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UNITED NATIONS EDUCATIONAL,
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INTERNATIONAL ADVISORY COMMITTEE
ON EARTHQUAKE RISK

Second session,
Paris, 9-12 October 1978

REPORT

1. Introduction

In consultation with the United Nations Disaster Relief Co-ordinator, the Director-General of Unesco convened the second session of this Committee at Unesco Headquarters in Paris on 9-12 October 1978.

The following members of the Committee were present: Messrs. C. Allen, N.N. Ambraseys, D. Bensari, Ku Kung-hsu, A.A. Moinfar, T. Rikitake, E. Rosenblueth and J. Tomblin. Messrs. J.E. Cudjoe and S.V. Soloviev were unable to attend. The meeting was also attended by one consultant, by a representative of UNEP, by observers representing seven international organizations and by members of the Secretariats of Unesco and UNDRO. A full list of the participants is given in Annex I.

2. Opening of the meeting

The second session was opened by the Assistant Director-General for Science, Mr. A.-R. Kaddoura. After welcoming the members of the Committee, consultants and observers, Mr. Kaddoura referred to the major losses of life which had occurred during the past year, especially in Iran, which illustrated the need for continued efforts to mitigate earthquake disasters. He stated that the agenda for the present meeting differed from that of the first session (1977) in that it invited not only proposals for future activities, but also comments on the execution of the recommendations made in 1977. Mr. Kaddoura drew attention especially to agenda item 10 and said that although a majority at the Intergovernmental Conference on Earthquake Risk and Mitigation in 1976 did not favour the establishment of intergovernmental machinery for this purpose at that time, it would be appropriate for the Advisory Committee to consider whether this might now be desirable. He noted the support of UNDRO equally with Unesco for the Advisory Committee, and welcomed the two representatives of UNDRO and the representative of UNEP.

On behalf of UNDRO, the Director of Relief Co-ordination, Preparedness and Prevention, Mr. E.E. Anderson, endorsed the close co-operation which exists between UNDRO and Unesco and referred to a Memorandum of Understanding which is shortly to be signed by the two organizations. He stated that UNDRO had undergone a reorientation of policy and had adopted a new structure in January 1978. Among the three types of activity undertaken by UNDRO, the emphasis is now placed more strongly on relief, with the following estimated distribution of resources:

relief co-ordination	60 per cent
preparedness	30 "
prevention	10 "

Mr. Anderson described the proposed establishment of a new voluntary trust fund for disaster preparedness, which it was hoped would receive strong support at the next United Nations General Assembly in 1979, to create an annual budget of the order of US $25 million, of which the United States might contribute some US $5 to 7 million. The new policy of UNDRO would be to distribute aid primarily in the most severely affected areas and among the less developed countries. The expenditure by UNDRO from its sub-account for technical co-operation for the biennium 1976-1977 amounted to US $260,783. It was particularly pleasing that several contributions to this fund had been received recently from very poor countries. A tentative future programme and arrangements for the administration of the new trust fund had been made in an inter-agency meeting in May 1978.

Mr. Anderson stated that UNDRO was short of staff, with only fourteen positions filled out of an establishment of twenty-five. There exists a need for specialists in the applied sciences.

3. Elections

The Committee re-elected, by unanimous decision, the same officers as for its previous session, namely:

Chairman:	Professor Tsuneji Rikitake (Japan)
Vice-Chairman:	Dr. Ali Akbar Moinfar (Iran)
Rapporteur:	Dr. John Tomblin (Trinidad and Tobago)

4. Agenda

The meeting had before it the following agenda:

1. Opening of the session by the representative of the Director-General.

2. Address by the representative of the United Nations Disaster Relief Co-ordinator.

3. Election of Chairman (Article 5, paragraph 2 of the Statutes of the Committee).

4. Election of Vice-Chairman and Rapporteur.

5. Review of action taken by Unesco since the previous session of the Committee.

6. Review of action taken by UNDRO since the previous session.

7. Review of action taken by other international organizations since the previous session.

8. Discussion of the Draft Programme and Budget of Unesco for 1979-1980 (document 20 C/5, paragraphs 2294-2314).

9. Discussion of UNDRO programme for 1979.

10. Intergovernmental machinery for the management and reduction of earthquake risk (resolution 12.21, operative paragraph 4, of the Intergovernmental Conference on the Assessment and Mitigation of Earthquake Risk).

11. Adoption of report.

12. Date and place of next session.

5. Review of action taken by Unesco since the previous session of the Committee

A written summary of the action taken by Unesco (document SC-78/505/3) was submitted by Mr. Fournier d'Albe. This consisted of 11 items, each of which was reviewed orally by Mr. Fournier d'Albe and then opened to discussion by the Committee. The full contents of the written summary are given in the inset portions of sections 5.1 to 5.11 and are followed by the main additional points of Mr. Fournier d'Albe's verbal presentation and a review of the discussion where this developed.

5.1 Assistance to the Inter-Union Commission on Geodynamics

Financial assistance was provided to the ICG for holding three meetings on subjects relevant to the earthquake problem:

(i) "The geodynamics of the Western Pacific-Indonesian region", held in Tokyo on 13-17 March 1978;

(ii) "The tectonics and magmatism of the Rio Grande rift" to be held in Santa Fe on 8-17 October 1978;

(iii) "Geological and geophysical studies in the Pamir-Himalaya region", held in Leningrad on 2-11 October 1978.

Mr. Fournier d'Albe explained that the financial assistance amounted to $10,000 in 1978 under a contract for the three meetings involved.

5.2 Assistance to the International Centre on Recent Crustal Movements

The International Centre on Recent Crustal Movements received financial assistance under contract, particularly for the collection of data regarding contemporary movements, both vertical and horizontal, of the earth's crust in the Alpine and Carpathian regions of Europe.

This Centre, set up after the IUGG Assembly in 1975, and based in Prague, has received an allocation of $1,500 in 1976-1977 and a similar amount in 1978.

5.3 Annual Summary of Information on Natural Disasters

No. 10 of this Annual Summary, covering the year 1975, was prepared for publication. Due to the difficulty of collecting information and to the shortage of staff, it has been decided to discontinue this publication. However, arrangements have been made with the International Seismological Centre whereby the ISC will prepare and publish, under contract with Unesco, an annual World List of Felt and Damaging Earthquakes. Although the format will be different, this list will contain essentially the same information and data as did the Annual Summary.

The Annual Summary was initiated at the request of, and to replace, the publications of the International Relief Union which had appeared from the 1920s until 1965 when the Union's existence ceased. It was explained that the International Seismological Centre would publish the relevant earthquake data, covering the years from 1976 onward; a contract for $6,000 had been concluded with the ISC for the publication of a World List of Felt and Damaging Earthquakes in 1976. Mr. Adams, present as observer for the ISC, confirmed that the Centre was glad to do this.

Among the other types of disaster, information on tsunamis was already being provided by the International Tsunami Information Centre, and on volcanoes by the Smithsonian Scientific Event Alert Network. Landslides had in the past been covered by the International Association of Engineering Geology, although the extent of this coverage had recently declined. No prospect existed for the continued review of snow avalanches.

The annual cost of the latest Unesco Annual Summary had been $9,000 for printing alone, and the readership had been about 1,000.

It was pointed out that volcanic activity had also been reviewed for many years in the Bulletin of Volcanic Eruptions, produced jointly by the Volcanological Society of Japan and the International Association of Volcanology.

5.4 Proposed Global Seismic Data Bank

Following a resolution adopted by the IASPEI General Assembly in Durham (August 1977), the IUGG requested Unesco's assistance in convening a meeting of experts to discuss the need and the feasibility of creating a Global Seismic Data Bank, to serve as a central depository and source of information and data, both descriptive and instrumental, on past earthquakes throughout the world.

This meeting was held, under the joint auspices of Unesco and IASPEI, at Unesco Headquarters on 20-23 March 1978. It was attended by ten experts from seven countries. Copies of the report of this meeting are available, for study and discussion by the present Committee.

The report by the IASPEI meeting of experts on the above subject was circulated for discussion. It was noted that the estimated cost was $300,000 per annum for the first five years.

The Committee considered that this proposal was an important one and merited serious consideration by Unesco. Dr. Adams said that the ISC would be willing in principle to assume responsibility for setting up such a global data bank (as a matter of fact, the ISC had already a large volume of such data in its archives), provided that the additional financial resources required were made available to the ISC. In view of the magnitude of the funds apparently required, the Committee felt that Unesco would do best to proceed gradually. A first step might be to ask one or two consultants to undertake in 1979 a detailed feasibility study on the establishment of the proposed data bank under the wing of ISC. It seemed likely that, in any case, the data bank would have to grow slowly, because the inflow both of financial resources and of the data would probably be gradual.

The need exists for studies of past seismicity, both from the scientific aspect and for the estimation of seismic risk for purposes of civil preparedness, engineering, and insurance, and for such studies a file of historical earthquakes is required which is as complete as possible. The Committee recommended that Unesco start negotiations with the International Seismological Centre as soon as practicable with a view to providing a contract to enable the Centre to upgrade its file of historical earthquakes, and to facilitate the inclusion of additional information. It was also recommended that Unesco assist other institutions to prepare and publish original catalogues of historical earthquakes for inclusion in the data bank.

5.5 Earthquake Reconnaissance Missions

At the request of the Government of Iran, a mission of two experts (N.N. Ambraseys and M. Arzovski) was sent to that country to assist in studying the effects of the Zarand earthquake of 20 December 1977. A further request for a mission was received after the Tabas earthquake of 17 September 1978, but due to difficulty of access to the epicentral area, this mission has been postponed until later this year.

Following the series of earthquakes which occurred near Thessaloniki in May, June and July this year, the Greek Government requested Unesco to send a mission of experts to advise on the creation of a National Institute of Earthquake Engineering and Engineering Seismology. This mission (V. Karnik, J. Prince, R.I. Skinner) visited Greece on 16-30 August 1978 and its report has already been submitted to the Government.

On the Tabas earthquake, Mr. Moinfar, who had been in the area up to 6 October 1978, gave a review of the latest statistics. The two most notable scientific features were firstly that it had occurred in an area which had been relatively aseismic and which contained mosques which had stood for up to 1,000 years prior to their collapse on 17 September 1978. Secondly, the event was notable for the large number of strong motion accelerograph records which indicated a peak acceleration of about 80 per cent g.

Mr. Moinfar indicated that help from Unesco would be welcome in the form of organizing a study mission which would review in detail all historical data for the area, as well as providing assistance with the interpretation of the strong-motion accelerograph records. The services of one seismologist, one specialist in historical seismicity and one earthquake engineer would be desirable. Mr. Ambraseys endorsed the importance of relocating previous instrumental events, and of analysing the historical record in detail. Mr. van Essche said that UNDRO would like to be associated with such a mission for the evaluation of pre-disaster planning and relief aspects of this earthquake.

The series of events in Thessaloniki from May to July 1978 were described by Mr. Fournier d'Albe. The most notable feature of this activity was that a slightly damaging event on 20 May had been followed a month later by a stronger shock which did considerable damage, including the collapse of one high-rise apartment building. This gave rise to a popular rumour that a third shock would occur on 20 July, which was the date of the next full moon. As a result, there was a voluntary and massive exodus from Thessaloniki, with serious economic and social repercussions. In an attempt to re-establish the confidence of the population, the Prime Minister of Greece transferred his office temporarily to Thessaloniki and set up a committee including foreign experts, before 20 July. The event predicted (non-scientifically) for 20 July did not take place, but a decision was made to create, by government decree, a National Institute of Earthquake Engineering and Engineering Seismology. The sequence of events provides an unusual and interesting case of public response to, and management of, a non-scientific prediction.

In response to a question, it was stated that the Greek Government did not ask the scientists who met before 20 July to predict whether a third large earthquake would occur. One of the scientists stated that specific prediction was almost impossible, especially with the very few scientific observations then available. This itself was a useful source of relief and assurance.

The Romanian earthquake of 4 March 1977 was then described by Mr. Ambraseys. The event appears to have been closely similar to a previous one on 10 November 1940. However, the extent of the damage was much greater in 1977, with direct losses of at least $1,500 million, mostly to medium- and high-rise buildings suffering from ageing, or in which the original structure had been modified and thereby weakened. From the scientific and risk viewpoint, this event was of special significance in that it was much deeper (110 km) than usual for the Balkan region, and in that the response spectrum with peak acceleration at a very long period (1.6 sec.) was very different from those currently used for design purposes. It was noted that an even larger (magnitude 8.3) intermediate-depth earthquake had occurred south of this region, in the eastern Mediterranean in 1928.

In response to a question, it was stated that Unesco normally earmarked $20,000 per annum for reconnaissance missions.

5.6 International Workshop on Strong-Motion Instrument Arrays

Following a decision taken by its Executive Committee in New Delhi (January 1977), the IAEE convened in Honolulu in May 1978, with the financial assistance of Unesco and of the United States National Science Foundation, a workshop on strong-motion earthquake instrument arrays which was attended by 63 seismologists and earthquake engineers from 15 countries. The workshop produced a detailed and substantial report containing recommendations for the installation of such arrays in various parts of the world. The implementation of these recommendations will demand considerable financial resources, but their scientific interest is certain.

This workshop resulted in a report of about 100 pages in draft form, recommending a world-wide installation programme costing several million dollars and including suggestions regarding types of array, areas and locations. This amount far exceeds the capacity of Unesco's Earth Sciences budget, and the implementation of these recommendations will be conditional on financial support from other sources.

5.7 Basic Concepts of Seismic Building Codes

The IAEE has undertaken the preparation of a comprehensive monograph on the basic concepts of seismic building codes, which it is hoped will be ready for publication before the next World Congress of Earthquake Engineering (Istanbul, September 1980). Unesco has provided financial assistance to the IAEE, through contracts, for meetings in 1978 of the three subcommittees which are charged with preparing the texts: on seismic zoning (in co-operation with IASPEI), on the idealization of seismic actions, and on non-engineered construction.

It was noted that Unesco has provided $5,000 in 1978 for meetings of the three subcommittees concerned with this question. In addition to being involved in this activity, the International Association issues a world list of building codes and has helped to promote regional training courses which include topics related to earthquake-resistant building codes.

5.8 Regional Seminars and Conference on Earthquake Engineering

The sixth regional seminar on earthquake engineering, held under the auspices of Unesco and of the European Association of Earthquake Engineering, was held in Primorsko (Bulgaria) on 2-15 September 1978. It was attended by 32 students from 9 countries, and lectures were delivered by leading experts from Bulgaria and from six other countries.

Unesco provided $9,000 for this seminar, and contributed $3,000 to the First Caribbean Conference on Earthquake Engineering held in Trinidad in January 1978.

5.9 Seminar on Earthquake Hazards and Insurance

Plans are well advanced for the holding by Unesco, in co-operation with the National University of Mexico, of an international seminar on earthquake hazards and insurance in Cocoyoc (Mexico) on 4-8 December 1978. This seminar will be attended by about 20 insurance specialists and about 20 seismologists and earthquake engineers. It is hoped that there will be a useful dialogue between the different professional groups and that it will lead to a reinforcement of co-operation between the insurance industry and institutions concerned with research in seismology and earthquake engineering.

Copies of the provisional programme for this seminar were circulated. It will consist of four themes as follows:

1. Present situation of earthquake insurance.
2. Loss assessment and prognosis.
3. Earthquake hazard.
4. Proposed pilot study of earthquake risk.

The sum of $15,000 has been allocated by Unesco for the travel and subsistence of the 20 seismologists and earthquake engineers who have been invited to attend.

It was commented that in certain parts of the Caribbean region, considerable interaction had occurred between reinsurance, insurance, government and scientific authorities as a result of recent large increases in insurance premiums where no earthquake-resistant regulations exist and where very poor construction methods are followed. The introduction of large differential in premium according to type of construction has produced a new motivation towards better construction.

5.10 International Symposium on Earthquake Prediction

The response to the Announcement and Call for Papers for this symposium (Paris, 2-6 April 1979) has been very satisfactory. Over 100 papers have been submitted, covering both the scientific and social aspects of earthquake prediction, and attendance at the symposium is expected to exceed 150.

The Organizing Committee for the symposium met at Unesco Headquarters on 2-4 October 1978 and drew up the final plans and programme.

The symposium will be followed, on 9-11 April 1979, by a meeting of a Panel of Experts composed of the members of the Organizing Committee, the Chairmen of sessions and the authors of the basic review papers, in order to discuss the results of the symposium and to formulate recommendations for further action by Unesco in this field.

The report of the Organizing Committee for this symposium (document SC-1697/3) listing titles of the papers provisionally accepted under the seven different themes, was circulated. Unesco expects to spend about $30,000 on travel, up to $15,000 on simultaneous interpretation and up to $25,000 on the publication of the proceedings.

Mr. Adams informed the meeting that a seminar on social and economic effects of earthquake prediction in New Zealand in October 1977 had received impetus from the recommendations of the Unesco Intergovernmental Conference on Earthquake Risk Assessment and Mitigation in 1976.

5.11 Working Group on the Seismicity of the Ibero-Maghreb Region

Following a recommendation adopted at the meeting of this group held in Madrid in June 1977, a second meeting will be held to discuss and plan in detail the preparation of an earthquake catalogue covering the five countries of this region, based on revised national catalogues. This meeting, originally planned for September 1978, will now be held in January 1979.

In response to a question, it was stated that Unesco has made no specific plans to contribute to the cost of publishing the catalogue.

5.12 Review of Action in Response to the Specific Recommendations of the First Session of the Advisory Committee

In reviewing the above recommendations (document SC-77/CONF.501/2, page 12), it was noted that Unesco had:

(1) supported IASPEI in carrying out the feasibility study for the global seismic data bank;

(2) organized the International Symposium on Earthquake Prediction in 1979;

(3) not yet promoted any case study on the effect of building codes in reducing damage. It was however noted that comprehensive studies had been made, with some support from Unesco through CERESIS, on the effects of the San Juan (Argentina) earthquake of November 1977. It was hoped that a detailed study would be made of damage in the Thessaloniki events of May and June 1978;

(4) initiated studies on problems of insurance against earthquake risks, by means of the seminar in Mexico in December 1978;

(5) not yet organized seismic zoning and micro-zoning seminars. It was noted that seminars were to take place, independently of Unesco, on micro-zoning and prediction in Lima in October 1978, organized by the OAS and the Instituto Geofísico del Perú, and in San Francisco in November 1978, sponsored by the National Science Foundation and other organizations;

(6) provided expertise to advise on earthquake-resistant building codes by contributing to the travel costs for three foreign specialists to attend and give keynote addresses at the First Caribbean Earthquake Engineering Conference in January 1978, at which the discussion of regional codes was one of the main topics;

(7) supported interdisciplinary training and studies in numerous recent seminars;

(8) not yet produced audio-visual material on earthquake risks. The question was discussed as to what type of audio-visual material Unesco or UNDRO could produce in the future. It was noted that films are one of the most effective media for public education, being suitable for presentation either to live audiences or on television. It was stated that three films on earthquakes have been donated to Unesco. On the possibility of having films made commercially for Unesco, Mr. Fournier d'Albe said that he thought that this would be expensive but it could be investigated. One Committee member said that suitable material existed on film (without sound) in his own and probably in other scientific institutions, and that the main work involved may consist only of editing plus the addition of sound, which would be less costly. It was noted that at least one film on earthquake hazards and prediction had been made recently in a specialized university audio-visual research department, and that this possibility for producing further educational films on earthquakes could be investigated. It transpired that several films on earthquake risk and mitigation existed but were known to only one or a few members of the Committee. It was therefore recommended that Unesco compile and circulate an inventory of available films on the subject, with details of language, duration, format and the source from which they could be obtained on loan. It was stated that UNDRO had planned to make a film on preparedness and relief, and that perhaps a joint UNDRO-Unesco film would be possible, which might include earthquakes plus other disasters. The LICROSS observer reported that the League also makes films and has an audio-visual section which could possibly co-operate with those of Unesco and UNDRO. He mentioned that commercial film-makers are often willing to donate clips from their archives.

6. Review of action taken by UNDRO since the previous session

The UNDRO representative stated that the re-examination and the reorientation of UNDRO's policies toward a stronger emphasis on disaster preparedness and relief, and the subsequent redeployment of the office staff in January of this year, had led to a revision of structure and a period of readjustment, which inevitably took time. The action taken by UNDRO on the Committee's previous recommendations were therefore necessarily modest.

The "State of the Art" series of studies in disaster prevention and mitigation continued, albeit at a somewhat less rapid pace. The Committee noted the value of this series in providing guidance to planners, government officials and interested members of the public in disaster-prone developing countries on essential measures to adopt for disaster preparedness and prevention. Thus far, six out of twelve monographs had been published (volcanology, hydrology, meteorology, seismology, land use and public information), six studies were in preparation (social aspects, legal aspects, engineering, sanitation, preparedness and vulnerability analysis).

The policy and strategy of UNDRO's technological co-operation programme was being revised with a view to strengthening preparedness measures in the least developed and most seriously affected countries. This programme change had somewhat slowed down UNDRO's technical advisory services in the first half of 1978, but a new series of exploratory missions had begun.

UNDRO's activities in disaster relief co-ordination, on the other hand, had been substantially stepped up, particularly in the wake of the recent floods in Asia and Africa. The Committee was reminded, however, that assistance in any form, be it in relief or pre-disaster planning, was contingent upon the host government requesting such assistance. There was no UNDRO involvement in the recent earthquake in Iran, although the office monitored the situation through the UNDP Resident Representative in Tehran.

7. Review of action taken by other international organizations

The representatives of ICOLD, ISC, ISSC, LICROSS and UNEP gave a review of the action taken by their respective organizations since the previous session. Summaries of these statements are given in Annex II to this report. The Committee took note of them with appreciation.

8. The Draft Programme and Budget of Unesco for 1979-1980

Mr. Fournier d'Albe introduced and commented on the section of the Draft Programme and Budget of Unesco for 1979-1980 dealing with the earthquake problem (paragraphs 2293-2311 of document 20 C/5). He emphasized the relation between this two-year programme and the Medium-Term Plan of Unesco, and explained how the work on natural hazards (including earthquakes) is fitted into the overall programme of the Organization under Objective 7.1 (Studies of the earth's crust and its mineral resources). He also explained the timetable for the preparation of document 20 C/5, which would be submitted to the General Conference of Unesco at its twentieth session this year. The Committee was also informed of the activities carried out and planned by the Division of Cultural Heritage for the protection of monuments in seismic areas under Objective 7.6.

Mr. Popyrin informed the Committee of UNEP's concern with the problem of natural disasters and of its particular interest in early warning and preparedness to meet them (see Annex II). UNEP was ready to co-operate with Unesco in this field and would participate in the forthcoming symposium on earthquake prediction and in the meeting of the Panel of Experts which would follow the symposium.

The question was raised as to why the multidisciplinary activities relating to earthquakes were presented in the Unesco programme under Objective 7.1 which concerned mainly geology and mineral resources. Mr. Fournier d'Albe admitted the logic of this was perhaps not clear, but that it derived from the fact that the natural hazards programme had started as a programme in seismology, directly related to geology and geophysics and that it had only gradually developed into a multidisciplinary programme. He agreed that this question needed further study, particularly when the time comes for preparing the medium-term programme of Unesco for the 1980s.

The Committee agreed that, given some degree of flexibility in the execution of the activities mentioned in this section, and given the budgetary constraints under which Unesco has to operate, the Draft Programme for 1979-1980 is in line with the recommendations formulated by the Committee at its first session.

9. Discussion of UNDRO Programme for 1973

In introducing this item, the UNDRO representative reminded the Committee of the importance UNDRO attached to its work.

Mr. van Essche recapitulated a number of points relating to UNDRO's role within the United Nations system. He emphasized the importance of inter-agency collaboration and referred to the Memoranda of Understanding which UNDRO had signed with a number of Specialized Agencies within the United Nations system. The signing of such a Memorandum of Understanding between UNDRO and Unesco was imminent and would give formal recognition to the division of responsibility which the two organizations had between them.

The Committee was reminded of the allocation of resources within UNDRO since its reorganization (60 per cent to relief co-ordination, 30 per cent to preparedness, and 10 per cent to prevention). In this context, Mr. van Essche explained to the group what UNDRO understood by "preparedness" and prevention, and why there had been a policy shift in favour of disaster preparedness. While UNDRO clearly intended to preserve its catalytic role in prevention, it was felt that more effective co-operation could be established if the scientific and technical responsibilities of prevention remained within the agencies concerned. Mr. van Essche referred to Unesco's lead role in seismology, earthquake engineering, earthquake prediction, and so on, and to WMO's role in meteorology for example. UNDRO saw its role in the interface between science and planning, and also between science and practical measures to mitigate risk.

UNDRO currently emphasized its responsibility for preparedness in order to present disaster-prone developing countries with a tangible, short-term alternative to disaster mitigation, pending the impact of long-term, capital-intensive, technical measures. UNDRO's present priority lies in assisting governments in organizing effective social and organizational measures to bring rapid rescue and relief in situations where populations are exposed to inevitable risk. There is nevertheless a large measure of overlap between preparedness and prevention, and it is UNDRO's view that advances in earthquake risk analysis and earthquake prediction will be relevant to both areas of planning.

In this respect risk analysis remains an important area of concern to UNDRO. Mr. van Essche appealed to the Committee for technical guidance in this field.

Mr. Allen wondered how UNDRO obtained its technical advice in risk analysis. He felt that the Manila study, for example, was only partially complete in that it concentrated on probable ground response, but did not fully evaluate the seismicity of the Manila area in general.

Mr. van Essche replied that an attempt had been made by UNDRO to translate into straightforward planning language an evaluation of the ground response factor in the event of an earthquake. This may have been an insufficient approach admittedly, but the object of the exercise was to examine how risk could be expressed in terms suitable for practical application in land use planning.

Mr. Ambraseys and Mr. Rosenblueth felt that the concept and awareness of risk was one that concerned the community as a whole, and not the scientist or technician alone. The scientific uncertainties which still beset earthquake risk evaluation and prediction demand that extreme caution be taken when trying to estimate the probability of disaster. Mr. Bensari however pointed out that whatever the scientific uncertainties, some risks were sufficiently obvious to justify improvements to building construction regulations and methods for example. Mr. van Essche said that the two views were easily reconciled and that they clearly pointed to the need for both public education and the technical consideration of earthquake risk in UNDRO's programme.

In outlining UNDRO's proposed technical co-operation programme for the next biennium, Mr. van Essche drew the Committee's attention to the criteria set in providing assistance, namely to the most severely affected and least developed disaster-prone countries, with the emphasis placed upon building up national, regional and local preparedness (civil defence) services.

Assistance in preparedness would aim at creating national preparedness in the first instance, although regional co-operation for technical advances could be considered, an example being the proposed Unesco project to establish a seismological network in East Africa.

Mr. van Essche briefly ran through UNDRO's projected programme by region and by country in so far as earthquake risk mitigation was concerned. Mr. Bensari inquired whether UNDRO's budget for technical assistance was specifically divided up between equipment, training and experts, or between relief, preparedness and prevention.

Mr. van Essche replied that each request was reviewed on its merits, and that there was no hard and fast rule. However, every attempt was made to work to the policies and priorities established by the co-ordinator. In the present situation, UNDRO had about $250,000 in its technical co-operation sub-account, and this money was earmarked for the exploratory field work referred to above. If the proposed preparedness fund was established, equipment would probably form an important component of assistance. UNDRO will report on the progress of its technical co-operation programme and the fund at the next meeting of the Committee.

10. Intergovernmental machinery for the management and reduction of earthquake risk

The background to this subject was reviewed by Mr. Fournier d'Albe. He stated that the earthquake risk programme had developed since 1964, within the Division of Earth Sciences. At the Intergovernmental Conference in 1976 (resolution 12.21, paragraph 4), it was envisaged that one of the tasks of the present Advisory Committee would be to consider and advise on what intergovernmental machinery would be advisable. Mr. Fournier d'Albe said that it was possible that the subject would be brought up for discussion at the forthcoming General Conference of Unesco in November 1978.

Examples were given of the two types of intergovernmental machinery in other scientific fields within Unesco. The first is a commission, such as the International Oceanographic Commission. This is a co-ordinating and planning body which any Member State may join, with its own secretariat at Unesco. The IOC secretariat, of about 10 professional staff, includes three staff members of other United Nations organizations. The Unesco budget represents only a very small part of the total funds spent on projects planned and launched by IOC.

The second type of intergovernmental body is an intergovernmental programme, such as that on "Man and the Biosphere" (MAB). This is managed by an Intergovernmental Co-ordinating Council of representatives of Member States, elected by the General Conference of Unesco. Unesco provides a secretariat, funds, and plans the outline programme, while national MAB committees plan their activities in detail. A possible shortcoming of an intergovernmental programme, in the case of earthquakes, is that there would be no guarantee that the most actively interested countries would be represented on the Co-ordinating Council. As with a commission, Unesco's financial input is multiplied typically 10-50 times in total expenditure on programmes.

Individual members of the Advisory Committee then gave their comments, with particular reference to the request from the Unesco Secretariat, issued when the present meeting was announced, that they should seek the opinions of their respective governments on the establishment of intergovernmental machinery for earthquake risk and related studies. In every case where government response had been obtained, this was favourable or at least expressed willingness to consider new proposals. However, it was pointed out that several government authorities had raised the question of what new financial commitments would be involved, and details had been requested of how the machinery would operate. Some of the Advisory Committee members expressed personal concern that the scientific emphasis which existed in the present Unesco earth science programme, should not be lost beneath a heavy administrative system.

It was noted that several fundamental issues had arisen in seismology and related fields in recent years, which could appropriately become the business of an intergovernmental commission. In particular, there were the important questions of the future affiliation of the International Seismological Centre, the creation of a Global Seismic Data Bank, a Strong-Motion Data Bank, and the co-ordination of regional programmes of seismic monitoring and risk studies in several parts of the world.

It was pointed out that seismologists and earthquake engineers have assumed greatly increased social responsibilities in the last few years, because of the possibilities for substantially reducing the enormous human and economic losses due to earthquakes, and also because of the very high rate of increase in exposure of populations and property to earthquake damage. In most regions of the world, with the notable exception of China, there has not been a corresponding increase in scientific efforts or in public education to mitigate these increased risks. It was agreed that the time is ripe to create new machinery such as an intergovernmental commission to stimulate and co-ordinate government action in the numerous disciplines involved. There is at present no intergovernmental body in existence other than Unesco and UNDRO which could undertake the responsibility for planning and guiding an earthquake risk programme. Even though the WMO, for example, had recently added the transmission of seismic data to its services, the present constitution of WMO did not easily permit that Organization to cover work on the engineering, social and economic aspects of earthquake risk and prediction studies. Unesco had demonstrated its ability to provide a limited but highly effective service of this kind in the past, and would be the logical parent agency of an expanded co-ordinating body such as an intergovernmental commission. It would be simple for such a commission to incorporate one or more representatives of other United Nations agencies into its secretariat. Mr. van Essche stated that UNDRO would wish to be closely associated with such a scheme, and would therefore be in favour of its creation, particularly in the light of the proposed international preparedness trust fund. It was agreed by the Advisory Committee that an intergovernmental commission would fulfil the necessary functions better than an intergovernmental programme.

11. Date and place of next meeting

The Secretary consulted the Committee with regard to a suitable date for its next session. The week beginning 24 September 1979 was tentatively agreed as convenient to all members. The place of the meeting (Paris or Geneva) will be decided by Unesco and UNDRO in due course.

12. Summary of recommendations

The main actions recommended in this report are as follows:

(1) that a Global Seismic Data Bank be established as an extension of the specialized services already provided by the International Seismological Centre, and that Unesco support a feasibility study of this in 1979 (see section 5.4 for details);

(2) that a study mission be sent to examine and report on the seismological details and engineering effects of the earthquake of September 1978 in Tabas, Iran, this mission to be organized by Unesco in association with UNDRO along the lines requested by the Government of Iran (see section 5.5);

(3) that Unesco and UNDRO encourage, and if requested assist, the Government of Greece to make a thorough study of the Thessaloniki earthquakes of May and June 1978 (see section 5.5);

(4) that Unesco compile an inventory of available documentary films suitable for public showing and which provide useful information on earthquake occurrence, risk and risk mitigation. It was also recommended that Unesco and UNDRO investigate the possibility of making or commissioning one or more films (see section 5.12);

(5) that UNDRO, in co-operation with Unesco, continue to produce publications containing practical guidelines for government officials, planners, technicians and the general public on disaster preparedness and risk mitigation (see section 6);

(6) that consideration be given to the creation of intergovernmental machinery for the management and reduction of earthquake risk, because from the information given by the Committee members "in every case where government response had been obtained, this was favourable or at least expressed willingness to consider new proposals" (see section 10, paragraph 4). The Advisory Committee "noted that several fundamental issues had arisen in seismology and related fields in recent years, which could appropriately become the business of an intergovernmental commission" (section 10, paragraph 5). On the same subject, "it was stated that seismologists and earthquake engineers have assumed greatly increased social responsibilities in the last few years", whilst there has been a "very high rate of increase in exposure of populations and property to earthquake damage", but "there has not been a corresponding increase in scientific efforts or in public education to mitigate these increased risks" (section 10, paragraph 6).