation in behaviour, effectively in the cultural values which determine the goals and norms of society and the individual. And in this perspective, the role of education and public information of every kind and at every level is critically important.

The financial, economic and climate crises are already having significant impacts on behaviour and attitudes in many countries, particularly in regard to personal consumption and the acceptance of the huge inequalities in wealth and income as being normal. If this evolution in values becomes permanent – which is by no means sure – it will help greatly to reorient social and economic progress onto a new path.

In conclusion, let me identify three core challenges which are perhaps the most difficult and most crucial in determining whether we can act effectively and in time to master the threats to the future.

First, the era in which Western ideas and policies could dominate the thinking of the international community are coming to an end. The challenge we face, and on which UNESCO is heavily engaged is, how can we build consensus and support and agree on concerted action in a pluralist and multicultural world?

Second, how can we carry through the deep reforms of the policies and institutional structures and procedures of our societies in the time available, so as to introduce new approaches and solutions?

And third, and probably the most difficult, how can we have the courage to abandon entrenched attitudes, ideas and assumptions on which we have relied for decades to clear the way for the new ideas and approaches which are crucial to manage the existential threats to the future and to create economies and societies which can provide opportunity and hope in the new conditions of the 21<sup>st</sup> Century.

UNESCO can play a central role in finding the answers to these questions. You, the expert staff of this remarkable organisation are also challenged therefore to generate new thinking, to mobilize strong action and to stimulate the new level of international cooperation in the vital fields of education, science and culture which will be essential to achieve an equitable and sustainable world today and to preserve a decent future for succeeding generations.