



# **Earth System Science: Global Problems, Global Science; Europe's Future in Global Change An ESF Forward Look**

## **1. ESF Forward Looks**

It is becoming increasingly apparent that both the science community in general and funding agencies at both the national and the European level need to be aware of the likely direction which research will take in the future, especially as traditional disciplines combine to produce new and exciting multi-disciplinary areas of study. In taking a look ahead, agencies are also able to better plan their resources to meet possible future demand, including the development of facilities and infrastructure, which may have considerable lead time before becoming available. Additionally, such 'foresights' will help the development of pan-European approaches between national agencies as well as informing European institutions such as the European Commission and the ESF itself.

The ESF will promote scientific Forward Look activities as part of its role in serving the needs of the European research community and ESF's Member Organisations, for the most part the national research funding agencies. The aim is for a partnership between ESF and its Member Organisations, which will join forces between them and with other institutions involved in a particular topic.

To achieve this aim requires bringing together the best ideas and capabilities. Such a gathering of Europe's key scientific actors in any given topic must aim at producing an assessment and recommendations of the highest scientific quality so that they will be accepted by their scientific peers. At the same time this should not inhibit adventurous forward thinking and sometimes 'thinking the unthinkable', rather it should provide a means for exploring all ideas and new directions in research. The outputs of a Forward Look should influence the direction of science and the response of funding agencies.

## **2. Forward Look on Earth System Science**

### **2.1 The Aim**

The first such Forward Look on *Earth System Science: Global Problems, Global Science – Europe's Contribution to Global Change Research*, is somewhat atypical of the general Forward Look scheme in that the science agenda is being developed and agreed, as befits this topic, at the global level through programmes such as WCRP, IGBP, IHDP and Diversitas. While European scientists are influential in these debates and Europe, in general, makes a large intellectual and financial contribution to these programmes, we lack coherence and stability in our response to these global initiatives by working mainly at the national level. The aim of the Forward Look is not to re-invent the science agenda but to look at Europe's strengths and weaknesses, including the provision of organisational and research infrastructures, and to come up with recommendations for future coordinated national action and action at the European level (including the Framework Programme, ESF and other relevant European organisations).

## **2.2 Why and Why Now?**

Europe plays an important role in the implementation of these programmes, with the central coordinating offices for the international programmes all being located in Europe, as well as twelve out of seventeen programme element offices. These are funded mainly by the European national science funding agencies. The EU plays a major role in shaping the European profile in the programmes through substantial funding. However, the major part of funding of the science contributing to the global programmes comes from national agencies, which are mainly ESF Member Organisations. At present there is less structured interaction between funding agencies at the national and European level, than is desirable from a point of view of optimising the impact of the money spent in terms of science results, provision and use of infrastructure and visibility of the role played by Europe. In generic terms, the EU has signalled this situation in the preparation of its next Framework Programme. The Commission has introduced the concept of a European Research Area, with new instruments, like Networks of Excellence and Coordination among National Programmes. A significant new contribution to the ERA and the coordination of national programmes is the ESF EUROCORES scheme. At the same time the global programmes are determining their strategies and priorities for the coming decade, following the very successful first Global Change Open Science Meeting, which took place in July 2001 in Amsterdam. One outcome of this conference is the evolution towards a more integrated approach of global change, cutting across a broad range of natural and human disciplines and an increased interest in regional causes and effects. In view of these developments it is important that the national science funding agencies in Europe decide on their strategy regarding cooperation and joining forces.

## **2.3 Outputs of the Forward Look**

The Forward Look should foster cooperation between Member Organisations and with the EU, and develop the role of the ESF in such activities. It is a mechanism to develop recommendations for securing and maximising European investment and leadership in global change research through national and international routes. Concrete outputs could be:

- The definition of a role of the ESF in fostering a European science policy, adding to and complementing that of the EU, through the concertation of policies of its Member Organisations,
- A strengthening of the links of relevant ESF programmes to the global programmes, and to new collaborative programmes – like EUROCORES or ESF Network and Programme mechanisms-
- A strengthening of the links of relevant national programmes, with the ESF programmes, and the global research programmes.
- The optimisation of access and development of new European infrastructures (human resources, equipment, data, monitoring).
- The identification of existing mechanisms within the ESF and its Member Organisations which could contribute to the support of the global programmes and the harmonisation of these activities, e.g. with regard to support of the central infrastructure ('glue money'), or even the creation of ODP-like structures.
- The development of common approaches to capacity building and collaboration with developing countries and the countries of Central and Eastern Europe.

In order to arrive at these outputs, the Forward Look should involve leading European scientists in the global change research field, the leadership of the global programmes, together with the leadership of ESF, national Member Organisations and the EU. Science issues should drive the discussion, but the outcomes will mainly be addressed to the funding agencies (including the ESF). The science issues to be addressed should be fundamental questions requiring European collaboration between nations and research groups in different countries, because of scale availability of distributed expertise in different countries, need of shared infrastructure etc.