

# EVALUATION OF THE OECD MEGASCIENCE FORUM

## REPORT OF THE EXPERT PANEL

21st October, 1998

### SUMMARY

This report, by an international panel of independent science policy specialists, examines the work of the OECD Megascience Forum during the years 1995-1998. The panel members are: Prof. Dervilla Donnelly (Ireland) *Chair*, Prof. Sergio Barabaschi (Italy), Dr. John Boright (USA), Prof. Mitsugu Ishizuka (Japan).

Starting in 1992, the Megascience Forum has provided a venue for regular meetings between senior science policy officials of the OECD countries. In 1995, the OECD science ministers directed the Forum to identify specific opportunities, challenges and obstacles in large-scale international scientific collaborations, and to develop recommendations for actions by governments. Since then, the Forum has established working groups for detailed consideration of the following topics: neutron sources, biological informatics, radio astronomy, nuclear physics, administrative/legislative barriers to co-operation, and access policies at large facilities. In addition, workshops were organized to examine high-energy neutrino observatories, and integrated assessments of global-scale issues.

The Panel believes that the Forum's work has been effective, and that government policymaking has been strengthened by the findings and recommendations of the working groups and workshops. To cite a single example, the analyses and recommendations of the Working Group on Neutron Sources should have a significant impact on near-term government decisions to invest several billion dollars in large new facilities for basic and applied research using neutron beams.

The Panel supports the continuation of science policy discussions in the OECD, given the increasing importance of scientific research in numerous policy domains (for example: health, environment, sustainable economic growth), and the many fields of science where the high cost, global scope and world-wide expertise provide opportunities for governments to cooperate. During 1995-1998, valuable lessons have been learned about how to initiate and conduct focused multilateral discussions among government science policy officials. These lessons should be exploited in future work - to build on the Megascience Forum's accomplishments, and to correct weaknesses that the panel has identified. In defining the mandate for the next round of activities, Forum delegations should consider the following desiderata: a systematic approach to choosing topics for in-depth analysis, combined with a requirement for a commitment by most of the OECD governments and vigorous leadership by one member country; increased operational flexibility (beyond the existing working group format), suitable to each chosen topic; a good balance of scientists and senior science policy officials in all discussion fora, strong links to other activities within the OECD and/or other intergovernmental or scientific organizations.

## 1. Introduction

The OECD Megascience Forum was established in 1992 by the Ministers responsible for science and technology in OECD countries. The mandate of the Forum was extended in 1995 for the period 1995 to 1998. A new mandate for the Forum is now under active discussion at OECD.

The Ministers and the OECD wish to have a considered outside view on the Forum, the impact of its work and the lessons learned from the earlier periods of operation, and have established an independent Expert Panel to provide this.

The Panel membership is:

Prof. Sergio Barabaschi, Italy

Dr. John Boright, USA

Prof. Dervilla Donnelly, Ireland. (Chair)

Prof. Mitsugu Ishizuka, Japan

The Panel was assisted by a consultant, Dr. Tom Higgins, The CIRCA Group Europe Ltd., Dublin.

The Panel was asked by the Chairman of the Forum to consider the following questions:

- 1(a). Did the Forum choose the right issues for consideration?
- 1(b). Did the working group mechanism constitute a productive way of addressing the selected issues?
- 2(a). Will the activities of the Forum and its groups have a positive impact on international co-operation?
- 2(b). Will the benefits justify the time, expenses and effort contributed by Member delegations?
3. Should intergovernmental discussions on international co-operation continue in a subsidiary body of CSTP based on the themes and principles developed in the 13th Meeting of the Forum?
4. How can OECD play a role in addressing the international dimensions of science policy that will preoccupy OECD governments in the near and mid-term future?

In addition, the Panel was asked to comment on the future of the Forum and on the draft Mandate being prepared by the Secretariat.

To facilitate its consideration of these questions, the Panel was provided with the Evaluation Reports of thirteen national delegations on the performance of the Working Groups and the Sub-Groups and has drawn extensively on this material. In addition, self-evaluation reports from all groups were also provided by the Secretariat, as well as all the available technical reports from groups and subgroups. The Panel also considered the draft Mandate of the OECD Global Science Forum (the proposed follow on to the Megascience Forum), dated September 8<sup>th</sup>, 1998.

A selection of achievements by the Forum under its current Mandate are outlined in Annex 1.

## **2. Evaluation Approach**

The approach adopted by the Panel was as follows:

Review and analysis of documentation provided by the Secretariat, especially the reports of the national delegations to the Forum.

Review of the available technical reports by the Working Groups.

Based on the results of the above, consideration of the four questions posed to the Panel by the Forum, together with an assessment of the extent to which the new draft Mandate for the Global Science Forum, (GSF) reflects the lessons of the earlier mandate of the Megascience Forum (MSF).

## **3. The Four Questions**

### ***Q. 1(a) Did the Forum choose the right issues for consideration?***

#### **PANEL RESPONSE**

The Forum did choose a good set of issues for consideration. Even though the basis on which these selections were made is not clear, nonetheless, the Panel is satisfied as to the relevance and significance of the selected topics.

#### **PANEL RECOMMENDATIONS**

- Elaboration of a 'working menu' of important global science issues is important and should be addressed by the Forum in a careful and systematic way in the future. Topics should be evaluated before being added to the menu and the process should be dynamic so that the composition of this menu can be revised and updated by the Forum on a continuous basis.
- The selection of issues should be based on opportunities to significantly advance multilateral co-operation or other policy goals. Important scientific issues are a necessary but not sufficient condition for establishing a Working Group.
- Preparatory work by the Forum itself on the selected topics is important so that they are clearly defined and well targeted.
- Crosscutting issues are important, though difficult to deal with. Also, there are few international fora outside OECD to discuss them. The Forum should be encouraged therefore to identify both crosscutting and disciplinary issues of high importance.

### ***Q 1(b) Did the Working Group mechanism constitute a productive way of addressing the selected issues?***

#### **PANEL RESPONSE**

The Working Group has been a useful mechanism. Excellent scientific inputs were obtained on all the scientific topics which were considered by the Working Groups. Working Groups however, should not be the exclusive mechanism of the Forum. Other tools should be used depending on the nature of the particular topic under consideration and the requirements for making an effective analysis of the issues involved. For example, workshops, seminars or commissioned surveys may be adequate for many topics.

Experience to date has shown the importance of defining the goals of Working Groups and the expected deliverables as clearly as possible, at the outset.

Success of the Working Group is dependent on the leadership of the lead country.

### **PANEL RECOMMENDATIONS**

- In general, Working Groups to be preceded by a Preparatory Workshop, hosted by the Forum, to clearly define and specify the issues to be addressed, the deliverables expected and the timescales envisaged for the work. Issues selected should be coherent, timely and feasible.
- More attention needs to be given to the composition of Working Groups. A balance of scientists and senior science policy officials is essential. Strong senior level governmental representation is important. All major relevant actors must be represented in order to address problems/obstacles outside of the science policy domain, especially for crosscutting issues. User interests should be represented where relevant and appropriate.
- The Forum should play a more active role in relation to its Working Groups. It should request a precise work schedule from the Working Group, which it should monitor. It should intensify the level of reporting and communications with its Working Groups and in the case of long duration Working Groups - say three years or more - it should establish and initiate procedures for an intermediate evaluation of the programme and performance of the Working Group.
- Working Groups should not become institutionalised. Specific goals and time limits need to be established to ensure vitality.
- The Secretariat should ensure that adequate levels of contact and liaison are maintained with other relevant groups working within OECD in science, technology, economic affairs, environment and regulatory policies. All existing co-operative fora need to be thoroughly reviewed, as part of the preparatory work of the Forum, in order to avoid duplication with work being carried out elsewhere.
- The existence of strong leadership should be one of the criteria for the establishment of a Working Group.
- Decisions on the style or type of mechanism, such as working group, workshop or commissioned surveys/studies should be made carefully, depending on the maturity and nature of the subject.

### ***Q. 2(a) Will the activities of the Forum and Groups have a positive impact on international co-operation?***

### **PANEL RESPONSE**

The panel is satisfied that in several cases, notably Neutron Sciences, Bioinformatics and Radio Astronomy and from work undertaken under the earlier mandate, notably deep scientific drilling, the Forum and its Groups will have a positive impact on international co-operation. Understanding between Japan, the US and Europe has improved on many disciplinary and global issues. Non-OECD countries have contributed. Through the work of the Forum, world-wide initiatives on global scale issues (such as unbalanced population growth, new and re-emerging diseases, environmental degradation, scarcities of food, energy and natural resources) have started among OECD and non-member countries. The Forum is especially important for involvement of non-European nations in sharing of views on international science policy. Both the Forum and Working Groups provide a useful mechanism for bringing views and comments on international issues back to their Member Governments.

However, the Panel feels that more can and needs to be achieved. In particular, the available mechanisms for promoting international collaboration, especially as regards

follow through on recommendations, are not adequately developed. This is an important issue to be addressed by the Forum in the future.

#### **PANEL RECOMMENDATIONS**

- The Forum should formulate specific policy oriented questions to be addressed by the relevant Working Groups.
- The Forum should explore new mechanisms and new ways of promoting international co-operation. In particular, the institutional strengths of OECD itself, especially its internal disciplinary and horizontal structures, ought to be more fully exploited by the Forum in order to further international co-operation.

#### ***Q. 2(b) Will the benefits justify the time, expenses and effort contributed by Member organisations?***

#### **PANEL RESPONSE**

In some cases the results are not yet evident, but overall the Panel can answer this question in the affirmative. There have been some good successes, particularly in the work of the Bioinformatics, Neutron and Radio Astronomy Groups.

The panel believes that there is a rich agenda of issues for the future, with potential mutual benefit, which would justify the effort.

A stronger focus by the Forum on deliverables and on implementation processes would help.

#### **PANEL RECOMMENDATIONS**

- The Forum should more actively supervise the operation and performance of its Working Groups and give attention to ensuring that Working Groups focus on producing action-oriented recommendations for policy makers.
- The Forum should in future request all Working Groups to prepare proposals for follow through on their recommendations, so that recommendations are not left at an abstract level.

#### ***Q. 3 Should intergovernmental discussions on international co-operation continue in a subsidiary body of CSTP based on the themes and principles developed in the 13<sup>th</sup> meeting of the Forum?***

#### **PANEL VIEWS**

Our observations on this question are reflected in our comments on the new draft Mandate for the GSF dated 8<sup>th</sup> of September, which we have reviewed. We have divided these into general comments and suggestions for specific modifications to the draft text. The latter are provided in Annex 2.

[Note from the OECD Secretariat: Annex 2 is not reproduced here, since the draft mandate dated 8<sup>th</sup> of September is obsolete.]

#### **GENERAL COMMENTS**

The Panel believes that intergovernmental discussions on international scientific co-operation are needed, and should be pursued in the OECD.

The new Mandate appears to overlap with some of the existing responsibilities of the CSTP itself and some elements, especially in Section 11 (ii) Supporting Policy Making in Member Countries - are not well defined e.g. final bullet point of this Section. The Panel has not examined the relationship between the CSTP and the

Forum nor the most appropriate division of responsibilities between the Forum and the CSTP. This needs to be done.

The text of the draft could be shortened. Some paragraphs can be combined e.g. the first bullet points of 11 (i) and 11(ii).

The Mandate should be more specific on procedures for identifying important global issues for consideration and on how debate and preparation of these should develop, prior to the establishment of any formal structures, especially Working Groups.

Reporting frequencies are not sufficient and should be increased. Use of Internet should be encouraged. Communications need improvement between the Forum and its Working Groups, between the Forum and CSTP and with national governments.

Internet should be used to enable CSTP to ratify topics to be taken up by the Forum, especially in between meetings of the regular meetings of CSTP.

***Q. 4. How can OECD play a role in addressing the international dimensions of science policy that will preoccupy OECD governments in the near and mid-term future?***

**PANEL COMMENTS**

The proposal for a GSF is a step in the right direction and has the full support of the Panel. The Panel would like to emphasise however that it has not had the opportunity to review the relationship between CSTP and GSF and that this needs to be done as a matter of priority.

Two procedural issues relevant to this question need attention -

- Establishment of formal procedures for a dynamic and systematic identification and consensus on the major high level global science issues needing attention.
- Establishment of procedures which promote global collaboration which go beyond the publication of general guidelines and recommendations.

Finally, the interconnection of the traditional work of OECD in economy, industry, employment, environment, development assistance etc., and its S&T activities is now much more central and important. More formal management, liaison and linkage procedures between different groups within OECD for this purpose, need to be developed. This mainstreaming process needs more effective internal management within the organisation itself, and engagement and strategic vision by the leadership of the OECD and Member countries.

**PANEL RECOMMENDATIONS**

OECD can address this question by:

- Mainstreaming the S&T function within OECD itself.
- Promoting international co-operation in S&T.
- Continuous exchange of information and discussion on science policy issues in participating countries.
- Through careful selection of the key international issues for debate in OECD forums.
- Through speeding up the pace of debate and discussion and the work of OECD groups.
- Through improving communications at all levels.

## **ANNEX 1**

### **Main Achievements of the Megascience Forum**

Member governments have commented favourably on the work of the Forum. Their comments may be summarised as follows:

- The Report of the Working Group on Neutron Sources is a valuable reference for the agencies that are responsible for government policies in the field. The group developed recommendations and strategies for governments for ensuring an adequate neutron supply in the future. Opportunities for international collaboration were identified. A detailed, quantitative report on neutron demand and supply was commissioned by the Working Group. This Working Group has facilitated opportunities for wider participation in forthcoming international efforts to build new facilities in Europe, Asia and the North America. This network of high level managers and technical experts could now continue its activities beyond the Forum's mandate and without the OECD umbrella. This effort was an example of best practice on how to select and run a working group, and produce a short concise report. Collaborations, which were established by the Group, may help to significantly reduce the design cost and R&D of the US project to construct a new neutron facility. For example, a multinational experimental programme at the Brookhaven National Laboratory was established as part of the work of the group.
- The Biodiversity Informatics subgroup of the Working Group on Biological Informatics recommends the establishment of an international co-ordinating body and a new data network called the Global Biodiversity Information Facility (GBIF) that will allow users to navigate the vast quantities of biodiversity data that are being compiled by scientists. The Subgroup is refining an operational plan for the GBIF, but the recommendation has already received considerable support from governments, some of whom have expressed an interest in possibly being the host for the co-ordinating body.
- The Neuroinformatics Report has stimulated the emergence of a new scientific field and drawn the attention of governments to the benefits that could accrue from stronger international co-ordination. Proposals for the establishment of an International Co-ordinating Committee for Neuroinformatics are appreciated.
- The Radio Astronomy Working Group has demonstrated the need for government action to deal with an important issue where the interests of science have to be reconciled with those of the commercial communications industry: the issue of interference to radio astronomical observations caused by emissions from the new generation of low Earth orbiting satellites. At this time, the group is still pursuing its work, but governments have already acknowledged the importance of resolving this problem. China's participation in the working group should be noted.
- The Nuclear Physics Working Group shows that discussions between experts led to agreement on the need for genuine international co-operation in these areas and a quest for convergence among the long-term plans developed in Europe, Asia and North America. Despite a slow start, the group has identified several activities e.g. radioactive nuclear beams, ion collision and applications of nuclear physics as priority areas, and has suggested setting up an international contact

group . Some changes in government policies are evident on issues of nuclear applications (radioactive waste management, medical applications), which were stimulated by the work of the group.

- The report of the Sub-Group on Access to Large-Scale Research Facilities provides information on current access policies and practices at large-scale research facilities, and recommends principles for use by facility managers and government officials in formulating access policies in the future.
- Sub-Group on Legislative and Administrative Barriers describes specific problems that are encountered by scientists and administrators engaged in international megascience co-operation, and identifies good practices in member countries. The sub-group's report should stimulate reform of some outdated customs legislation for the temporary importation of components of large-scale instruments. Co-operation has been established with the World Customs Organisation.
- The Workshop on a Deep-Sea Neutrino Observatory was useful in identifying the primary technical and organisational challenges that need to be resolved in designing the next generation of underwater detectors of very high-energy cosmological neutrinos. Also, a useful set of arguments was developed that can be used by governments in understanding the importance of these neutrino observations within the context of a broad, well-balanced strategy of advancing physics and astronomy.
- The Workshop on Global-Scale Issues brought together scientists and policymakers to examine best practices for large-scale integrated scientific assessments of global issues. The workshop report can be used as a basis for future work by the Forum, with the goal of strengthening the process of incorporating scientific advice and analysis into government policy-making in areas such as health, environmental safety and sustainable economic growth.