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Address by
Mr Koïchiro Matsuura

Director-General
of the United Nations Educational,
Scientific and Cultural Organization
(UNESCO)

on the occasion of the opening of the International Coordination Meeting
for the Development of a Tsunami Warning and Mitigation System for the Indian
Ocean within a Global Framework

UNESCO, 3 March 2005

Excellencies,
Distinguished Participants,
Ladies and Gentlemen,

It is a great pleasure to welcome you here for this international coordination meeting for the development of a tsunami warning and mitigation system for the Indian Ocean within a global framework. I am delighted to see you here for this important meeting.

The recent Indian Ocean tsunami has tragically demonstrated that there is an urgent need for improved ocean observing systems and for enhancing the capacity of all nations to make optimum use of the information these systems generate.

The international community was shocked by the magnitude of the disaster and has shown an unprecedented and generous level of response to the tragedy.

Allow me now to provide some background and orientation so that we can have a shared understanding of the present situation and the most desirable way forward. The United Nations has been engaged for fifteen years in a process of creating awareness and promoting the development of policies to diminish the loss of life and property from natural and man-made disasters - first through the International Decade for Natural Disaster Reduction and then through the International Strategy for Disaster Reduction that followed and the establishment of the UN Disaster Task Force, in which UNESCO and IOC participate. This process of awareness-raising and policy development culminated in the World Conference on Disaster Reduction held in Kobe, Japan, in January 2005.

The Kobe Conference adopted the "Hyogo Framework for Action 2005-2015", a document that commits governments and the international community to achieving a set of concrete goals, among them the commitment to halve the loss of life caused by disasters, to make all schools and hospitals disaster-proof, and to establish national natural disaster platforms in each country.

The Hyogo Declaration states that " [...] we are far from powerless to prepare for and mitigate the impact of disasters. We can and must alleviate the suffering from hazards by reducing the vulnerability of societies. We can and must further build the resilience of nations and communities to disasters through people-centered early warning systems, risks assessments, education and other proactive, integrated, multi-hazard, and multi-sectoral approaches and activities in the context of the disaster reduction cycle, which consists of prevention, preparedness, and emergency response, as well as recovery and rehabilitation."

However, in the face of the Indian Ocean tsunami disaster and because today we have the knowledge and technology to avert such a human catastrophe, one cannot avoid feeling part of a major collective failure - failure to effectively communicate between science and government; failure to communicate with and prepare society; failure to build or renovate the necessary institutions; and failure to bring all these assets into play for the benefit of humankind.

The UN agencies have responded to this particular urgent need by agreeing to undertake the immediate creation of an Early Warning System for the Indian Ocean, building upon the experience of the International Coordination Group for the Tsunami Warning System in the Pacific – ITSU - of UNESCO/IOC. The robust, comprehensive mitigation approach used by ITSU is based on three mutually dependent components: first, the assessment of tsunami hazards; second, the detection/warning system; and third, the adoption of preparedness measures.

We are here in this technical meeting to start work on this task - to agree on the basic design of the observation networks; to identify those that need upgrading and to add new components; and to secure the communication links for the existing and new instruments. But we also need to look at the assessment of the tsunami hazard in the region, an aspect that is connected to the design of the networks but that also supports key activities in regard to preparedness.

The assessment of the tsunami hazard also requires important levels of research, and we need also to coordinate those efforts to get the best results and to avoid wasteful duplication of effort and investment. The bottom of the ocean needs to be re-surveyed. We need accurate bathymetric and topographic charts of the coastlines in order to successfully run the numerical models that forecast flooding in the case of a tsunami, thereby enabling the design of evacuation plans and the identification of safe locations.

Finally, the meeting needs to address the organizational aspects and the governance mechanism(s) that will enable the joint operation of the detection/warning system, based by necessity on international cooperation with the national system of emergency preparedness that is part of the governmental and societal structures of each country.

Ladies and Gentlemen,

Allow me now to make some points and clarifications that might help your deliberations on this subject, drawing upon our experience of designing and operating the Pacific Ocean system.

The tsunami warning system is composed essentially of an internationally run detection/alert system and the nationally run warning systems. IOC provides a governance structure to link the international component and the national components. Tsunamis, especially distant tsunamis, propagate through the high seas traveling at up to 800 km/h, where they can be detected thanks to the networks of instruments. These networks, operated by national agencies from the Member States of IOC, are coordinated by IOC under the principles of international cooperation and the open, free and unrestricted exchange of data and information. Accordingly, data and information are available to the operational centers where they are processed and information is distributed to participating countries according to pre-established protocols.

The high seas are an "international space" lacking a clear authority with jurisdictional responsibilities. However, tsunamis affect countries where the national authorities have responsibilities to warn and protect populations and property under their jurisdiction. It is incumbent only upon national authorities to issue warnings in the territory under their jurisdiction. These relationships define clear responsibilities.

Accordingly, one key element of the tsunami warning system is the designation by governments of a National Agency, with operational capabilities (24 hours a day, 7 days a week), to act as the National Tsunami Warning Centre. Its functions are to liaise with the international warning/detection system on the one side, and with the national competent authorities dealing with civil defense and emergency relief, on the other.

The system also requires a governance mechanism that enables and facilitates the articulation between the international detection/warning system and the national warning system, handled by national governments. In the case of the Pacific Ocean, this governance mechanism was established through the adoption of an IOC Resolution by the IOC Assembly (129 member states) specifying the duties and obligations of the participant members. As with other services run internationally, for example in meteorology, it would be wise that the governance text adopted establishes that those national officers who are responsible at the national operational agency/center should be the same as those who represent their nations at the international level. In the case of the Pacific Ocean, the International Coordination Group of ITSU meets every year and reports on its activities to the IOC governing bodies.

The existence of sub-regional centers in the Pacific Ocean is based on a strong technical requirement of the detection system. The detection system, based on the best science and technology of today, enables the detection of "distant tsunamis" and therefore the issue of a secure warning to distant places. However, a distant tsunami also generates a "local tsunami" for which there is no proven tool to confirm the

presence of a tsunami in a short time-lapse between its generation and the moment it touches the adjacent coast. For local tsunamis, the time to issue a warning is very short indeed and the protection of the population depends almost exclusively on preparedness. This also provides a fundamental reason why local authorities (authorities from the land closest to the tsunami generating point) must take full responsibility in issuing a warning to their populations (or ordering evacuations or other actions).

In the Pacific, there are five sub-regional centers with the responsibility to issue this warning in the sub-regions under their jurisdiction. The establishment of a sub-regional center requires approval by all the countries participating in the system and, in particular, the elevation of a National Tsunami Center to the status of a sub-regional center must have the consent of the countries over which the Center will have jurisdiction to issue the warnings. It should be noted that, as far as the entire Pacific basin is concerned, it is only the Hawaii center that can truly be called "regional". It never issues warnings to individual countries but passes on warnings to the sub-regional centers, which alone have the authority to transmit the information to the countries within their jurisdictions.

In this context, and given the number of initiatives that have been put forward by different nations, the design of the Indian Ocean system could benefit from a more "network-centric" approach and will certainly require the establishment of more than one sub-regional center in the system and the designation of one as the regional center.

Ladies and Gentlemen,

UNESCO's IOC has proposed a strategy to make this regional effort the first step in building a Global Tsunami Warning System. Tsunami risk exists in all ocean basins to different degrees. This proposal is consistent with the long-term goal of IOC to establish a Global Ocean Observing System, that can underpin a variety of ocean services world-wide.

In the Master Plan of the Pacific Tsunami Warning System, presented to the tenth IOC Assembly and published in 1999 in four languages, one finds a sober assessment of the achievements and limitations of the system: "The present system of warning centers has gaps in its coverage. Southeast Asia, the southwest Pacific, and Central and South America have no regional tsunami warning centers. Yet these areas are extremely vulnerable … In addition, although PTWC provides warning for distant tsunamis crossing the Pacific Ocean, there are no corresponding centers to warn against tsunamis crossing most of the Pacific's marginal seas." In hindsight, concentrating on a single use warning system for the Pacific basin is a strategy that has shown limitations. Let us not repeat the same mistake today.

The sensible way to proceed is to develop a tsunami warning system fully embedded in the global, operational ocean observing system that is regularly used for other related hazards, such as storm surges and cyclones. Storm surges associated with tropical cyclones can hit coastal areas well ahead of the landfall of the actual storm, with nearly the same rapidity as tsunamis, but they occur much more frequently. For unprepared and unwarned populations, they can be equally deadly. In 1970 and again in 1990, for example, 6 to 7 meter high storm surges associated with large cyclones struck Bangladesh and resulted in about half a million deaths.

The GLOSS tide gauge network can provide vital information for model validation and data assimilation in high-resolution models employed for storm surge prediction. The same high-resolution coastal bottom topography data needed for tsunami run-up and inundation maps is also required for storm surge impact modeling.

Responding to an appeal from the World Summit on Sustainable Development in Johannesburg (2002), a group of nations have committed themselves to build, in ten years, a Global Earth Observation Systems of Systems (GEOSS). This metasystem is aimed at integrating space-based (i.e. satellites) and "in situ" observations covering the land, the ocean, the atmosphere and ecosystems. A major driving force behind GEOSS is the need to provide early warning of natural disasters such as tsunamis as well as earthquakes, floods and storm surges. The value added of GEOSS is that, through its comprehensive and integrated architecture, the limitations of single systems can be overcome and the benefits of multipurpose usage can be maximized. It therefore makes every sense to develop a global tsunami warning system as part of the GEOSS architecture. Far from promoting a huge, single, centralized system, the goal is to integrate the existing efforts in an architecture that allows for the many specialized environmental, meteorological and oceanographic services to be run by the corresponding responsible agencies on a 24 hours a day, 7days a week regime, but benefiting from a strong synergy and a continuous upgrading of their components. The Indian Ocean tsunami warning system will be an early example of a coordinated and sustained effort in the family of systems foreseen in GEOSS.

There is a strong indication that the participating countries in GEOSS wish to make a global disaster warning system one of its priority objectives. The synergies between existing and new systems will make possible a multi-hazard approach that should improve the cost-effectiveness and long-term sustainability of the overall system. A number of early warning systems are already operating in the United Nations for areas such as drought, pests, floods, landslides, health and weather.

In response to the Indian Ocean tsunami, GEOSS adopted a declaration supporting the coordination efforts that UNESCO and IOC are leading on behalf of

the UN system. GEOSS now has a unique opportunity to prove the validity of the concepts underpinning its design.

I sincerely hope that you will be able to agree upon a common plan and timetable to implement the tsunami warning system of the Indian Ocean. The deployment of such a tsunami warning system by June 2006 is realistic under the condition of using the existing networks of instrumentation and communication links, working on their immediate upgrading and establishing the national warning centers as a first priority. Together with the World Meteorological Organization, we intend to contribute to this immediate goal.

The implementation of preparedness plans based on up-to-date tsunami hazard assessments will take more time and the incremental improvement of the system should be planned in close association with the development of a global system, which should be in place by June 2007.

Excellencies,
Ladies and Gentlemen,

We are honoured by the requests made to UNESCO and its Intergovernmental Oceanographic Commission to provide the needed leadership in coordinating the establishment of a tsunami early warning system in the Indian Ocean. I feel that your positive response to our invitation to come to this meeting provides us with a very good concrete first step in this direction.

Thank you.