Intergovernmental Oceanographic Commission
Reports of Governing and Major Subsidiary Bodies

IOC Committee for Training, Education and Mutual Assistance in Marine Sciences

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1. OPENING

1 The Chairman opened the Session at 10.00 hours on Monday 25 February 1991.

2 In welcoming participants, he recalled that the IOC Committee for TEMA had had its First Session in 1973; that is, an average session frequency of four and a half years which is appreciably greater than that of other subsidiary bodies of IOC; however, this is to some extent due to the special nature of TEMA. Training, education, and the strengthening of national and regional infrastructures for marine science and services, is an on-going, and to some extent routine, process which requires close attention by the Secretariat and less at the intergovernmental level. The Committee has therefore devoted its attention to more long-term policy issues and to an evaluation of the progress.

3 The First TEMA Session (Paris, 1973) was held when the general world economic situation was brighter than it has been since. The Committee therefore embarked optimistically upon the enhancement of marine science capability in developing countries. Following the First Session, five regional TEMA meetings were held between 1974 and 1977, to identify the needs of Member States and to design TEMA activities to meet those needs.

4 The results of these regional meetings were analysed at the Committee's Second Session (New York, 1977). Although the regional meetings provided important information on the state of marine science in developing countries, the Committee for TEMA did not have the proper organizational structure or the financial means to meet the aspirations of the developing countries to greater marine science capabilities. At its Second Session, the Committee therefore concentrated on improving the terms of reference of TEMA, and on the development of a mechanism for financing TEMA activities: the IOC Voluntary Co-operation Programme (VCP).

5 The Committee, at its Third Session (Buenos Aires, 1980), recommended certain improvements in the procedures for applications to the Voluntary Co-operation Programme. However, the Committee expressed its grave concern that the efforts to increase the marine science capabilities in developing countries fell well short of expectations. The Committee urged the development of a new mechanism, and the concept of a comprehensive plan for TEMA as a central IOC activity was first mentioned. The IOC Secretariat, with the co-operation of UNESCO's Division of Marine Sciences, further developed the concept, and in 1982 the IOC Assembly, at its Twelfth Session, adopted the UNESCO-IOC Comprehensive Plan for a Major Assistance Programme to Enhance the Marine Science Capabilities of Developing Countries (Document IOC/INF-612).

6 At its Fourth Session (Lisbon, 1984), the Committee discussed modalities for the implementation of the Comprehensive Plan and recommended that the implementation of the Plan be given a high priority in IOC's programme of work.

7 Although the Committee for TEMA has continuously tried to improve the ways and means of strengthening the marine sciences in Member States, the situation in international marine science today requires yet another re-evaluation of the situation of marine science development. The major issues confronting humanity today, such as those related to global change, require truly global scientific efforts, and there is a growing realization of the need for partnership among nations in the study of the earth, but such partnership can only be achieved if we succeed in narrowing the gap in marine science capabilities between developed and developing countries.

8 The Secretary of the Commission also welcomed the participants on behalf of the Chairman of IOC and the Secretariat. He noted that twenty-eight Member States were represented at the Fourth Session, whereas only twenty-one had registered so far for this Session. At the same time, the IOC programmes have evolved considerably in number and degree of implementation, particularly at the level of the regional subsidiary bodies; nevertheless, some regional bodies continue to need further encouragement to develop their activities. The number of persons involved in the marine sciences and services has also increased

considerably, world-wide, as has the general public interest in this field. These trends are reflected also in the number of IOC subsidiary bodies of all types, from 20 in 1980 to 90 in 1990, and in the IOC budget, from about 2 million dollars in 1980 to an expected 4 million in the 1992-93 biennium. The increased support has come from UNESCO, the IOC Member States (in the form of funding and secondment of staff), and from co-operating organizations (e.g., WMO, FAO, IMO, IAEA and UNEP).

9 In spite of this growth, the gap in marine science capabilities between the developed and the developing countries has continued to grow. The Secretary stressed the importance of the Committee's determining why this was so and what must be done to reduce the gap. He suggested that possible solutions must bear in mind the many underlying factors: the demographic trends, hence the increased pressure on the environment, including the marine and, even more so, the coastal-zone environment; global change, and notably climate change, which also particularly affect the coastal zone, globally, regionally and locally. The WMO-UNEP Intergovernmental Panel on Climate Change has addressed these problems and their possible solutions within its field of competence. Also, effectively for the first time, the existence of a climate system, and the need for a system-wide approach, was recognized at the Second World Climate Conference (Geneva, 1990). The need for a corresponding ocean-observing system, closely linking the open ocean to the coastal zone, was also recognized as being vital, taking into account not only the atmosphere and air-sea interaction, but also the role of the deep ocean.

10 To develop such an observing system, it will be essential to develop the corresponding capabilities on a global basis. This is therefore one of the important issues the Committee should address. It involves not only the creation of relevant data bases but also the analysis and interpretation of these data at the national and international levels. The growing general public awareness of the role of the oceans in socio-economic development may help to facilitate it, which, *inter alia*, could be reviewed at the 1992 UN Conference on Environment and Development.

11 The List of Participants in given in Annex V.

2. ADMINISTRATIVE ARRANGEMENTS

12 **The Committee adopted** the Provisional Agenda (Document IOC/TEMA-V/1 prov.) as is; the Agenda is attached hereto in Annex I.

13 **The Committee designated** Dr. Ezekiel Okemwa (Kenya) Rapporteur for the Session.

14 The Technical Secretary then described the arrangements for the Session and briefly reviewed the Provisional List of Documents (Document IOC/TEMA-V/4 prov.). He requested the Committee to work in plenary as far as possible, although, where deemed necessary, *ad hoc* Sessional Drafting Groups could be formed to deal with specific questions arising from the discussions of particular Agenda Items, or for revising a document which has been submitted to the Committee for its adoption, following its discussion by the Committee. Such Drafting Groups should report back to the Committee in Plenary.

15 The List of Documents is given in Annex IV, and the List of Acronyms is given in Annex VI.

3. REPORT ON INTERSESSIONAL ACTIVITIES

16 The Technical Secretary presented the Report of the Secretary on Intersessional Activities (Document IOC/TEMA-V/6), which covers major TEMA activities since TEMA-IV (Lisbon, 4-9 June 1984). The Report summarizes the training (group training, courses, workshops, study grants for individuals, shipboard training and the IOC Research Fellowship Scheme) and the development of the UNESCO-IOC Comprehensive Plan for a Major Assistance Programme to Enhance the Marine Science

Capabilities of Developing Countries. It also highlights the experience gained in carrying out TEMA, particularly in the implementation of the major global programmes, including their regional components, and the specific programmes of IOC regional subsidiary bodies. The Report also provides some background information on the evolution of the TEMA strategy during the intersessional period.

17 The Secretary also drew the Committee's attention to the Report on the Seminar on Partnership in Ocean Sciences and Services for Sustainable Development, held at the Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany, 19-22 September 1989 (Document IOC/INF-808), which contributed substantially to the above-mentioned development of the TEMA strategy.

18 He noted that the Bremerhaven Seminar had looked particularly at the obstacles to the development of marine science capabilities; in particular, there is still an appreciable discrepancy between what is being offered and the precise needs of developing countries, since the criteria applied on each side have not generally been harmonized. Moreover, the approach to marine science, and to its practical applications, has become increasingly interdisciplinary and intersectorial, and indeed cross-border, in nature. The idea of partnership - between developed and developing countries, their governments and institutions, between developing countries themselves, and between international organizations - was given considerable emphasis, as was the improved adaptation of TEMA solutions to problems of enhancing marine science capabilities in developing countries.

19 The Secretary felt that the possibilities for the restructuring of TEMA lie mainly in the newer IOC programmes such as Ocean Dynamics and Climate (ODC), Ocean Science in Relation to Living Resources (OSLR), and to Non-Living Resources (OSNLR), and perhaps in older programmes, such as Ocean Mapping (OM), that are re-emerging in the interest of the world marine scientific community. The concern for global and climate change and the related impacts, regionally and locally, together with the need for more research and more adequate related ocean observations, provide a basis for a new approach to TEMA and for a new paradigm for funding, with an overall view to focussing on the mutual benefits to be gained from solving common problems. TEMA should not be independent of the substantive programmes of the Commission. Although fewer donor agencies attended the Bremerhaven Seminar than had been hoped, some (notably SAREC, Sweden, and GTZ, Germany) had participated, thus helping the Commission to bring home to them the nature of the TEMA problem, even if extra-budgetary funding of IOC programmes had continued to grow at a very low pace. Such improved understanding of needs and mechanisms was, he believed, also being promoted by the World Maritime University (WMU), Malmo, Sweden, for which IOC has provided a course module, addressing the oceanographical aspects underlying the application of a number of international marine pollution conventions, and through increased inter-agency co-operation.

20 Mr. Jonas Karker, of the Secretariat, informed the Committee that the IOC Committee for the Global Investigation of Pollution in the Marine Environment (GIPME), at its Seventh Session (Paris, 21-25 January 1991), had paid particular attention to the related TEMA needs and described GIPME requirements and plans, with emphasis on regional workshops, training courses, intercalibration exercises, and quality-assurance programmes.

21 An IOC consultant described the approach of the Committee on IODE to TEMA. He noted the greatly increased use of PCs in data management, with a corresponding increase in the number of training courses in the use of PCs. A similar development had also occurred with respect to the use of satellite remote sensing. The Committee on IODE has promoted a self-training package based on a floppy disk. Nevertheless, the Committee on IODE has recognized the need for a more systematic approach, and has therefore promoted the development of course modules; these consist essentially of a set of transparencies with related text on a specific subject. Thus, modules can be combined to fit the requirements of a particular course; nevertheless, they are only a basis and do not exclude additional material. They save lecturers time, and IOC funds, in the preparation of a course. Comments on a sample module were invited.

22 Dr. Dirk Troost, of the Secretariat, was invited to review UNESCO Reports in Marine Science, No. 52: Year 2000 Challenges for Marine Science Training and Education Worldwide, which served, among others, as a conceptual basis for UNESCO's Marine Science Training and Education Programme (TREDMAR) for the Third Medium-Term Plan (1990-1995). The Report contains the results of a workshop in 1988 and a preparatory survey through six persistent theme questions. The survey questions probed into as many aspects and disciplines as possible, including management and learning technology. The prime objective was to help the present and future generations of teaching staff, training specialists and policy-makers to design and support educational programmes that will prepare young scientists and technicians - plus the public at large - for the changing world of the decades ahead.

23 The responses brought out by the survey and workshop were equally wide-ranging; however, a number of common tendencies were noted. For example, there was significant agreement on the need for:

(i) an interdisciplinary approach to marine science teaching, training and research;

(ii) a solid, broad foundation in basic science;

(iii) more and better training of teaching staff; and

(iv) adaptation of scientific work to the cultural context, particularly in countries with limited marine science capabilities.

24 A number of specific measures were recommended; for example, improved access to high technology (computers, remote-sensing etc). Many participants indicated that training should be reinforced in areas such as modelling, mathematics, statistics and English. The integration of scientists into communication and information networks was seen as a must. In general, students should be sensitized to phenomena such as climate change, the heritage of taxonomy and the role of ultraplankton and gelatinous organisms in the marine food web.

25 Small island communities are predicted to be in increasing need of training resources and infrastructure to cope with the new potentials and responsibilities that come with the establishment of Exclusive Economic Zones. For such communities, the advantages of distance teaching and the sharing of resources, as well as the relevance of traditional knowledge and management practices, were emphasized.

26 The workshop noted the shortage of funds for the marine sciences in many countries, sometimes due to the fact that the public in general and decision-makers in particular are not sufficiently informed about the importance of this domain. Also noted was the difficulty of the marine science community itself to communicate sufficiently with the non-scientific world.

27 Twelve delegations and three international organizations' (IHO), (WMO), and (IAEA) representatives participated in the subsequent debate, the main conclusions of which are as follows:

(i) In spite of a general and persistent lack of funds and staff, the Secretariat had made a considerable effort to promote and implement TEMA, and with some success, considering the large number of activities, trainees and programmes (thematic and regional) involved; nevertheless, achievements remain behind expectations of Member States despite a very noticeable positive trend, overall.

(ii) The Secretariat needs to have staff specialized in training, education and the related mutual assistance: TEMA cannot be left simply to amateurs however well qualified they may be as marine scientists; such staff must also be skilled in tapping financial resources of donor agencies and collaborating organizations.

(iii) There is a need to ensure continuity of TEMA opportunities in a given field and region, with a view, *inter alia*, to helping national experts to keep up to date in their respective fields of endeavour. Perhaps only long-term activities, such as those of the WMU and the Japanese training programmes in WESTPAC, could ensure the desired continuity.

(iv) The delivery of TEMA in the appropriate (i.e., widely used) language for a given region is essential even if difficult (expert trainers may be available but lack the requisite language ability).

(v) The scope of TEMA is still very broad, ranging from training in specific methods to deal with specific, even local, problems, to basic education in the marine sciences. There is a need for a better-structured approach, with a setting of priorities in IOC terms.

(vi) There is a need to evaluate the possibility of harmonizing the two foregoing aspects: the specific and the basic, which may now be facilitated by the fusion of the IOC Secretariat and the former Division of Marine Sciences, since the basic education approach was dealt with preferentially by the latter, and the specific, programme-oriented approach was preferentially dealt with by the IOC. The fusion of staff and programmes, and the related budgets, should open up new possibilities if the approach to TEMA is optimally structured.

(vii) The value of Marine Science Country Profiles in enabling Member States and the Secretariat to assess TEMA needs, among other things, was considered by some to be potentially valuable, even if the preparation of them was proving more difficult than was foreseen; others felt that the resources devoted to MSCPs might not be fully justified.

(viii) Little information is available on TEMA in the framework of intergovernmental bilateral activities, and of institutional (e.g., university) bilateral co-operation, yet such activities are the vehicle of much marine science and technology transfer, hence a potentially valuable element in the promotion of TEMA because of their great number and variety.

(ix) TEMA, and indeed IOC itself, lack public recognition which is a key factor in attracting the necessary funding. There is a need to bring the problems of TEMA to the attention of the world's political leaders.

(x) The establishment of a Group of Experts for TEMA would strengthen the TEMA Programme, since its members could: (a) advise the Secretary and the Chairman of the IOC Committee for TEMA; (b) assist in implementation of TEMA activities; and (c) ensure the continuity of the TEMA Programme.

28 **The Committee recognized** that many of these conclusions would need to be addressed further in subsequent Agenda Items, especially those dealing with the development of an Action Plan and a long-term strategy. **It thanked** the Secretariat for its efforts to advance TEMA and the fairly substantial activity level described in the Report of the Secretary on Intersessional Activities (Document IOC/TEMA-V/6), in spite of a lack of resources.

4. DEVELOPMENTS AND EXPERIENCES

29 The Chairman introduced this Agenda Item. He reviewed the new trends since TEMA-IV. TEMA has become more fully integrated into IOC's subject-area and regional programmes. Scientific workshops are increasingly being organized in association with subsidiary-body sessions, as the Committee had recommended at its Fourth Session. The subsidiary bodies are more and more defining specific TEMA needs within their field or region of concern, although the office of TEMA Co-ordinator in the regional subsidiary bodies has been abolished. The creation of regional training centres enjoys more support than

in the past. Mutual assistance has grown, however, in the form of technical co-operation amongst developed and developing countries and amongst developing countries themselves (TCDC) along various axes. On the other hand, the VCP and the production of Marine Science Country Profiles (MSCP) have not developed quite as had been hoped. Producing MSCPs requires persistent effort so as to ensure a proper coverage and therefore also requires follow-up of both parts and IOC Secretariat support.

30 Eight delegations intervened in the subsequent debate which was dominated by the level of priority to be given to MSCPs. Some delegates believed that MSCPs would have appreciable value to the Member States directly concerned, especially developing Member States. Others took the view that, although consuming time and money to produce, MSCPs were a valuable management tool to enable developing countries to assess their TEMA needs and develop national management plans and policies, and for international funding agencies to base their support on. Now that IOC had developed the basic format and guidelines for the preparation of individual MSCPs, such preparation should be a matter mainly for the interested Member States. However, many of these countries do not have the resources to prepare MSCPs, so that IOC assistance, particularly through consultants, would be essential.

31 **The Committee recognized** the growing tendency towards global observing and monitoring programmes, for which a great deal of TEMA effort is required. It is not easy to assess the role MSCPs might play in the development of Member State participation in these major programmes, since experience of MSCPs was, so far, very limited. Moreover, MSCPs, by taking considerable time to prepare, tended to build in their own obsolescence, and the principal needs of Member States could perhaps be more readily defined by such mechanisms as regional subsidiary bodies, scientific seminars, etc.

32 **The Committee noted** that it was not clear yet whether MSCPs would be found useful by donor agencies so that these agencies would be prepared to cover the costs of preparation. On the other hand, the development of, for example, a global-ocean observing system is being favoured not only by IOC but also by the WMO-UNEP Intergovernmental Panel on Climate Change and most probably will be by the UN Conference on Environment and Development; the latter may lead to an international convention covering the development of global observing systems and hence to the required funding, which would certainly have to be used for relevant TEMA actions, among other things.

33 **The Committee stressed** the need for IOC to define its objectives for the next few years (up to 2000 AD, say), how to achieve these objectives, and what TEMA would be required. Then the IOC should fix its TEMA priorities and the required funding, staffing, etc. **It believed** that the temptation to follow passing vogues in marine science must be resisted; creating basic capabilities in its Member States was still the most important need to be met.

34 **The Committee expressed** its deep concern with growing knowledge gap between developed and developing countries, **and considered** that the reduction of this gap should be the principal aim of TEMA.

5. STATE OF IMPLEMENTATION OF THE UNESCO-IOC COMPREHENSIVE PLAN FOR A MAJOR ASSISTANCE PROGRAMME TO ENHANCE THE MARINE SCIENCE CAPABILITIES OF DEVELOPING COUNTRIES

35 The Technical Secretary introduced this item, referring particularly to the Report of the Secretary on Intersessional Activities (Document IOC/TEMA-V/6), and to Document IOC/INF-808 (Partnership in Ocean Sciences and Services for Sustainable Development).

36 The UNESCO-IOC Comprehensive Plan for a Major Assistance Programme to Enhance the Marine Science Capabilities of Developing Countries (Document IOC/INF-612) comprises the following major elements: the establishment by Member States of National Oceanographic Commissions or equivalent bodies to promote national co-ordination of marine research as well as the liaison with international

programmes and organizations concerned; Marine Science Country Profiles as an aid to the assessment of marine scientific research, national ocean-development programmes and related activities; large-scale technical assistance projects to assist national institutions in building marine science infrastructure and trained personnel for active participation in national and international programmes (e.g., those organized by IOC), and provision of scientific advice in relation to international conventions and related negotiations; regional co-operation within the framework of a well defined programme to foster transfer of marine science methods and related techniques.

37 The number of National Oceanographic Commissions (or equivalent bodies) has gradually increased, in some degree with the assistance of IOC.

38 Although several Marine Science Country Profiles are in preparation, only one has been finalized and published (for Portugal, in Portuguese, with an English version now in press, with IOC assistance). Draft MSCPs for six small, English-speaking Caribbean-area countries developed during an IOC Advisory Mission in 1988 are awaiting clearance by the national authorities concerned. Others for Pakistan and Indonesia are in preparation.

39 Several extra-budgetary assistance projects are being implemented with UNDP support: (i) Strengthening the National Aquatic Resources Agency of Sri Lanka, for which a preparatory phase was completed and an operational phase is in progress; (ii) the preparatory phase of a project on Monitoring and Prediction of the El Niño Phenomenon in the Southeast Pacific: Application and Development (jointly with CPPS); (iii) the preparatory phase of a project on a Tsunami Warning System in the Southwest Pacific; (iv) the preparatory phase of a project on Regional Collaboration on Marine Resource Development and Management in Southeast Asia; (v) likewise for a project on Strengthening of the National Institute of Oceanography (in Pakistan); and the preparatory phase of a project on Environmental Planning and Management of Heavily Contaminated Zones in the Wider Caribbean.

40 An assistance project, supported by the UNEP Environmental Fund, the Caribbean Trust Fund and the US Environmental Protection Agency, on a Marine Pollution Assessment and Control Programme for the Wider Caribbean (CEPPOL) has also been initiated.

41 Several Advisory Missions have also been carried out to develop proposals for other technical assistance projects.

42 Support is also being received from the Swedish Agency for Research Co-operation with Developing Countries (SAREC) for selected IOC programme actions in the IOCINCWIO region, and is being negotiated with the Danish International Development Agency (DANIDA) in support of IOC activities under OSLR and GIPME in the IOCINDIO region.

43 Several Member States provided selected forms of mutual assistance under the IOC Voluntary Co-operation Programme (VCP); for instance: Germany (training courses in Kenya, Philippines and Malaysia - the latter still in the planning stage); Sweden (tide gauges for GLOSS in selected West African countries); and the USA (current meters for POEM).

44 The Comprehensive Plan also called for a meeting of multilateral and bilateral funding agencies to assess needs for achieving the main objective of enhancing marine science capabilities in developing countries. It has not proven possible to organize this meeting. However, at the 25th General Conference of UNESCO, the President of Portugal, Dr. Mario Soares, offered to organize a major high-level meeting of world political and scientific leaders and representatives of donor agencies, to be held in Lisbon in September 1991.

45 The IOC Assembly, at its Fourteenth Session (Paris, March 1987), called for the joint servicing of the Committee for TEMA by IOC and the UNESCO Division of Marine Sciences. In practice, the Division and the IOC Secretariat have been combined into a new structure called The Office of the IOC and marine science related issues (IOC/MRI). This allows for combining the two programmes relevant to TEMA, and the two budgets, and therefore for a reinforced and streamlined TEMA activity.

46 The Secretary provided information on UNESCO's and IOC's part in the preparations for the Lisbon meeting (1991) mentioned above and for the UN Conference on Environment and Development (Brazil, 1992). He noted that one of the main objectives of both meetings was to identify ways and means to reduce the gap in marine scientific and technical capabilities between the developing and the developed countries, and increase the awareness of the role of the marine environment and its resources in development.

47 The Representative of IHO, noting the close relationship between marine science and marine hydrography, suggested that advisory missions to developing countries now being carried out independently by IHO and IOC could usefully be combined or a least fully co-ordinated.

48 From the subsequent debate, the following main conclusions were drawn:

(i) TEMA, and particularly the assistance called for under the Comprehensive Plan, if it is to attract adequate funding, must focus on specific actions, as, for example: coastal-zone monitoring and management, including sea-level monitoring; assessment of the impact of global and climatic changes on the marine (especially coastal) environment. It must also be brought more effectively to the attention of the general public and to national decision-makers at the highest possible level.

(ii) Priorities for TEMA activities, including those under the Comprehensive Plan, must be set and adhered to; the advice of the IOC regional and technical subsidiary bodies in this regard must be sought and heeded.

(iii) The training and the related follow-up, particularly in respect of technical assistance, must be better harmonized and pursued, so that the training provided can be put to effective use at the national and regional levels.

(iv) IOC must play an active part in developing the agenda and documentation for the proposed high-level meeting in Lisbon, must participate actively, but appropriately, in it and its follow-up, especially with a view to similarly active participation in the UN Conference on Environment and Development.[1]

(v) The IOC Secretariat must be strengthened, notably by the appointment, as soon as possible, of a person well qualified in the techniques of training, education and mutual assistance, to fill the vacant post of Head of the TEMA Unit.[1]

49 **The Committee endorsed these conclusions. It particularly wished** to place on record its appreciation of the offer made by the President of Portugal.

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[1]The Committee adopted a Recommendation on these matters when discussing Agenda Items 7 and 8, see section 8, below.

6. CO-OPERATION WITH OTHER ORGANIZATIONS (INCLUDING CO-OPERATIVE USE OF RESEARCH VESSELS)

50 The Technical Secretary introduced this Agenda Item, referring particularly to Document IOC/TEMA-V/6: Report of the Secretary on Intersessional Activities.

51 IOC co-operates extensively with other Organizations, especially: the ICSPRO Agencies (UN, FAO, UNESCO, IMO, WMO), IAEA/ILMR and UNEP, within the United Nations System; and IHO, CPPS, ICES, ICSU-SCOR and others, outside. Much of the co-operation includes TEMA-related activities, sometimes as the main objective.

52 The Representative of FAO reminded the Committee of FAO's early efforts to inventory fishery research vessels; later it was joined by IOC, with UNDP funding, and the inventory was expanded to cover marine research vessels in general. The present data base has information on 508 such vessels, worldwide; it covers technical specifications, including scientific instrumentation, main area(s) of operation, availability etc. The data are used as a basis for providing technical assistance and for working out possible sharing arrangements. Preparations are under way to pass the data base into IOC's care. However, to promote the use of ships of opportunity in marine scientific observation, much more data are needed on national cruise plans. FAO, IOC and UNDP have also co-operated with ICOD (International Centre for Ocean Development) to produce a Guide to the Management and Operation of Marine Research and Survey Vessels, which will be published in April 1991. It comprises four volumes and fourteen resource chapters. The first volume presents an overview of opportunities, research fields, and problems in marine research and survey that require consideration at the political level. The second addresses the organizational problems that senior bureaucrats may encounter in the course of building an effective national programme. The third volume is virtually a handbook for running a marine science laboratory, with an emphasis on ship support. The fourth deals with every phase of a research or survey cruise, from pre-cruise planning to publication of final results.

FAO co-operates with UNESCO and IOC to help Member States to define standards for first-degree courses in fishery science, with the support of the Asian Development Bank in the Asian region.

53 FAO also co-operates closely with Norway in the co-operative use of the Norwegian R.V. DR. FRIDTJOF NANSEN for various types of regional marine scientific survey. The present Chairman of IOC, as well as representatives of FAO, are members of the board charged with programming the work for a new research vessel which will replace the R.V. DR. FRIDTJOF NANSEN. The new vessel will also be equipped for studies of the marine environment, and IOC has provided input for the development of the environmental studies.

54 **The Committee welcomed the information provided. It recalled that the Nigerian government had made available the R.V. SARKIM BAKA for regional co-operative use in work under the IOC-UN(OALOS) Programme on Ocean Science in Relation to Non-Living Resources (OSNLR). It also recalled that FAO and IOC co-operate formally in the Programme of Ocean Science in Relation to Living Resources (OSLR).**

55 The Representative of WMO briefly reviewed the structure of his Organization and its principal subsidiary bodies (e.g., Commission for Marine Meteorology), and its main programmes in the marine context (e.g., World Weather Watch and World Climate Research Programme). From the TEMA standpoint, WMO, within its Environment and Training Programme, concentrates on manpower development, the elaboration of training course texts (e.g., on marine meteorology, hydrology etc.), the development of regional training centres (e.g., in the Philippines and in Nairobi), the award of fellowships and the organization of training events. One of WMO's main fields of co-operation with IOC is in the Integrated Global Ocean Services System (IGOSS) under which long-term training has been established in marine meteorology and physical oceanography for IGOSS purposes.

56 **The Committee thanked the Representative of WMO for the information provided.**

57 **The Representative of IAEA, and particularly of its International Laboratory for Marine Radioactivity, drew the Committee's attention to some of the frequent obstacles to effective mutual assistance which he felt had to be addressed if TEMA was to succeed fully. Offers of international funding aid are more often made than given effect. Often, new high-tech equipment is offered but no concern is shown by the donor for its installation and proper operation, and training in its use is generally rare. Such equipment may not even be relevant to the recipient's needs. Then there is, from time to time, international dumping of obsolete or obsolescent equipment. Transfer of equipment should never be confused, he believed, with transfer of technology. The infrastructural contexts in the donor and in the recipient countries are usually quite different, so that good equipment in the former may become bad in the latter. The circumstances mentioned above sometimes create considerable disillusion, but provide a basis for remedying the problems.**

58 **IAEA/ILMR's approach, in co-operation with UNEP, IOC and others, is to treat technical assistance as an investment with a human return rather than a financial one. It is giving considerable attention to training in the installation, operation and maintenance of scientific equipment, including the follow-up of the technical teams it tries to turn out in institutions of developing countries. For this purpose, specialized technical rather than scientific personnel are used.**

59 **In its co-operation with IOC, UNEP and others, the ILMR is also participating in the preparation of relevant technical manuals.**

60 **The Committee welcomed the efforts IAEA/ILMR is making to overcome some of the obstacles to TEMA.**

61 **The Representative of IHO recalled its strong co-operation with IOC in preparing the General Bathymetric Chart of the Oceans (GEBCO) and now the International Bathymetric Charts for the major ocean regions. Although most of IHO's work is the gathering and exploitation of bathymetric data, he felt that there should be a much closer association between hydrography and marine science. With the Fédération Internationale des Géomètres, IHO is providing practical training and relevant training syllabuses. The IHO syllabuses are aimed at two categories: the professional hydrographer; and the hydrographic technician. In a similar way, IHO is attempting to define standards for hydrography itself, as well as standards for training in hydrography. The Representative also stressed the value of coastal hydrographic surveys to the management of the marine resources and coastal economic development in general, as well as to marine scientific research. This meant there is a need for even closer co-operation between IHO and IOC.**

62 **The Committee recognized the value of modern hydrography and noted the growing interest in applying it to many of the Commission's marine scientific problems.**

63 **The Delegate of the USA spoke on behalf of the South Pacific Applied Geoscience Commission (SOPAC). He recalled that SOPAC was a treaty organization and not unlike IOC in its *modus operandi*. It has a very active training programme in the fields of geology and geophysics. Its members are mainly small Pacific island states, but it receives advice from many developed countries. Joint training exercises with IOC could prove valuable.**

64 **The Committee recalled the considerable co-operation already achieved between IOC and SOPAC in the context of the relevant regional components of OSNLR, and welcomed the idea of increasing joint training exercises.**

65 **It adopted** Recommendation TEMA-V.1 (all Recommendations are given in Annex II hereto).

66 The Delegate of Sweden, who was also the Representative of the Swedish Agency for Research Co-operation with Developing Countries (SAREC), described his agency's activities, noting, however, that only a small percentage of its resources go into marine science development. Although it has proven usually better to work on a regional basis, SAREC often lacked information on other relevant intergovernmental activities; it was therefore ready to look to IOC for assistance and guidance in developing regional training activities in the marine sciences . At present SAREC, in its co-operation with, and support to, the IOC, *inter alia*, is concentrating efforts on East Africa.

67 The Delegate of Somalia stressed that, in his country's experience of co-operation with SAREC in building national capacities, SAREC had demonstrated flexibility and adaptability.

68 **The Committee thanked** the Delegate of Somalia for the encouraging information on his country's co-operation with SAREC. **It therefore welcomed** the idea of increased co-operation between SAREC and the Commission, particularly in Africa.

69 The Chairman of the Board of Directors of the International Centre for Ocean Development (ICOD) and of the International Ocean Institute (IOI) briefly described on-going activities. ICOD is perhaps the only governmental agency devoted exclusively to international marine scientific development. Training is a major component of ICOD's mandate. Besides its involvement in the improved use of research vessels, it is concentrating effort on ocean development in the South Pacific, the Indian Ocean, West Africa and the Caribbean where it has recently signed an agreement with CARICOM to strengthen regional fisheries management; it has also sought to establish a regional centre for marine industrial technology and development, with emphasis on such technology as desalination, aquaculture, marine pollution control, in the Mediterranean and similarly in the IOCARIBE region.

70 Training is also a major component of IOI's mandate. IOI is a non-governmental organization; besides training, IOI is also active in policy research, publishing and technology transfer. Training concentrates on the Exclusive Economic Zone, high technology and regional co-operation. Co-operation with IOC has been developed over an extensive period; nevertheless, IOI seeks increased co-operation with IOC on a more effective, better co-ordinated and longer-term basis.

71 Some Delegates pointed out that, even if the co-operation between the various organizations concerned with TEMA had increased, it continues to be necessary to achieve a greater and more efficient co-ordination of actions, including that between the IOC and other organizations of the UN system.

72 **The Committee welcomed** the above-mentioned developments in inter-organization co-operation, **but agreed** that there was room for considerable improvement in the co-ordination of the activities of co-operating agencies, by way of concerted approaches to such problems as those of fishery resource management, coastal-zone protection, etc. **It believed** that there is a need to search for a greater synergy.

73 The Chairman proposed that some of the suggestions made in this section be taken up in the discussion of the draft strategy and action plan for TEMA (Agenda Items 7 and 8).

7. TEMA STRATEGY

74 The Chairman introduced this item, referring particularly to Document IOC/INF-808 (Report on the Seminar on Partnership in Ocean Sciences and Services for Sustainable Development), Document IOC/TEMA-V/Inf.3 (Draft Strategic Framework to Strengthen Oceanography in Developing Countries Through the TEMA Programme), Document IOC/EC-XXIII/8 Annex 6 (Draft Outline of Medium-Term Strategy and Action Plan for TEMA, which, with some small amendments to incorporate the comments

of the Executive Council, was before the Committee as Document IOC/TEMA-V/7) and some parts of Document IOC/TEMA-V/9 (Draft TEMA Action Plan for 1991-1995).

75 He suggested that, if delegates wished it, discussion could also cover Agenda Item 8 at the same time.

76 The Chairman recalled that the first draft of the Draft TEMA Strategy had been submitted to Member States for comment but virtually none had responded. The Working Documents (IOC/TEMA-V/7 and 9) for the present Session therefore differed little from the earlier versions of the Strategy and the Action Plan

77 He stressed the importance of identifying TEMA components for all IOC programmes (subject-area and regional), then defining the mechanisms (e.g., courses, shipboard training, fellowships, etc.). He considered it important to try to achieve continuity of TEMA actions for each subject-area and region, and to adapt them to the appropriate levels (national, regional and global). He attached considerable importance to partnership in meeting the needs, noting that long-term basic educational training was still beyond IOC's present capacity, the Research Fellowship Scheme notwithstanding.

78 After a short preliminary debate, **the Committee decided** to revise Documents IOC/TEMA-V/7 and 9. In the former case, it particularly wished to incorporate relevant conclusions from the Bremerhaven Seminar (Document IOC/INF-808). **It noted,** however, that the main elements of the Strategy had been incorporated into the introductory text of the Draft Action Plan, **and, after due consideration, decided** to submit to the Executive Council (Twenty-fourth Session, Paris, 5-6 March 1991) a single proposal entitled Draft TEMA Strategy and Action Plan for 1991-1995, as Annex III to the Report of the Committee's Fifth Session (the present Document); the Report (in English only, except the Recommendations, at this time,) will be before the IOC Assembly at its Sixteenth Session (Paris, 7-22 March 1991) for approval. It should be borne in mind that Annex III could be modified by the Executive Council before receiving endorsement.

79 **The Committee requested** the Secretary, once Annex III had been finalized, taking into account any observations of the Executive Council, to distribute the Draft TEMA Strategy and Action Plan for 1991-1995 to all IOC regional and technical subsidiary bodies, asking them to identify their present priorities for TEMA, and to inform the Secretary accordingly within a period of time to be specified by him. **It further requested** the Secretary to compile such information in an eventual amendment to Table I of the present version of the Strategy and Action Plan, for subsequent distribution to all IOC Member States and subsidiary bodies.

8. TEMA ACTION PLAN FOR 1991-1995

80 The Secretary introduced the Agenda item, referring to Document IOC/TEMA-V/9. Although the substantive debate on this item was taken under Agenda Item 7, **the Committee agreed** to incorporate into the body of the Report some background information relating to the Proposed Guidelines for the IOC Voluntary Co-operation Programme (VCP); these Proposed Guidelines are themselves attached as an Appendix to Annex III of the present Report. They constitute, in fact, a slightly updated version of the Document IOC/INF-585 (Revised Rules for the Utilization of the IOC's Voluntary Assistance Programme (IOC-VAP)) dated 12 March 1984.

81 The Fourth Session of the Committee renamed the Programme the IOC Voluntary Co-operation Programme, which proposal was endorsed by the Thirteenth Session of the Assembly. It is recalled that the Document IOC/TEMA-IV/9, entitled "IOC Voluntary Assistance Programme: Review and Perspectives", prepared by Professor H. U. Roll, identified a number of reasons for the so far rather unsatisfactory results of the Programme; e.g., that the oceanographic community in Member States is not

properly organized and centralized; the dependence of IOC on the willingness of its Member States to establish and to maintain national bodies prepared and able to act as a focal point for IOC-VCP(VAP); the procedure for processing IOC-VCP (VAP) requests is cumbersome and time-consuming; the fields in which assistance is solicited are generally broad (Document IOC/TEMA-IV/3 para. 176). Differences between the VCPs of IOC and WMO were also noted (id., paras. 177, 178).

82 The trends in recent years call for further efforts under the IOC-VCP in relation to the overall concerns for the environment and development, the global and climate change issues, associated local impacts, and to the need to develop and support the related ocean and coastal-zone observation system, also with respect to the health of the ocean. The agreement between IAEA/ILMR and IOC to facilitate transfer of equipment and maintenance support is recalled as one attempt to strengthen the IOC-VCP.

83 The Committee was invited to re-examine the IOC-VCP and suggest ways and means to strengthen it. It approved the proposed guidelines given in the Appendix to Annex III to the present Report.

84 The Committee, having reviewed the experience gained, the present and prospective problems of TEMA, and the Draft Strategy and Action Plan, adopted Recommendation TEMA-V.2 (see Annex II, hereto), with a view to providing a firm basis on which to address some of the afore-mentioned problems.

9. ELECTION OF TEMA CHAIRMAN AND VICE-CHAIRMAN

85 The Chairman invited nominations for Chairman.

86 The Delegate of Germany proposed Professor Michel Vigneaux (France); the Delegate of Turkey seconded the proposal and, no other proposal being heard, Professor Vigneaux was elected by acclamation.

87 The Chairman then invited nominations for Vice-Chairman.

88 The Delegate of Germany proposed Dr. Hernan Perez Nieto (Venezuela); the Delegate of France seconded the proposal and, no other proposal being heard, Dr. Perez Nieto was elected by acclamation.

10 ADOPTION OF THE REPORT AND RECOMMENDATIONS

89 The Committee adopted the Draft Summary Report, including two Recommendations, of its Fifth Session.

11. CLOSURE

90 The Chairman closed the Session at 15.30 on 1 March 1991.

ANNEX I

AGENDA

1. OPENING
2. ADMINISTRATIVE ARRANGEMENTS
3. REPORT ON INTERSESSIONAL ACTIVITIES
4. DEVELOPMENTS AND EXPERIENCES
5. STATE OF IMPLEMENTATION OF THE UNESCO-IOC COMPREHENSIVE PLAN FOR A MAJOR ASSISTANCE PROGRAMME TO ENHANCE THE MARINE SCIENCE CAPABILITIES OF DEVELOPING COUNTRIES
6. CO-OPERATION WITH OTHER ORGANIZATIONS (INCLUDING CO-OPERATIVE USE OF RESEARCH VESSELS)
7. TEMA STRATEGY
8. TEMA ACTION PLAN FOR 1991-1995
9. ELECTION OF TEMA CHAIRMAN AND VICE-CHAIRMAN
10. ADOPTION OF THE REPORT AND RECOMMENDATIONS
11. CLOSURE

ANNEX II

RECOMMENDATIONS

Recommendation Number	Agenda Item	Title
TEMA-V.1	6	Co-operation with the South Pacific Applied Geoscience Commission (SOPAC)
TEMA-V.2	8	TEMA Staffing in the Secretariat

Recommendation TEMA-V.1

CO-OPERATION WITH THE SOUTH PACIFIC APPLIED GEOSCIENCE COMMISSION (SOPAC)

The Committee for Training, Education and Mutual Assistance in Marine Sciences,

Recalling that SOPAC, as a regional intergovernmental organization of small island States, is involved in marine science development and training that offers a possible model in respect of training activities,

Recognizing that this similarity of IOC's and SOPAC's interests in the field of TEMA could provide a good basis for expanding their co-operation,

Requests the Secretary of IOC to participate in the annual session of SOPAC in October 1991, or, if this is not possible, to make arrangements to be represented thereat.

Recommendation TEMA-V.2

TEMA STAFFING IN THE SECRETARIAT

The Committee for Training, Education and Mutual Assistance in Marine Sciences,

Recognizing the importance of TEMA activities to the promotion and success of IOC subject-area and regional programmes,

Being aware that no Head of the TEMA Unit is presently in the Secretariat,

Recognizing the importance of careful preparation, particularly from the TEMA standpoint, of the IOC contribution to the high-level meeting on marine science proposed by the President of Portugal, Dr. Mario Soares, and scheduled for September 1991, in Lisbon, and for the UN Conference on Environment and Development, scheduled for June 1992, in Brazil,

Also recognizing the equal importance of effective follow-up of these two major events,

Invites IOC Member States to consider the secondment of an expert in training, education and mutual assistance methods to the IOC Secretariat, as soon as possible and in a timely fashion, to allow the aforementioned preparations to the required standard;

Further invites Member States to give urgent consideration to making available to the Secretary additional funds-in-trust to cover the costs of ensuring that the IOC's participation in the preparations for, and follow-up of, the above-mentioned conferences is highly effective;

Requests the Secretary of IOC to seek the appointment of an appropriately qualified staff member to take charge of TEMA in the Secretariat, either through a consultancy or an appointment by UNESCO;

Further requests the Secretary to organize, subject to the availability of funds, an ad hoc meeting of TEMA experts, also as soon as possible and in a timely fashion, to assist him in the preparation of an IOC position paper on TEMA for the meeting in Portugal and as a basis for IOC participation in the UN Conference on Environment and Development.

ANNEX III

DRAFT TEMA STRATEGY AND ACTION PLAN FOR 1991-1995

1. INTRODUCTION

A major task of the Commission is to promote training, education and mutual assistance essential to: the conduct of global and regional ocean research and the provision of related services; studies of global and climate changes; sustainable development and rational use of the resources of the marine environment; and the operation of a global ocean-observing system including the coastal zones and the effective exploitation of the data obtained through these activities.

The importance of human resources and infrastructure development to marine research and ocean services has been emphasized by the Commission since its establishment. The views of IOC Member States on this matter were reinforced by the Third United Nations Conference on the Law of the Sea through the Resolution on "Development of National Marine Science, Technology and Ocean Service Infrastructures" (Resolution IV: Annex VI, adopted by UNCLOS, in 1982), which recommended that, *inter alia*,

> *"all competent international organizations within the United Nations system expand programmes within their respective fields of competence for assistance to developing countries in the field of marine science technology and ocean services and co-ordinate their efforts on a system-wide basis in the implementation of such programmes, paying particular attention to the special needs of the developing countries, whether coastal, land-locked or geographically disadvantaged".*

and that

> *"the World Bank, the regional banks, the United Nations Development Programme, the United Nations Financing System for Science and Technology and other multilateral funding agencies augment and co-ordinate their operations for the provision of funds to developing countries for the preparation and implementation of major programmes of assistance in strengthening their marine science, technology and ocean services".*

The UNESCO-IOC Comprehensive Plan for a Major Assistance Programme to Enhance the Marine Science Capabilities of Developing Countries (Document IOC/INF-612) was drawn up to respond to the spirit and objectives of this Resolution. It provides a conceptual framework for the required enhancement, possible types of action by UNESCO, IOC and the Member States, and a basis for a strategy to achieve the objectives of the Comprehensive Plan.

UNESCO, through its (former) Division of Marine Sciences has devoted considerable effort to the preparation and execution of extra-budgetary marine science development projects as part of its Coastal Marine Programme (COMAR), and generally promoted marine science activities through its programme on the Promotion of Marine Sciences (PROMAR), as exemplified by the on-going UNDP-funded Regional Project on Research and Training for the Integrated Management of the African Marine Coastal Ecosystems (COMARAF), and by the Marine Pollution Monitoring and Training Programme in Indonesia. Under the Marine Science Training and Education Programme (TREDMAR), which is aimed at helping to meet the need for worldwide sharing of knowledge, the Division organized an important Workshop on Year 2000 Challenges for Marine Science Training and Education Worldwide.

The Committee for TEMA, at its Fifth Session (Paris, 25 February - 1 March 1991), considered a proposal on the TEMA Strategy (Document IOC/TEMA-V/7) and another on the related Action Plan (Document IOC/TEMA-V/9). The present text and tables represent the Draft TEMA Strategy and Action Plan for 1991-1995 as it was agreed by the Committee and submitted, as Annex III to the Report of its Fifth Session, to the IOC Assembly (Sixteenth Session, Paris, 7 - 22 March 1991).

The sources of the ideas embodied in the Draft Strategy and Action Plan are many: the Comprehensive Plan itself; the TEMA recommendations of the IOC governing bodies, regional and technical subsidiary bodies, including the Committee for TEMA itself; a UNESCO Workshop on Year 2000 Challenges for Marine Science Training and Education World-wide (UNESCO, Paris, 1988; UNESCO Reports in Marine Science, No. 52); an AWI-IOC-UNESCO Seminar on Partnership in Ocean Sciences and Services for Sustainable Development (Bremerhaven, Germany, 19-22 September 1989; Document IOC/INF-808); and Document IOC/TEMA-V/10: Marine Scientific Research in the 1990s.

2. STATEMENT OF PROBLEM AND MAJOR GOALS

Provision of substantial assistance is necessary to developing Member States of IOC to improve their capabilities in marine science and related matters in order to help them benefit from the enhanced opportunities and responsibilities provided through, for example: the extended maritime jurisdiction of coastal states; the diversification of ocean uses and the evolution of national goals in marine affairs; and the development of scientific knowledge and new technology. Requirements for assistance are further substantiated by the need to study and monitor global climate and other changes on global, regional and local scales, and by the desirability of formulating marine policies for development and management of large sea areas under national jurisdiction.

The consensus of the IOC Executive Council, at its Twenty-Third Session, was that partnership amongst countries/institutions was essential in dealing with: new lines of research; the introduction of advanced technologies; the monitoring of environmental changes; and the management of resources in the coastal zone and the open ocean. The Executive Council emphasized that partnership between developed and developing countries should be based on achieving agreed common objectives, and that partnership should become an essential element in promoting and strengthening TEMA activities, in fostering scientific and technological transfer to developing countries and in reducing the scientific and technological gap between developed and developing countries.

The above-mentioned Seminar on Partnership in Ocean Sciences and Services for Sustainable Development identified several items which need to be taken into account in the implementation of the TEMA Programme. These include: use of existing subject-area programmes and recommendations of IOC regional subsidiary bodies; development of marine science education in the context of research and institution-building; increased communication between various groups of society (marine scientists, managers, decision-makers, politicians).

The above-mentioned Workshop on Year 2000 Challenges for Marine Science Training and Education World-wide identified a number of challenges and proposed several lines of action. The analysis and the suggestions made were also based on a synthesis of responses to a set of questions from a wide range of members of the community involved in TEMA activities. This synthesis stressed, in particular, the need for an interdisciplinary approach to teaching and training in marine sciences, and for many new subject areas to be incorporated into the marine science curricula: modelling theory and techniques; remote sensing; assessment of climate-change impacts; deep ocean resources; data acquisition and management. The Workshop considered it important that newly developed educational techniques be used, such as: computer-aided learning and expert systems; remote-sensing imagery; distance teaching; multi-media learning packages.

It agreed on three basic goals for marine science training and education; namely to:

(i) provide a core of trained professionals and technical support staff to:

a) perform basic and applied research on the marine environment;
b) supply high-quality marine training and education to students;
c) supervise marine conservation, protection of the marine environment, and management of marine resources;
d) initiate and facilitate marine science, technology and other related studies;
e) plan, design and undertake marine resource exploitation and development projects;

(ii) establish (on a national basis) continuing education and training for professional and for support staff in order to maintain and enhance the quality of their expertise and to satisfy individual aspirations; and

(iii) increase the availability of knowledge, and promote its dissemination among all people, so that decision-makers, teachers and others can better understand and appreciate the relevance and value of the marine environment and its resources to national goals and international affairs, and hence the need for their wise use and planned management.

Six working groups considered different themes, namely: I, research; II, developing coastal states, with special reference to small islands; III, economic and social potentials; IV, sustainable development and management; V, data management and information acquisition; and VI, continuing education and retraining. Each addressed the same subject areas and questions.

3. IMPLEMENTATION STRATEGY

Strengthening of marine research capabilities relative to on-going programmes of the Commission should be carried out through: (i) developing subject-oriented training packages for individual and group training; (ii) organizing training courses and workshops at regional and global levels; (iii) award of scholarships under the IOC Research Fellowship Scheme; (iv) further improvement of co-operation and mutual assistance between the developing and developed countries participating in the IOC programmes; (v) further strengthening of the IOC Voluntary Co-operation Programme (VCP).

TEMA actions should accordingly respond to needs of individual Member States and needs of global, regional and sub-regional programmes. Therefore, each IOC programme should, in its implementation, include TEMA actions defined on the basis of the programme requirements. Each individual Member State should, depending upon its own commitment and priorities, define its needs with respect to TEMA, through appropriate mechanisms, including expert advice from IOC and UNESCO.

The regional structures created by IOC provide a potential mechanism to identify particular problems/needs and possible solutions to priority problems of interest to developed and developing Member States and thus help define and establish partnerships based on mutual interest in the marine environment and its development.

The regional approach has also been used in providing support for training activities related to such large-scale ocean research programmes as the World Ocean Circulation Experiment (WOCE), the Study of Tropical Atmosphere and Global Ocean (TOGA) and the Joint Global Ocean Flux Study (JGOFS). The IOC regional subsidiary bodies should become more closely associated with such programmes, and trained personnel from the region should become involved in them.

4. GENERAL OUTLINE OF THE ACTION PLAN

The implementation of the Action Plan should focus attention on the following aspects:

(i) Preparation of a **Marine Science Country Profile** that should provide, *inter alia*, information for a given country on the scope of its marine scientific research, ocean services, management and related needs for appropriate development.

(ii) Establishment of an adequate **national co-ordinating structure** for: effective co-ordination of marine research, related services and activities at the national level; promotion of an effective linkage between producers and users of marine scientific knowledge and data, and managers; interaction with IOC and liaison with regional and international organizations involved in marine research and development; and providing assistance to the Government in the formulation of marine science policy.

(iii) Promotion of **bilateral and regional co-operation** (including regional pooling of facilities such as instrumentation, research vessels), to contribute, on the one hand, to the integrated development and management of a shared environment and its resources, as well as to address common problems of the region, and on the other hand, to benefit from mutual co-operation in fostering transfer of knowledge and technology and thus provide feed-back to development at the national level.

(iv) Preparation of **technical assistance projects** at the national, regional and sub-regional levels for extra-budgetary funding in support of national and regional initiatives to enhance marine research capabilities.

4.1 MARINE SCIENCE COUNTRY PROFILES (MSCP)

The following actions are considered to initiate the preparation of an MSCP:

(i) Upon the request of a Member State that a national MSCP be prepared, with the assistance of designated national institutions or experts, IOC should provide guidance and assistance in the compilation of basic information for the Profile.

(ii) An MSCP thus having been prepared by appropriate national authorities, IOC will, if requested, assist in the preparation of the standard software, the camera-ready manuscript of the translated version, if required, and in the printing.

In general, the IOC Secretariat should establish, as far as possible, the schedule of preparation of MSCPs and the related financing required.

4.2 NATIONAL ORGANIZATIONAL STRUCTURE

The following actions should be taken by national authorities of Member States and/or the IOC Secretariat to strengthen national co-ordinating bodies:

(i) The IOC Secretariat should continue to invite Member States that have not established co-ordinating bodies to consider creating such bodies, and should provide advice when requested.

(ii) As an alternative, the IOC Secretariat should continue to invite Member States to establish a suitable national co-ordination mechanism for specific programmes of regional and global scope, and provide advice, as appropriate, through IOC regional/technical subsidiary bodies.

(iii) A national co-ordinating body should, with expert advice, help identify national needs in relation to a country's priorities and interests in relevant IOC programmes.

(iv) The IOC and/or other relevant bodies should, upon request, provide advice to Member States on relevant aspects of such a national organizational structure.

4.3 TECHNICAL ASSISTANCE PROJECTS

A significant recent trend is the increased IOC involvement in extra-budgetary projects. The Commission's role is important not only to provide motivation, but also as an active promoter of project proposals, particularly in obtaining the endorsement of funding organizations and recipient Member States. The following actions are required:

(i) Identification of problem areas in individual Member States and regions through visits of experts and through the IOC regional subsidiary bodies.

(ii) Drafting of project documents, with the assistance of national/regional experts, as well as relevant governmental authorities.

(iii) Seeking support from, and negotiating with, potential funding organizations, and procuring national commitment to prioritizing such projects.

(iv) Implementation of these projects, with proper co-ordination, upon receipt of necessary funding.

5. TRAINING ACTIVITIES

Training activities include group training (IOC-organized or co-sponsored training courses and workshops) and individual training through study grants, shipboard training and the Research Fellowship Scheme (IOC-RFS).

At its Twenty-third Session, the Executive Council referred to the IOC regional and global programmes which offer a unique opportunity for developing and strengthening co-operation amongst the participating Member States. It emphasized that TEMA activities should be a part of those programmes and that all IOC subsidiary bodies should play a decisive role in defining TEMA needs and implementing related projects. Table I summarizes TEMA needs identified at recent sessions of regional and subject-area subsidiary bodies of IOC, referring to each discipline and reflecting on-going programmes of the Commission; i.e., Ocean Dynamics and Climate (ODC), Ocean Science in Relation to Living Resources (OSLR), Ocean Science in Relation to Non-Living Resources (OSNLR), Ocean Mapping (OM), Marine Pollution Research and Monitoring (MPRM), Integrated Global Ocean Services System (IGOSS), Global

Ocean-Observing System (GOOS), International Oceanographic Data and Information Exchange (IODE) and International Tsunami Warning System in the Pacific (ITSU).

The COMAR (Coastal Marine), PROMAR (Promotion of Marine Sciences) and TREDMAR (Training and Education in Marine Sciences) Programmes, within UNESCO/IOC, contribute substantially to TEMA activities. These programmes include: training in applications of marine remote and *in situ* sensing through computer-based learning modules; training activities in coastal studies; support for advanced taxonomy training courses and a university degree programme in tropical coastal management.

Current trends in training courses are more and more to on-the-job training rather than class-room training, and this requires well equipped laboratories and computer facilities and, in some cases, research vessels. To minimize the travel cost of trainees and to encourage institutions in the regions to utilize fully their facilities, most training courses should, as far as possible, be organized in the developing countries, with appropriate support from the host country, rather than in industrialized countries.

Individual study grants may be provided upon request for relevant short-term activities.

In the past, shipboard training was based on the offer of berth space by cruise organizers. Presently, requests are more and more oriented towards specific research projects and there is a trend in the availability of berths on topic-oriented cruises such as those specifically arranged in support of the Commission's scientific programmes, e.g., OSNLR, OSLR and ODC, as well as regional projects identified by IOC's regional subsidiary bodies.

Group training will continue to be implemented according to the following guidelines:

(i) identification, in close collaboration with the regional and technical subsidiary bodies, of training needs for each region in relation to the agreed priority programmes;

(ii) the design of course programmes and the identification, through national authorities, of possible host institutions in the regions concerned;

(iii) the search for support, if required, from funding organizations, as well as other interested organizations as co-sponsors;

(iv) the conduct of the course, and the evaluation of the results;

(v) the follow-up (e.g., by provision of expert advice, equipment and assessment of the value of the course in TEMA terms).

Individual training, including shipboard training, will continue to be implemented according to the following guidelines:

(i) upon request, the IOC should seek possible host institutes or research ships for the proposed training, priority being given to requests related to IOC programmes and activities;

(ii) the involvement of developing countries in the formulation, planning and implementation of the research programme and in the analysis of results;

(iii) the planning, in collaboration with the host institutions, of the training programme;

(iv) the implementation of the training programme; and

(v) follow-up, including assessment of the benefit, for the trainee(s), of the ship-board training and their use of the training.

The Member States should also co-operate with the IOC Secretariat to ensure, as far as possible, that the training, education and mutual assistance offered under bilateral aid agreements be co-ordinated or at least harmonized with the Commission's TEMA activities.

Likewise, Member States offering TEMA facilities, should, as far as possible, ensure the continuity of opportunity in each subject area and region of the IOC's programme of work. An important aspect of the continuity should also be the development of appropriate institutional networks to facilitate exchange of information on problems, solutions and experience.

Improvement and expansion of information network centres and data transmission facilities relevant to marine science training within regions will continue to be encouraged.

6. RATIONALE AND PROGRAMME ACTIONS FOR GLOBAL OCEAN AND COASTAL ZONE OBSERVATIONS, DATA MANAGEMENT AND RELATED DEVELOPMENTS

The proposal made in this section is based on consideration of current capabilities in marine science in connection with the development of a framework proposal for a global coastal and near-shore observing system. A large number of IOC Member States were visited to evaluate current capabilities in this field.

6.1 CURRENT CAPABILITIES IN MARINE SCIENCE

The observed range of capabilities in marine science covers nearly all levels, from a virtual absence of such a capability to advanced capabilities.

In several of those countries where present marine science capabilities are weak, development plans and action strategies for establishing or enhancing existing capabilities have been prepared. However, in many countries where marine data are collected on an operational basis, responsibility is split between various departments of government, often resulting in duplication of effort. Nevertheless, owing to the diversity of agencies involved in marine activities (fisheries, mariculture, ports and harbours, navy, coast-guard, transport, tourism, marine research stations, oil exploration/extraction and refining), the body of data relating to the marine environment is often more extensive than might appear at first sight, varying from long-term operational sets, to medium-term project data, often concerning physical ocean parameters for assessment of coastal engineering requirements, to short-term specific research data. Data quality is variable, however, and there is often a difficulty to interface different sets.

For most countries, the over-riding need at the present time is for an enhanced capability to manage existing coastal-zone data in an efficient manner. In addition, modelling and data-assimilation capabilities need to be developed for coastal-zone management to be achieved.

Integrated coastal-zone management is perceived by most developing countries as a necessary step towards sustainable development of their coastal and near-shore zones and archipelagic waters. This is evidenced by the number of States that are signatories to declarations such as the Baguio Declaration (ASEAN States) and the Malé Declaration (fourteen small States from the Indian, Pacific and Caribbean regions) and the results of the IPCC activities, in particular the findings of the coastal-zone management sub-group of the IPCC Working Group II.

The IOC-WMO-UNEP proposal for Integrated Coastal Area Management (see Document IOC-XVI/8 Annex 1, and UNEO-IOC-WMO/GCNSMS-I/3) has therefore received wide general support in the countries visited.

6.2 GLOBAL OCEAN-OBSERVING SYSTEM

The long-term development and establishment of a global ocean-observing system will also require considerable training and assistance to become operational. The IOC has initiated the formulation of a plan and an implementation strategy, in co-operation with WMO, for a global ocean-observing system, as part of a global climate-observing system, but with wider perspectives and serving other needs, such as those related to the assessment of the state of the marine environment (health of the oceans) (Document IOC-XVI/8 Annex 3). The TEMA Action Plan for 1991-1995 should therefore include the development of appropriate training and mutual assistance packages, so as to help create the human resources required for the planned observing system. This TEMA development should use the experience gained through IGOSS and IODE/MIM.

6.3 ACTION FOR ENHANCING THE RELATED TEMA ACTIVITIES

It would seem appropriate to include strong elements of marine science training and mutual assistance in activities relevant to the proposed global coastal and near-shore monitoring system, global-change studies and impact assessment in the future TEMA Programme.

It is suggested that, in addition to specific training activities such as courses in tide gauge use and maintenance, a comprehensive regional programme of training related to operational and applied research and monitoring be organized and operated at a regional level. Such training activities should be directed at a wide range of individuals from different disciplines currently involved in marine activities, who may also serve as focal points for national level in-service training in operational aspects of marine science.

One element of such training programmes may focus on the integrated use of data from different disciplines and branches of marine science and may:

(i) provide concrete guidance on and training in biological, physical and chemical sampling of near-shore and coastal waters;

(ii) provide practical skill in the application of standardized techniques for measuring physical, biological and chemical parameters;

(iii) provide practical experience in the statistical and mathematical analysis of data including the use of software packages developed for oceanographic and marine science purposes;

(iv) include cross-disciplinary exercises designed to demonstrate the need for integrated approaches to coastal-zone management;

(v) include training in the use and analysis of remotely sensed imagery (satellite and aerial photographic) as it relates to coastal-zone and shallow-water habitats; and

(vi) demonstrate the use and applicability of the Geographical Information System (GIS) for planning and integrated management of the coastal zone.

Such training programmes might be initiated through the organization of regional and/or sub-regional workshops on integrated coastal-zone management and the provision of training materials for use by participants in organizing and running, perhaps with additional IOC support, national workshops. Curricula for the workshops need to be developed, including course material and possibly case studies.

Various agencies from developed and developing countries have strong marine science capabilities, particularly in relation to the coastal zone, and could participate, within the concept of partnership development, in the organization and conduct of such programmes and follow-up activities in individual countries. Such participation might be provided by the countries concerned as a contribution to the IOC Voluntary Co-operation Programme in the framework of TEMA. (Proposed revised guidelines for VCP are attached hereto as an Appendix).

7. MARINE ENVIRONMENTAL EDUCATION

The increasing direct pressure from human populations on the marine environment are apparent in many different areas. There is a great need to inform the public at large, and not least, decision-makers, of the scale of environmental change that is occurring, particularly in coastal zones, and of the key processes that relate to climate and global change.

Even in developed countries, comprehensive coverage of environmental issues is woefully lacking in terms of factual information in the modern educational systems. There is also a special need to provide education in developing countries on the consequences of altering marine environments.

7.1 PROPOSAL

It is proposed that, initially, efforts of such a TEMA activity be concentrated at the tertiary educational level (universities and colleges), but it is to be hoped that plans for improvement at this level would be relevant at the secondary and primary levels. Curricula for use on all scales, from global to regional and local, need to be developed. Modern information systems and audio-visual techniques should be used from the beginning, so that effective use of the available expertise at the international level is achieved.

It is furthermore proposed that a small group of eight to ten experts in marine environmental education, with at least two members drawn from developing countries, be constituted and include expertise on the use of TV systems in education. Membership should be solicited through contacts with the IOC and other collaborating Agencies of the UN system that are concerned with such issues. Terms of reference should be drawn up and a timetable of action prepared leading to an outline curriculum for a course in marine environmental education.

An initial intensive planning meeting would be required to agree the terms of reference and a timetable of action. This would be followed by gradual development of the curriculum via electronic mail with a summary of progress every three months. A mid-term (i.e., after 18 months) discussion meeting should be held and a summary meeting at the end of year three to prepare a final report.

The venues for the meetings should be decided after the composition of the group has been determined.

8. PROPOSED TEMA ACTIVITIES FOR 1991-1995

The following actions are proposed for the period 1991-1995, as shown in Table II. They have been identified on the basis of requirements and actions proposed by regional and subject-area subsidiary bodies:

(i) preparation of Marine Science Country Profiles; the number will depend on interest expressed by Member States;

(ii) advisory missions to Member States, at their request, to assist in the formulation of MSCPs and identification and assessment of needs in priority areas;

(iii) preparation of technical assistance projects and their submission to funding agencies;

(iv) implementation of approved technical assistance projects;

(v) organization of training courses, marine science teaching materials, seminars; and

(vi) provision of study grants for individual training including shipboard training to assist Member States' participation in regional and global programmes.

9. BUDGETARY IMPLICATIONS

The actions will be implemented under the supervision of the IOC Secretariat. Based on the assumption that the actions indicated above are acceptable, the Secretariat will require a budget. The cost to IOC's regular programme budget will be reduced when direct contributions are made available by Member States, either in cash or in kind (provision of experts, laboratories, equipment, ship-time).

Table II shows a breakdown of the activities corresponding to each year and type of activity. The corresponding budgetary estimates are given in Table III. Figures in the Table II indicate the possible number of activities of each type requiring at least currently available resources, although IOC direct funding is not sufficient to respond to all requirements. There is thus a strong requirement for extra-budgetary projects, focussing on regional programmes.

Priority in assigning IOC catalytic funding to TEMA activities will take into account its mobilizing effect, as well as the availability of outside funding. Mobilization comprises the possibility to generate additional funding and accelerate a given programme implementation. It is necessary to identify funding (donor) agencies that are willing to support the implementation of programme activities. The IOC regional subsidiary bodies identify training, assistance and development needs related to the agreed priority programmes. These needs, together with the programmes, are transmitted to donor agencies, and the IOC Secretariat negotiates with the potentially interested donor agencies. In this way, sustained funding may be obtained to support adopted priority programmes for a region, even if individual donors focus on selected countries. Examples where this approach is working are the agreements IOC has reached with SAREC, DANIDA and FINNIDA.

TABLE I

LIST OF IDENTIFIED TRAINING NEEDS*

A. OCEAN DYNAMICS AND CLIMATE

- Equipment Handling and Data Analysis for Continental Shelf Circulation Studies
- Continental Shelf Circulation Modelling
- Marine Meteorology and Physical Oceanography
- Coastal Water Dynamics

B. OCEAN SCIENCE IN RELATION TO LIVING RESOURCES

- Collection, Processing and Analysis of Oceanographic Data and Phytoplankton Samples
- Collection, Processing and Analysis of Zooplankton/Ichthyoplankton Samples
- Larval/Post Larval Identification
- Qualitative and Quantative Chemical Analysis of Blooms and associated Bio-Toxins

C. OCEAN SCIENCE IN RELATION TO NON-LIVING RESOURCES

- Preparation and Interpretation of Data Maps for Palaeogeographic Studies
- Data Compilation and Analysis for Palaeogeographic Mapping
- Interpretation of Marine Geological/ Geophysical Data
- Monitoring Coastal Erosion
- Marine Geological Survey Technique and Sediment Budget

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* The list is based on the past and projected training requirements as determined by the Secretariat. IOC regional and programme bodies will up-date the list accordingly.

TABLE I (Cont'd)

LIST OF IDENTIFIED TRAINING NEEDS

- Continental Margin Environment and Mineral Resources

D. OCEAN MAPPING

- Bathymetric Mapping for Marine Studies

E. MARINE POLLUTION RESEARCH AND MONITORING

- Methods of Monitoring, Processing and Interpretation of Petroleum Pollution
- Intercalibration Techniques
- Monitoring River Inputs of Pollutants
- Application of Remote-Sensing Techniques for Coastal Environmental Monitoring
- Oceanography in Relation to MARPOL

F. INTEGRATED GLOBAL OCEAN SERVICES SYSTEM

- Compilation, Analysis and Interpretation of IGOSS Data

G. GLOBAL OCEAN-OBSERVING SYSTEM

- Observation and Analysis of Sea Levels
- Storm-Surge Prediction
- Remote-Sensing Techniques for Ocean Observation

H. INTERNATIONAL OCEANOGRAPHIC DATA AND INFORMATION EXCHANGE

- Managing and Handling Oceanographic Data
- Marine Science Information Management
- Compilation and Processing of Oceanographic Data for Micro-computors

I. INTERNATIONAL TSUNAMI WARNING SYSTEM

- Tsunami Warning Practice

TABLE II

INDICATION OF ACTIVITIES PROPOSED FOR 1991-1995 *

	Total	1991	1992	1993	1994	1995
Preparation of MSCP	14	2	2	3	3	4
Advisory Missions	7-12	1-2	1-2	1-2	2-3	2-3
Preparation of Technical Assistance Projects	4-6		1	1	1-2	1-2
Implementation of Technical Assistance Projects	4-9	1	1-2	1-3	1-3	
Training Courses, Workshops, Seminars	72	10	14	16	16	16
Individual Training (Shipboard Training)	150 (60)	14 (10)	18 (10)	18 (12)	20 (13)	20 (15)

* In addition to these activities, development of curricula for marine environmental education and training in integrated data analysis, monitoring and related developments is envisaged.

TABLE III

TOTAL ESTIMATED BUDGET REQUIREMENTS (US$)*
(i.e., coming from the TEMA subject area and the regional programme support)

	1991	1992	1993	1994	1995
Preparation of MSCP	15,000	15,500	20,000	20,000	25,000
Advisory Missions	10,000	10,500	12,100	15,000	20,600
Preparation of Technical Assistance Project	5,000	10,000	11,000	11,000	12,000
Execution of Technical Assistance Project	5,000	10,000	11,000	12,000	12,000
Training Courses	100,000	120,000	130,000	150,000	190,000
Individual Training	60,000	72,000	80,000	90,000	100,000
TOTAL:	**195,000**	**238,000**	**264,100**	**298,000**	**349,000**

* The sums indicated assume not only contributions from the IOC TEMA budget but also from other subject-area parts of the IOC budget and, where appropriate, from other organizations that may co-sponsor certain activities.

APPENDIX

PROPOSED GUIDELINES FOR THE IOC VOLUNTARY CO-OPERATION PROGRAMME (VCP)

1. TERMINOLOGY

The programme shall be known as the IOC Voluntary Co-operation Programme (VCP). It shall consist of two components:

(i) the Voluntary Co-operation Fund (VCP(F)) which is part of the IOC Trust Fund, but for this specific purpose and with identified allocations;

(ii) the Technical Training, Equipment and Maintenance Programme (VCP(TEM)).

2. PURPOSE AND RESOURCES OF THE VCP

The VCP shall be established and maintained by voluntary contributions received from Member States for the purpose of meeting officially notified requests proposing co-operation or partnership projects in different fields. Contributions may take the form of financial payments in any currency which can be readily used for the VCP(F) and/or offers of technical training, equipment, and related maintenance, including fellowships for the VCP(TEM). Contributions in the form of equipment shall only be acceptable upon the signing of an agreement between the supporting country and the Intergovernmental Oceanographic Commission which shall specify the details of the arrangements for the transfer of the equipment and which shall, *inter alia*, include a formal statement of the transfer of the title of the equipment to IOC or the receiving Member State laboratory.

Financial contributions shall be made unconditionally; the Secretary of IOC shall invite Member States once every year to notify the Secretary as early as possible of the amount and the currency of financial contributions which they wish to pledge for the next calendar year.

3. ADMINISTRATION OF THE VCP(F)

The VCP(F) shall be administered by the Secretary in accordance with existing rules for the IOC Trust Fund and:

(i) the provisions of the present guidelines; and

(ii) any supplementary directives for interpretation of these guidelines and regulations that may be decided by the IOC Assembly or Executive Council.

Costs involved in the management of VCP should be kept to a minimum and should be met from the appropriate allocations in the Regular Budget, together with allocations from VCP(F), as necessary, but not exceeding 10 percent of VCP(F) and interest credited to VCP(F).

4. FIELDS OF CO-OPERATION

The fields of co-operation covered by the VCP shall include:

(i) the implementation of global, regional and coastal ocean marine environment observations and monitoring;

(ii) the granting of long-term and short-term fellowships;

(iii) the support of short-term training seminars for personnel engaged in observation and monitoring programmes and other activities covered under VCP;

(iv) the support of activities in other IOC Programmes; and

(v) the establishment of observing and data-processing facilities necessary for the global ocean-observing system, in particular for climate study, as well as health of the ocean monitoring purposes, and including the coastal zone.

The VCP shall not compete with or replace other means and resources available for promoting activities mentioned in the preceding paragraph. Accordingly, the VCP should be regarded as being a supplement to the following activities:

(i) national programmes in oceanography, marine sciences and related services, and especially observational and/or monitoring programmes;

(ii) bilateral or multilateral programmes of technical co-operation in those areas; and

(iii) United Nations Development Programme projects.

The VCP is also an appropriate mechanism for implementing Technical Co-operation among Developing Countries (TCDC).

5. APPROVAL FOR THE UTILIZATION OF THE VCP

Authority to approve the utilization of the VCP(F) and VCP(TEM) shall be vested in the Executive Council, which shall exercise such authority by approving individual projects. In order to ensure timely action and implementation, the Executive Council may choose to delegate certain authority to the Chairman and the Secretary. In approving each project the Executive Council shall specify clearly the technical aim of the project, the manner and period of its implementation and, in the case of projects to be implemented under the VCP(F), the amount and currency authorized for this purpose. The Executive Council shall have the right to amend any previously approved project prior to its completion as it considers necessary in the light of changing circumstances. The use of a VCP(F) allocation to support TCDC activities can be authorized by the Assembly or Executive Council. The Secretary is authorized to adjust the amount of VCP(F) approved for the implementation of VCP projects by an amount not exceeding 15 percent provided he is satisfied that adequate financial resources are available in the fund.

6. CRITERIA FOR APPROVED PROJECTS

All approved projects shall satisfy the following criteria:

(i) the Executive Council shall be satisfied that there is a reasonable prospect that, at the end of the project, the benefits will be lasting or the services installed will be maintained;

(ii) the Executive Council shall be satisfied that the project contributes to one or more of the following:

a) the implementation of an essential or important feature of the overall IOC programme activities and, in particular, components of the global ocean-observing system;

b) the training of personnel serving or to be employed in a national oceanographic research or resource institution;

c) the establishment of observing and data-processing facilities necessary for the World Climate Programme or the support of the activities within the World Climate Applications Programme related to impacts of changes in the marine environment;

d) the Member State concerned shall in all cases have signified agreement to the project and to any necessary counterpart action or contribution on its part.

7. FORMULATION OF PROPOSED PROJECTS

Proposed projects shall be based on official requests received from Member States. Each request shall specify the following details:

(i) purpose and description of the project;

(ii) reason why other sources of support cannot be expected;

(iii) explanation of how the project fits into the overall IOC Programme implementation;

(iv) global, regional or national benefits to be expected from the project;

(v) outline of a development or strengthening plan for the national oceanographic and marine services;

(vi) nature and scope of national contributions to the project; and

(vii) proposed VCP contribution including training and expert services.

Details requested in paragraph (vi) shall include budget support planned for spare parts and consumables after the initial operation, and information on particular problems to be expected with customs clearance or reimbursement of taxes by the relevant service to the government, where applicable.

Proposed projects concerning fellowships shall be based on official requests received from Member States and may, as appropriate, be considered as part of the existing IOC Research Fellowship Scheme. Each request shall specify the following details:

(i) background information for evaluation of training requirements;

(ii) field of specialization in which training is requested;

(iii) proposed duration of training; and

(iv) importance of training.

Proposed projects involving short-term training seminars shall be based on official requests made by Member State(s) and endorsed by the regional IOC subsidiary body concerned or the Chairman thereof on its behalf. These project proposals shall contain:

(i) nature and scope of the project;

(ii) participating countries;

(iii) relation to development of ocean (marine environment) observation and monitoring; and

(iv) duration of the project.

8. APPROVAL OF PROJECTS

A list of proposed projects shall be submitted by the Secretary to the Executive Council, which shall establish a list of approved projects. This list shall then be circulated by the Secretary with a minimum of delay to all Member States, requesting each to notify him for which of the approved projects they are prepared to provide the equipment and related services.

In the light of the offers received from Member States, the Secretary shall submit to the Executive Council the proposed VCP projects, giving full information on which of these projects could be implemented from the offers of equipment and services made by Member States and which will require, for implementation, financing from the VCP(F). The Executive Council shall then establish a list of projects authorized for implementation either by means of the offers from Member States for equipment and services (VCP(TEM)) or financing from the VCP(F). In particular, when more than one offer is received for the same project, the Executive Council, in consultation with the countries concerned, shall decide which shall be accepted.

9. PROCEDURES FOR IMPLEMENTATION OF PROJECTS

Before implementation of any approved project begins, the Secretary shall negotiate the appropriate agreements between the Member States concerned and the IOC. These agreements may take the form of an exchange of letters.

The following principles shall be incorporated into the agreements between IOC and the Member States providing equipment and services:

(i) each agreement shall relate to, and be consistent with, a project within the VCP which has been approved;

(ii) the agreement shall be signed by a person designated by the relevant government institution of the contributing government, on the one hand, and the Secretary of IOC, on the other;

(iii) the agreement shall specify in detail the equipment and training to be provided and services to be rendered by the contributing government, with a planned schedule for the implementation of the project;

(iv) the agreement shall specify clearly that the equipment in question is donated to the IOC, or other receiving government laboratory, the transfer of title to be effective at a time and place specified;

(v) notwithstanding principle (iv), the agreement may and shall normally include arrangements for the transportation of equipment and its installation; as far as possible, the costs involved shall be met by one or other of the co-operating parties; and

(vi) the agreement shall specify that, after completion of the project, a report will be drawn up and signed by both co-operating parties stating that the equipment is operational and the project completed.

The following principles shall be incorporated in the agreements between IOC and the Member States being provided with cash or equipment or services under the VCP:

(i) each agreement shall relate to, and be consistent with, a project within the VCP which has been approved;

(ii) the agreement shall be signed by a person designated by the governmental institution of the government, on the one hand, and the Secretary of IOC, on the other;

(iii) the agreement shall specify in detail the equipment which the IOC shall transfer to the government and the services which shall be rendered by the IOC or its authorized agent; the authorized agent may be the contributing country;

(iv) in the case of projects which involve a contribution in cash to a Member State, the agreement shall specify the items for which the cash contribution shall be used and shall lay down procedures for the financial accounts to be submitted by the Member State concerned;

(v) the agreement shall specify in detail the counterpart responsibilities accepted by the government in respect of the local facilities, internal transportation, site preparation, provision of personnel to be trained, installation, subsequent operation and maintenance of the equipment, with a planned schedule for the implementation of the project;

(vi) the agreement shall specify the conditions for the transfer of the title of equipment from the IOC to the government concerned; and

(vii) the agreement shall specify that, after implementation of the project, a report will be drawn up and signed by both co-operating parties stating that the equipment is operational, the project completed and the operating Member State assumes responsibility for continued operation of the equipment from national resources. The agreement shall also specify the arrangements for periodic reporting by the Member State concerned to the Secretary on the on-going effectiveness of the project; the period for submitting reports will depend on the types of equipment provided.

From the time of negotiating the agreements, the Secretary shall act as a focal point during the entire implementation of the projects, keep the projects under constant review and take all possible steps to ensure that unforeseen difficulties are removed and the prescribed rate of progress in implementation is maintained in each case.

The Secretary shall submit a progress report on the programme to each session of the Assembly or the Executive Council.

10. DURATION OF VALIDITY OF PROJECTS

Projects that have been circulated for more than five years and have not been supported shall be reviewed, updated or cancelled, as appropriate. The Secretary shall take appropriate action in this respect with Member States concerned and if necessary assist them in reformulating the VCP request.

11. REVIEW OF THESE GUIDELINES

These guidelines may be amended by the Assembly or Executive Council as necessary to ensure the efficient management of the Voluntary Co-operation Programme.

ANNEX IV

LIST OF WORKING WORKING DOCUMENTS[1]

Document Code	Title
IOC/TEMA-V/1	Agenda
IOC/TEMA-V/2	Annotated Provisional Agenda
IOC/TEMA-V/3	Summary Report
IOC/TEMA-V/4	List of Documents
IOC/TEMA-V/5	List of Participants
IOC/TEMA-V/6	Report on Intersessional Activities
IOC/TEMA-V/7	Draft TEMA Strategy
IOC/TEMA-V/8	Not allocated
IOC/TEMA-V/9 rev.2	Draft TEMA Strategy and Action Plan for 1991-1995
IOC/TEMA-V/9 Add.	State of Implementation of the UNESCO-IOC Comprehensive Plan for Major Assistance Programme to Enhance the Marine Science Capabilities of Developing Countries
IOC/TEMA-V/Inf.1	Technical Assistance in Hydrographic Surveying and Marine Charting
IOC/TEMA-V/Inf.2	Status of Hydrographic Surveying and Nautical Charting World-Wide
IOC/TEMA-V/Inf.3	Draft Strategic Framework to Strengthen Oceanography in Developing Countries Through the TEMA Programme
IOC/TEMA-V/Inf.4	Extracts from the Report of the Twenty-third Session of the Executive Council (Doc.IOC-EC XXIII/3)
IOC/TEMA-V/Inf.5	Extracts from the Report of the Thirteenth Session of the IOC Assembly, Related to TEMA (Doc. SC/MD/79)

[1]This list is for information only. No stocks of these documents are maintained.

ANNEX V

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ANNEX VI

LIST OF ACRONYMS

ASEAN	Association of South East Asian Nations
AWI	Alfred Wegener Institute for Polar and Marine Research (Germany)
CARICOM	Caribbean Community
CEPPOL	Marine Pollution Assessment and Control Programme for the Wider Caribbean
COMAR	Coastal Marine Programme
COMARAF	Research and Training on Coastal Marine Systems in Africa
CPPS	Permanent Commission for the South Pacific
DANIDA	Danish Agency for International Development
FAO	Food and Agriculture Organization of the United Nations
FINNIDA	Finnish International Development Agency
GEBCO	General Bathymetric Chart of the Oceans
GIPME	Global Investigation of Pollution in the Marime Environment
GLOSS	Global Sea-Level Observing System
GTZ	Agency for Technical Co-operation (Deutsche Gesellschaft Technische Zusammenarbeit) Germany
IAEA	International Atomic Energy Agency
ICES	International Council for the Exploration of the Sea
ICOD	International Centre for Ocean Development (Canada)
ICSU	International Council of Scientific Unions
IGOSS	Integrated Global Ocean Services System
IHO	International Hydrographic Organization
ILMR	International Laboratory of Marine Radioactivity
IMO	International Maritime Organization

IOC	Intergovernmental Oceanographic Commission
IOC/MRI	Office of the IOC and Marine Science Related Issues
IOCARIBE	IOC Sub-Commission for the Caribbean and Adjacent Regions
IOCINCWIO	IOC Regional Committee for the Co-operative Investigation in the North and Central Western Indian Ocean
IOCINDIO	IOC Regional Committee for the Central Indian Ocean
IODE	International Oceanographic Data and Information Exchange
IOI	International Ocean Institute
IPCC	Intergovernmental Panel on Climate Change (of WMO and UNEP)
JGOFS	Joint Global Ocean Flux Study
MIM	Marine Information Management
MSCPs	Marine Science Country Profiles
OSLR	Ocean Science in Relation to Living Resources
OSNLR	Ocean Science in Relation to Non-Living Resources
PC	Personal Computer
POEM	Physical Oceanography of the Eastern Mediterranean
PROMAR	Promotion of Marine Sciences
RFS	Research Fellowship Scheme (of IOC)
RV	Research Vessel
SAREC	Swedish Agency for Research Co-operation with Developing Countries
SCOR	Scientific Committee on Oceanic Research
SOPAC	South Pacific Applied Geoscience Commission
TCDC	Technical Co-operation Amongst Developing Countries
TEMA	Training, Education and Mutual Assisstance in the Marine Sciences
TOGA	Tropical Ocean and Global Atmosphere
TREDMAR	Training and Education in Marine Sciences
UN	United Nations

UN(OALOS)	United Nations Office for Ocean Affairs and the Law of the Sea
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
VCP	Voluntary Co-operation Programme
WESTPAC	IOC Sub-Commission for the Western Pacific
WMO	World Meteorological Organization
WMU	World Maritime University
WOCE	World Ocean Circulation Experiment