

**Report to the 52nd Regular Session of the IAEA General Conference
from the 11th Scientific Forum**

3 October 2008

Delivered by Professor V. S. Ramamurthy on behalf of

Forum Chair: Honourable Ruud Lubbers,
Former Prime Minister of the Netherlands

Mr. President,

In this era of incessant change, “the future”, it is said, “has a way of arriving unannounced”. Organisations, therefore, face a constant challenge to try and discern the trends that are likely to affect their future and to map the way ahead.

It is a tribute to the foresight of the Agency’s leadership that it has not waited for the future to descend upon it. Instead, as the Director General Dr. Mohammed ElBaradei stated, the Agency has pro-actively ventured to “think big and to think long term” across the full range of its mandate.

That Member States are the ultimate decision makers in matters relating to the Agency’s destiny is well understood. However, consideration by Member States of an issue of such importance can only be enriched by inputs from a variety of stake holders. The Scientific Forum was this year amongst the concentric circles tasked to provide inputs as part of the process to stimulate discussions on the evolving vision of the Future Role of the IAEA.

The Agency has a complex mandate straddling issues relating to peace and security as well as development. In addressing the future of the IAEA, our deliberations at this year’s Scientific Forum greatly benefited from the Director General’s report “*20/20 Vision for the future*” and the thoughtful set of wide ranging recommendations made by the Commission of Eminent Persons headed by the former Mexican President, Prof. Ernesto Zedillo, in the Report “*Reinforcing the Global Nuclear Order for Peace and Prosperity*”. Our deliberations have not been circumscribed by the breadth or the scope of the submissions provided in the public domain, nor have we been constrained in our discussions by *what is possible*; we have tried rather to emphasise *what ought to be possible*.

Our discussions, structured in four sessions, were fruitful, not only through the excellent presentations made by 21 distinguished speakers, but also through the interactions and discussions with the Scientific Forum audience as a whole, which consisted of a total of 280 registered participants. Our deliberations were technical and academic. It is my honour and pleasure to present the outcome of these deliberations. Of necessity, my presentation is selective. I outline themes and issues that have recurrently featured and provide you a broad brush picture. The intention is to present some common denominators that could enable the Agency and its Member States to work together with the goal of strengthening the competence of the Agency.

Mr President,

These are uncertain times. A “stalemate” plagues the current nuclear order and needs to be addressed by “supranational means”. As Senator Sam Nunn eloquently said in his address to the Forum, “we are in a race between cooperation and catastrophe”.

It is acknowledged that different expectations exist and will continue to exist on what the future holds in store. However, from our discussions it was evident that the Agency has over half a century of its existence assumed recognisable roles along well defined trajectories.

- In certain spheres of activity it is the acknowledged lead actor globally. For example, verification of the fulfilment of non-proliferation commitments.

- In certain other areas, for example in assessing *nuclear energy* as part of the global *energy* sector, the Agency plays an important role as *the* place in the world where long-term visions, strategies, innovation and nuclear planning can be discussed and – hopefully – be condensed into a shared view of all Member States on the nuclear future. The Agency also assists States in developing infrastructural requirements, energy assessments that support decision making. In such tasks it works alongside other inter-governmental bodies, academic and professional institutions, industry groups and NGOs. While safety and security are national responsibilities, the development of international safety standards and nuclear security norms based on best practices is a key Agency role.
- In yet other areas, such as the entire spectrum of development assistance, the role the Agency plays is strategic but modest, making specific targeted contributions in activities where nuclear techniques have a comparative advantage.

Mr. President,

Let me outline the contours of what participants at the Scientific Forum viewed as the Agency's future along these trajectories. It is, of course, entirely possible that there may be drivers in the future that could lead to changes in these trajectories.

Safeguarding our future

Mr. President,

It was an unfortunate twist of fate that the first public demonstration of nuclear technology was its destructive power. That association of nuclear technology with destructive capabilities has remained the predominant concern in the public perception of all things nuclear. Irrespective of the forum in which they are pursued, efforts towards nuclear disarmament, arms control and non-proliferation will remain crucial to the future of all aspects related to the public acceptance of nuclear technology. The perils of the '*dark*' side of the nuclear equation are such that the Agency's verification role will always remain, in the public's perception, an overwhelming priority.

As the world economy grows, energy needs are poised to grow faster than supply. New nuclear facilities will be constructed, old ones modernized, the amounts of nuclear material, and sensitive knowledge will grow and spread, nuclear supply chains and trade will expand. Countries having no previous safeguards infrastructure or experience are planning to embark on nuclear power programmes. Bottlenecks in nuclear manufacturing and fuel services may appear which in turn could trigger construction of new nuclear fuel cycle facilities that could pose new proliferation risks. Threats posed by clandestine networks for the supply of nuclear goods and technologies are a concern. Access by non-state actors to weapons of mass destruction and their means of delivery remains a worry. Expanding the effectiveness and efficiency of nuclear safeguards in such circumstances is not only important from a technical angle but also from the point of view of its political, economical, industrial and social impact.

Much will depend on what will be the shared safeguards and verification standard applied in 2020. In case it would be, as it is widely expected, the combination of a comprehensive safeguards agreement and an additional protocol, this would imply continuing changes to the verification culture and practices including more information-driven verification activities, use of state-of-the-art technologies, high caliber staff, outsourcing, etc. Since the Agency's resources are unlikely to increase at the same pace as its increasing verification activities, efficiency requirements will also be greater. Transparency and cooperation with States and with nuclear vendors embedding safeguards features directly and deeply into their facility designs, systems and components, will play important roles.

Initiatives have been launched to develop policies, concepts, technologies, expertise and infrastructure necessary to sustain the international safeguards system as its mission evolves over the next 25 years. Meeting successfully new global challenges needs also other

innovations related to fourth (IV) generation reactor systems and multilateral approaches to the nuclear fuel cycle.

Past initiatives for multilateral nuclear cooperation did not result in any tangible results. Proliferation concerns were perceived as not serious enough. Economic incentives were seldom strong enough. Concerns about assurances of supply were paramount. National pride also played a role, alongside expectations about the technological and economic spin-offs to be derived from nuclear activities. Many of these considerations may still be pertinent. However, the result of balancing these considerations today, in the face of a possible multiplication of nuclear facilities over the next decades and the possible increase in proliferation risks associated with sensitive parts of the nuclear fuel cycle, may well produce an environment more conducive to multilateral nuclear approaches in the 21st century that may help the expansion of nuclear power.

Mr. President,

Myriad technical issues of an evolutionary nature will form the “bread and butter” tasks in the foreseeable future. On the other hand, it is imperative not to lose sight of the commitment of all of us to “de-demonize” nuclear technology. The genie cannot be put back into the bottle. We need; however, to be assured that it is up to no further harm. This can only be done if disarmament and arms control return as the focus of the international agenda. It is rightly pointed out that the Agency is not the lead agency or forum for nuclear disarmament. However, it must prepare for and be ready to respond to the technical needs of verification which will be required to be met as and when the political decisions are taken in the appropriate fora. As the Secretary General in his message to the fifty-second session of the General Conference indicated, future progress in nuclear disarmament may also bring opportunities for the Agency in the area of verification, transparency and irreversibility.

Partnerships for meeting energy needs in a safe and secure manner

It is estimated that the world’s energy needs could be 50 per cent higher in 2030 than they are today. There are rising expectations in the area of nuclear power that are gradually leading towards a renaissance of nuclear energy, through expanding programmes in ‘mature’ countries and through new programmes in ‘newcomer’ countries alike. As a result, the nuclear landscape in the next decades might look fundamentally different from that of today. A second important fact affecting the nuclear future is that the perceived or real concerns associated with the disposal of spent fuel and radioactive waste remain. To a large extent, public acceptance of the use of nuclear power depends on the solutions to this issue.

The expectations from the Agency are likely to be:

- A continuing demand for support stemming from operating nuclear installations.
- In the short and medium term, requests for more support for ‘newcomer’ countries, either through providing planning and decision-making guidance or through direct assistance.
- To ensure the sustainable development of nuclear energy, continued Agency support will be needed in finding appropriate solutions for the back-end issue, keeping in mind concerns linked to scarcity of resources, technical sustainability of the complete global nuclear system and public acceptance.
- The Agency will be asked to contribute to innovation that will be key for building the nuclear fleet of tomorrow, be it in nuclear power technology, fuel cycle technology or innovations in institutional arrangements.
- The Agency should continue to be an active player in the global debate on climate change, possibly also in connection with public acceptance campaigns, taking advantage of its role as a trusted international organization.

The envisaged renaissance depends very much on the success of international cooperation and approaches, and thus on the Agency, in particular regarding confidence-building, communicating with the public and with governments, and in consensus-building through a global discussion. A bright future of nuclear energy does not only depend on individual countries' policies. It depends on all those who want to use its benefits to get it right every time, thus the world needs to do nuclear together.

A stringent approach to safety and security is necessary to enable this renaissance. Measures to advance nuclear safety and security are important and should be achieved in a way which harmonises them.

There is recognition that, while safety requirements are well established, not all safety problems have been resolved. In addition, security requirements continue to develop. Care must be taken to ensure that this process of continuous improvement results in harmony between safety and security. It is important to emphasize that the protection of people and the environment is the ultimate goal and that harmonization of safety and security is a means to achieve the end goal, it is not the end goal itself.

Continuous international cooperation will be required to facilitate improvements to safety and security. Numerous challenges remain in harmonizing safety and security, in particular because security often involves sensitive information. The Agency has a leading role in this harmonization process through the definition of instruments, standards and norms and the provision of services. It will require strengthened capabilities including adequate resources to take on this expanded role and to continuously improve its standards, guidance and services.

Opportunities in Partnerships for Development

Mr. President,

The development scenario is one of pressing, unfulfilled needs. According to a World Bank study released a little over a month ago, nearly one out of every four of the world's population live on less than \$1.25 a day. By 2015 more than a billion people will still be living on less than \$1.25 per day. Many who have climbed above the \$1.25 per day line will remain poor by the standards of rich or middle income countries. On the other hand, the UN's MDG Task Force has recently identified that only 5 countries have reached or exceeded the UN's ODA target of 0.7 % of their Gross National Income in 2007.

Amidst the vast expanse of unfulfilled needs, the validity, indeed the viability of an organisation adopting solely a normative role, while having the capacity to contribute its mite to developmental goals is a non sequitur. At the Forum, it was a widely shared belief that targeted assistance in human health, food and agriculture, environment and water resources are areas where nuclear technologies can make a difference.

By way of illustration, let me provide a few examples of where Forum participants strongly felt that the Agency can and should be doing more, much more, in the future:

- Cancer kills more people every year than AIDS, TB and malaria combined worldwide. More than 10 million people are expected to die of cancer in 2020, up from 7.9 million in 2007. More than 70% of cancer deaths now occur in low and middle income countries. While combating cancer is a multi-dimensional effort, nuclear techniques have a unique role in cancer diagnosis and therapy.
- Radiation therapy - a lifesaving component of treatment for over 50% of cancer patients in high income countries – remains out of reach for millions of cancer patients in the developing world. The current shortage of radiotherapy machines in developing countries exceeds 5000 machines, with no radiotherapy capacity at all in more than 30 countries in Africa and Asia. The Agency has unrivalled experience in the transfer of radiotherapy and diagnostic imaging technology and nuclear medicine procedures to developing

countries as part of its support for the safe, effective and sustained implementation of radiotherapy and nuclear medicine services. However, the public health benefit of the Agency's cancer-related activities can only be maximized if planned and coordinated within the context of national cancer control strategies in partnership with the WHO. In this context, the objective of PACT - to create a unified vision and operational framework for all IAEA cancer-related activities so as to achieve maximum public health impact in developing Member States – was recognized as an extremely important and timely initiative on the part of the IAEA.

- In his opening address to the General Assembly last week, the UN Secretary General Ban Ki-Moon reminded the world that in a single year, rice, the food staple that feeds half of the population, more than doubled in price setting off concerns regarding food security. If the target set by the UN of 50% more food annually by 2030 is to be met, food production must grow by 2% per year. Historically, every quantum leap in food production in the past was based on a change in agrarian practices along two dimensions, namely a change in cultivation practices combined with genetic selection of new crops, varieties and breeds. The Joint FAO-IAEA Division is well placed to participate in and contribute to both these endeavours. It can assist in transforming cultivation practices by transferring methodologies aimed at making ecosystem services visible and valued by policy makers, starting with plant nutrient transformations in soil ecosystems, crops and livestock. Partnerships with environmental scientists, ecologists, agronomists, livestock specialists, nutritionists, social scientists and policy makers need to be pursued. Similarly, nuclear scientists will need to partner with geneticists, plant and animal breeders, molecular biologists and social scientists to play a meaningful role in surmounting the challenge posed by the need for appropriate genetic varieties and breeds. Although water is a basic human need, nearly one billion people in the developing countries do not have access to safe drinking water and more than two billion lack basic sanitation facilities. The combination of a growing population, increased industrial growth and irrigated agriculture has stressed the global freshwater resources over the last several decades. Irrigation, responsible for nearly 40% of world food production, uses about 70% of total water withdrawals and increasingly relies upon groundwater resources. A significant proportion of groundwater used for irrigation is from fossil or non-renewable sources and makes the food supply unsustainable for a growing human population. There are a number of issues associated with the energy-water nexus that will challenge both water and energy experts and planners. Water is used in a variety of ways in the energy sector. Similarly, energy is a critical requirement in the water sector. Finally, climate change and variability are leading to a more intense water-cycle with drastic impacts on the geographical distribution and availability of water.
- Isotope and nuclear techniques have demonstrated their utility in understanding water dynamics, past climates and in assessing available resources. Isotopes help to rapidly and cost-effectively provide scientific information on, and understanding of water resources – that may otherwise not be possible or may require observations over decades. Additionally, in order to apply isotopes at local or regional scales and in particular to assess the impact of climate change, methodologies and reference data sets are needed on an international scale. The Agency's continued role in collecting isotope data and assisting developing countries to use such data will remain important in the future. There is also a continuing need for the Agency to build sufficiently trained capacity and to help countries use isotopes for their national water resource assessment and management efforts. To maximize the effectiveness of its work, the Agency needs to enhance partnerships with other UN and international programmes and agencies such as the World Bank, the Global Environment Facility (GEF), UNDP, WMO and UNESCO.

Mr. President,

Given the overwhelming nature of development needs, the scope for an enhancement of the Agency's future role in this area remains vast. However, for this to happen, the provision of operational support through enhanced technical cooperation in partnership with other organisations will need to be supplemented by giving thought to overcoming factors that have impeded the full potential of nuclear technologies being realised. Working towards enhancing acceptability, accessibility and affordability of nuclear technologies for development will be the key to success of the Agency as an organisation contributing to development.

Concluding remarks

In their capacity as specialists, the Forum participants did not delve into the financial and administrative minutiae of the Future Role of the IAEA. It was self-evident to all of us, and this is a fact I would like to emphasize, that growing expectations vis-à-vis the Agency will have to be accompanied by a consideration of the need for additional resources. Such resources should not be subject to artificial constraints. As President Eisenhower once said, "there is no victory at bargain basement prices."

To sum up, let me reiterate those five items which were the most relevant messages that we heard in the course of this Scientific Forum and which are vital from the point of view of the Agency's dual mission for development and security:

1. The nuclear landscape is changing. In modern organizations there is no success without a strategic framework, where a shared vision is a critical focal point giving shape and direction to the organization's future. The world needs the Agency to plan to stay ahead of the curve and should provide it with the required mandate, strengthened capabilities and necessary resources.
2. The Agency needs to provide more technical assistance to individual Member States, working through the transfer of technology, decision making support, planning tools, capacity and knowledge building and R&D coordination.
3. The Agency needs to work towards enhancing acceptability, accessibility and affordability of nuclear technologies for development.
4. The Agency needs to make sure that all existing and planned nuclear installations respect safety, security and safeguards requirements.
5. The Agency needs to be *the* place in the world where technical visions are shared and – hopefully – harmonized to build one nuclear future that the world creates jointly.

Mr. President,

The path towards the future is a journey and not an end. When looking back at the history of the Agency in maybe 10, or 20, or 50 years, the process of discussions on the "Future Role of the IAEA", and all actions that we expect to be triggered by these considerations will form a milestone in the course adopted by the Agency. That the participants of the Scientific Forum were part of this process and hopefully will have contributed to the transition which comes about, is a matter of satisfaction to all of us who participated in this venture. We are honoured to have had the opportunity to be part of this process. Thank you.