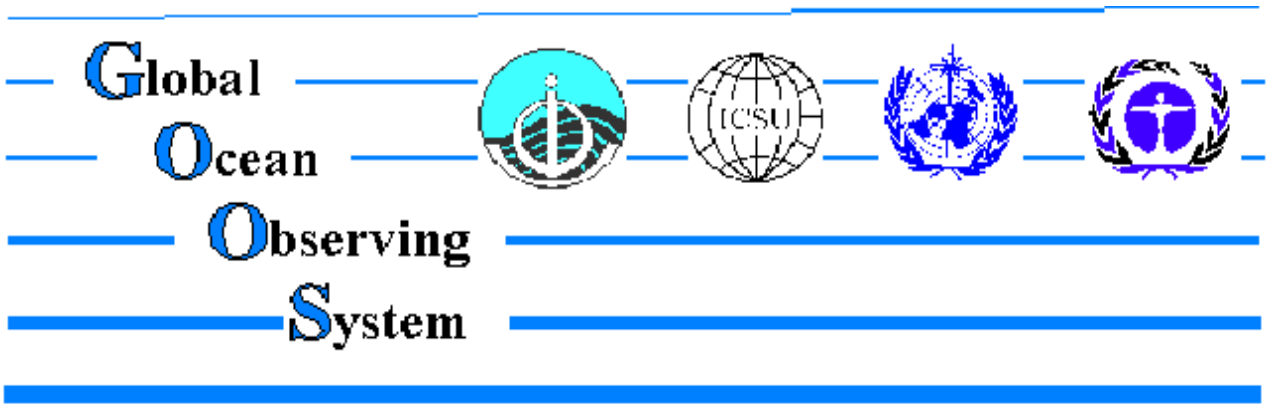

Intergovernmental Oceanographic Commission

Principles of the Global Ocean Observing System (GOOS) Capacity Building

GOOS Report No. 69
IOC/INF-1158

UNESCO 2001

Intergovernmental Oceanographic Commission

Principles of the Global Ocean Observing System (GOOS) Capacity Building

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GOOS Report No. 69
IOC/INF-1158

UNESCO 2001

IOC/INF-1158
Paris, March 2001
Original: English*

ABSTRACT

This document sets out the context for the capacity building needed to enable all countries to participate in, contribute to and benefit from GOOS. Building self-sustaining capacity requires a paradigm shift - to thinking and acting in partnership, in an integrated and fully comprehensive way, and for the long term. The Principles for GOOS Capacity Building are that its programme will:

- focus on increasing national participation in GOOS activities and on improving operational oceanographic and related services to the users and peoples of all countries;
- emphasize the development of local expertise for advising policy-makers about sustainable development of marine resources and preservation of the marine environment;
- be tailored to the requirements of targeted countries or regions;
- actively involve the community in the recipient country;
- capitalise on regional cooperation to maximize resources, to encourage mutually beneficial activities between countries with similar requirements, and to establish robust regional systems;
- pay attention to the interaction between local, regional and global systems, without which the full benefits of GOOS cannot be achieved;
- be sustainable, through the forging of partnerships between the donor and the recipient organizations or countries;
- entrain the support of governments, international organizations, the private sector, and other donors;
- create awareness in the minds of the public and policy makers so as to raising national and international support;
- maintain consistent goals over a long term;
- measure how effective each mission is in meeting its goals.

* Translated into French and Spanish

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EXECUTIVE SUMMARY

The GOOS Capacity Building initiative is set in the context of the overall need to address the growing imbalance among countries, which is fundamental to a sustainable future. The ocean is a global commons, unique, critical to our collective life support system and to our quality of life. We cannot deal with its many issues without both national and international action, for which we need sufficient knowledge and information.

Through dedicated research efforts, our understanding of the ocean system has increased, however solving society's needs also requires a capacity for making observations, analyzing the data, generating forecasts and other products and communicating the results. Those coastal countries with the lowest capacity for marine research and technology are often the most vulnerable.

Recently, the awareness of policy makers and the public in the oceans has been raised by the coming into force of the United Nations Convention on the Law of the Sea, giving a massive increase in offshore jurisdiction to coastal states. There have also been several global conventions and agreements directly and indirectly involving the marine environment and recently a call for improved ocean governance has arisen from several sources, including the UN Commission on Sustainable Development. One element of any governance model must be an adequate ocean observing system, built with the support of all nations.

The document *"Principles of GOOS Capacity Building"* is intended to explain and clarify the development of the GOOS assistance programme.

THE PROCESS

Developing and strengthening marine research and observational capacity involves human resources, institutions, and a management framework. Integrating these components is difficult, because of the complexity of jurisdictions and the variations in ability and capacity. GOOS capacity building activities must be designed for the long-term, be a true partnership between recipient and donor, be tailored to national and/or regional requirements, be flexible in scope, be sustainable and involve the user community.

THE ROLE OF THE IOC AND GOOS

The IOC is not a funding agency and has limited resources. The IOC coordinates, facilitates and advises. The IOC regional bodies can assist by coordinating their own resources and drawing on the centrally available global expertise. The IOC also can use its overall capacity building programme to enhance the GOOS efforts through links with potential donor agencies and sister organizations such as WMO, UNEP, UNDP and ICSU.

GOOS and its sponsors are developing principles and a programme to establish national capabilities in marine sciences and services in a wide range of activities and at many levels. The building of capacity of all countries is regarded as essential for the effective development of a continuing global ocean observing system. In some countries this will mean addressing a strategy for the development of infrastructure to sustain the needs of and benefits from a marine observation network for seasonal predictions, drought and severe storm monitoring, sea level rise, regional climate change, coastal zone and fisheries management. Donor countries will benefit from the contribution to both local and global services.

APPROACHES

It is necessary but not sufficient to find sources of funding for GOOS Capacity Building and development. For a sustainable capacity building programme, a partnership must be forged between the donor and the recipient organization or country. The former may supply the financial assistance, expertise or technology, but it is the latter that must set up the programme framework and establish its priorities. Without a framework to channel funds to the desired priorities, each source of funding will risk duplication or fragmentation. GOOS development plans will need to address multi-year commitments.

GOOS capacity building activities must be compatible with those of other entities, organizations and states interested in the marine environment, in related monitoring or with building capacity in the nation/region involved. The GOOS programme will also investigate more creative funding and support possibilities that involve existing and future users of the international ocean commons.

National GOOS coordinating committees involving key stakeholders would focus and enhance cooperative activities and their benefits. Regional cooperation increases programme visibility, emphasizes the importance of collective local priorities and improves the efficiency and effectiveness of local networks. As GOOS continues to evolve, regional programmes will assist in the transfer of new technologies and methodologies. Donor agencies will be more receptive to well planned programmes that promise national and regional commitments.

It is important to recognize national and regional efforts will be part of an effective Global Ocean Observing System. Although present development is mostly in industrialized countries, all countries must be eventually involved and capacity building activities must receive greater priority. Donor agencies will need to understand the potential benefits, to address long-term aspects and to work with the recipient countries in producing sustainable results.

Measures must be applied to assess the effectiveness of GOOS capacity building activities in order to be aware of whether such activities are useful. Without these no basis would exist for improving capacity building activities, and it is difficult or impossible to make a persuasive case for financial support for capacity building activities. Capacity building programmes must therefore address the difficult question of accountability and evaluation. Success must be measured in terms of results.

External sources of funding for GOOS Capacity Building and development are desperately needed. Commitments must also be made by the receiving governments to establish the necessary continuing framework to ensure an operational system, a partnership must be forged between the donor and the recipient organization or country. In many countries there will be a requirement for assistance in the initial planning process. Donor agencies will respond more positively to collective regional requests and to programmes that promise national and regional commitments. Attention must also be paid to creative ways of addressing the future needs of capacity building, which transcend even an optimistic outlook for the existing donor structure. Part of the wealth from future ocean resources could be arguably used to promote services and the capacity in all countries so as to benefit from the knowledge and information needed to sustain this wealth.

ORGANIZATIONAL ASPECTS

A GOOS Capacity Building Panel will be constituted as a resources and steering committee reporting to the GOOS Steering Committee and through that committee to the Intergovernmental Committee for GOOS (I-GOOS). It will consist of experts, representatives from the sponsors, and the private sector donor and recipient communities. The Panel Chair will be independent of the GOOS organizational structure.

The Panel is a link between the users and developers of GOOS. It will initiate, plan, and oversee the implementation on GOOS capacity building by facilitating and assisting in related programme development and through key demonstration projects. It will develop policies and plans for funding, create awareness and evaluate performance.

1. THE SETTING

1.1 THE VISION OF REAL PARTNERSHIPS

The need to address the growing imbalance among countries is fundamental to a sustainable future for the world community on two major fronts.

Firstly, there can be no hope of achieving and preserving a peaceful future unless there is a better balance of quality and dignity of life, amongst all communities, than we have at present.

Secondly, there is no way that the present critical global environmental issues can be addressed unless all governments are able to cooperate in joint solutions.

The ocean is unique in its very magnitude, its contribution to the planetary life support system and its position as a global commons. Due to the international nature of the oceans it is possible to take global actions (as was the case with the UN Convention on the Law of the Sea) that serve as a model for other global intergovernmental issues. In particular, for the Global Ocean Observing System, the opportunity for all countries to cooperate in obtaining sufficient knowledge to understand, predict and manage wisely the global commons, represented by the marine environment and its resources, represents an immense but achievable goal.

1.2 THE CHALLENGE

Through dedicated research efforts, our understanding of the ocean system has increased greatly during recent decades. Modelling and forecasting are playing rapidly increasing roles, complementing the largely observational nature of ocean science of the past. Society, however, is not yet fully benefiting from the results of ocean science. Considering the major issues currently facing society it is imperative that optimum use be made of scientific and technological progress.

Science plays a key role in development, as demonstrated in the *World Science Report* of UNESCO and many recent studies of the World Bank. However, solving society's needs requires not only capacity for making observations, but also the capacity to analyze the data, generate forecasts and other products and to communicate the results to the public, managers and policy makers. In addition, the product definition implies input and interaction between the system and its users.

The United Nations Convention on the Law of the Sea (UNCLOS), in defining the Exclusive Economic Zone, gave coastal states the right to use and the obligation to protect and manage their resources within at least 200 miles of their coasts. The United Nations Conference on Environment and Development (UNCED), through the conventions on biodiversity and climate change and through the publication of *Agenda 21*, committed countries to develop integrated management programmes for the sustainable use of the environment and the development of a global monitoring system.

More recently, the awareness of policy makers and the public was raised further through the United Nation's *International Year of the Ocean* (1998), the report of the Independent World Commission on the Oceans, the UN CSD-7, and other initiatives calling for increased attention to global ocean governance. One element of any governance model must be an adequate ocean observing system, built with the support of all nations.

All too often, those coastal countries with the lowest capacity for marine research and technology are also the ones most vulnerable to the potential effects of climate change such as rising sea levels, to the consequences of coastal disasters and to marine pollution, etc. Sound advice from indigenous experts is essential for policy makers in such countries. To develop local expertise requires a series of successive and interlinked approaches, including science education, the training of technicians, a knowledge of, and framework for, integrated management, a research ability, and an operating ocean service system that is fully integrated into a global network. All in all, a challenging assignment.

2. THE PROCESS

Developing and strengthening marine research and observational capacity involves human resources, the necessary institutions, and a framework that supports and sustains the observational system. These components must be integrated to form a network, but the implementation is difficult, because of the complexity of jurisdictions within and amongst nations and the variations in ability and capacity. Because of the large differences between countries, GOOS capacity building activities must be tailor-made to the specific needs of a country or a region.

A number of overall conclusions can be drawn about marine capacity building:

(i) it is a long-term process;
(ii) the involvement of the recipient government is crucial;
(iii) approaches must be tailored to specific country or regional needs;
(iv) for building and indigenous capacity, the active involvement of the community in the recipient countries is an absolute necessity;
(v) partners in developing countries are the most effective and persistent advocates for marine science and technology;
(vi) capacity building activities can vary from a single training course to the installation of a complete environmental monitoring system;
(vii) the best instruments for capacity building are activities in which scientists, engineers, socio-economists, and users work closely together (learning by doing, teaching the teachers) in the execution of projects, programmes, and partnerships;
(viii) governments, international organizations, the private sector, and donors should join forces in capacity building. In this regard, substantial interaction is also needed between the science foundations and donor organizations, because most donor organizations are unsure of marine issues;
(ix) creation of awareness in the minds of the public and policy makers is essential for raising national and international support; and
(x) finally, all participants must recognize the need to sustain capacity once it has been built.

3. THE ROLE OF THE IOC

The IOC is not a funding agency and has limited resources. The IOC, however, does have an important advisory, coordinating, and facilitating role to play in supporting the creation and strengthening of national mechanisms. It has established several regional subsidiary bodies, that can assist in making national efforts more sustainable and effective and that can provide mechanisms to stimulate capacity building for GOOS and other IOC programmes, as appropriate.

The IOC regional bodies formulate and agree on cooperative regional projects built on national actions and addressing identified national and regional needs and priorities. They aim at regional pooling of resources and joint capacity building, and draw upon the global programmes of the IOC, for expertise, results, and advice.

The IOC-Training, Education and Mutual Assistance in marine sciences (TEMA) capacity building programme is central to the overall IOC role and supports the capacity building efforts that are focused within the programmes of the Commission. A strong TEMA policy, acceptable to Member States, is desirable to help ensure that the capacity building process is linked to existing and planned national and regional programmes, thereby enhancing the success rate of capacity building activities.

The IOC acts as a link with potential donor agencies, although it has limited success to-date, and cooperates with regional intergovernmental subsidiary bodies and with the analogous mechanisms of sister organizations such as WMO, UNEP, UNDP and ICSU.

Funding is mostly found from a combination of the IOC funds and contributions from Member States. More substantial sources of support must be found from donor agencies (including the private sector) and by other appropriate and creative means.

The IOC/GOOS is developing principles and a programme to develop national capabilities in marine sciences and services. This programme for the building of capacity involves a wide range of activities, depending on the starting capacity (level of ability) of the nation concerned. The activities fall under the general headings of training, education, and mutual assistance; and within the IOC they are managed through the TEMA Programme.

The first steps in building capacity are raising awareness of the activities involved, the benefits that may accrue from participation, and the likely costs. The building of capacity of all countries to participate in and benefit from GOOS on a continuing basis is regarded as essential for the effective development of a continuing global ocean observing system. Donor countries stand to benefit from their investment in the capacity of developing countries because it will lead to a broad development of GOOS, from which all countries will benefit.

(The goals of IOC capacity building are given in Annex I.)

4. GOOS CAPACITY BUILDING OBJECTIVES

Capacity building in relation to GOOS is carried out by three partners:

(i) recipients or local, national or regional beneficiaries of the activities;
(ii) national or international donor agencies, the private sector or countries; and
(iii) the GOOS organization with its sponsors.

In the OECD (Organization for Economic Co-operation and Development) countries, the existing infrastructure will underpin many of GOOS activities. This is not true of many other countries, where the necessary infrastructure is only partly or poorly developed. Where such infrastructure does not exist, strategies should be implemented to meet the needs of nations:

- to develop and maintain a minimum scientific capability to support, participate in, and take advantage of GOOS-related activities, including among others coastal zone and fishery resource management;
- to raise understanding of the importance of *in situ* and space-based observations of the ocean in seeking solutions to socioeconomic problems;
- to educate the public and politicians regarding the socioeconomic benefits of, and fundamental dependence on, an ocean observing system;
- to raise the ability of countries to contribute to and benefit from global observing systems.

There must be a long-term investment in developing infrastructure for receiving, processing, and interpreting data from ocean and space-based sources. Such investment to be optimized by training in the use of such facilities and in the provision of services and products. (Services and products are likely to relate to seasonal predictions, drought and severe storm monitoring, sea level rise, regional climate change, coastal zone and fisheries management, coastal protection, coastal pollution, harmful algal blooms, coral reef disturbance and recovery and the like).

Special efforts should be made to create and sustain baseline networks of high quality surface-based stations or sections in a wide range of climates. Many of these are likely to be required in the coastal waters and the EEZ of countries requiring assistance.

5. GOOS CAPACITY BUILDING APPROACHES

5.1 FUNDING

It is necessary but not sufficient to find sources of funding for GOOS capacity building and development. Commitments must also be made by the receiving governments to establish the necessary continuing framework to ensure an operational system.

For a sustainable capacity building programme, a partnership must be forged between the donor and the recipient organization or country. It may be the former that can supply the financial assistance, expertise or technology, but it is the latter that must set up the programme framework and establish its priorities. In many countries there will be a requirement for assistance in the initial planning process and to ensure linkages, because local benefits cannot be optimized without adequate attention being paid to the interaction with the local, regional and global systems.

Donor agencies will respond positively to collective regional requests and to programmes that promise national and regional commitments. Expertise must be sought to prepare quality proposals that will have an optimum chance of being received and funded. It is recognized that the process of preparing a proposal itself needs financial support.

Donor funds should be used to assist and accelerate the participation of developing countries, however without a commitment by the receiving government, programmes will be as transient as the funding source, and without a framework to channel funds into the programme, and to the desired priorities, each source of funding will risk duplication or fragmentation.

Attention must also be paid to creative ways of addressing the future needs of capacity building, which transcend even an optimistic outlook for the existing donor structure. Again the ocean has already been a medium to point the way. In the UN Convention on the Law of the Sea, it has been envisioned that part of the profit from the sea bed mineral resources return to *"the common heritage of mankind"* via the *"Sea Bed Authority"*. Although the market pressures have delayed the exploitation of this particular marine resource, this mechanism could be further amplified.

The international ocean transports most of the world trade and this activity will be further increased by 25% in the near future. The maritime industry is one of the prime users of ocean marine forecasts and their closer involvement in voluntary ocean observations and in support of GOOS will be necessary.

The tourist trade is a huge industry and a major part is predicated on a healthy marine environment. Several countries are already imposing an environmental tax to assist in monitoring and managing their marine investment. Ocean health needs the protection of the whole marine environment.

The untapped potential of genetic and pharmaceutical resources of the ocean may yield billions of future dollars in the not-too-distant future, a proportion of which should be considered for return to the good of the whole international community, rather than using a first come, first served principle.

Hydrocarbons, international fishing stocks and many other marine resources already known, or to still come, should also be considered as part of the global commons.

The time to act is now. We must use existing funding and support opportunities, but more is needed. Generating adequate global support for environmental issues may not be a feasible cause for the GOOS Capacity Building Panel alone, but the thinking must start somewhere.

5.2 COOPERATION

Effective GOOS capacity building is a long-term process which starts with the potential users and their needs. An important instrument is partnerships between countries, those possessing and those requiring advanced marine capacity. The partnerships may involve bi-lateral or multi-lateral relationships. An underlying objective is that the interests and commitments of all partners must be considered prior to undertaking any activity.

GOOS capacity building activities should be harmonized to the extent possible with those of other entities, including organizations and states interested in the region. A major part of the financial support must come from agencies/states located in, or interested in supporting, the region.

It should be remembered that many capacity building activities are undertaken on behalf of the Global Climate Observing System or the Global Terrestrial Observing System as well as GOOS. Thus, it is imperative to retain close connections between the global observing systems when planning new capacity building initiatives.

5.3 PERFORMANCE MEASURES AND ACCOUNTABILITY

It is imperative that measures be applied to assess the effectiveness of GOOS capacity building activities. Without such performance measures we would be unaware of whether such activities are useful, we would have no basis for improving capacity building activities, and we would find it difficult to make a persuasive case for financial support for capacity building activities. Capacity building programmes must therefore address the difficult question of accountability and results of their activities. Success must be measured in terms of results and these are not merely represented by the numbers of workshops, participants and national attendance. Successful

programmes will leave a legacy to be built upon and failures noted and avoided in the future. Certainly the statistical data of what, where and how many (see Note 1 below), will remain useful, however in the long term the evaluation will depend on what is done beforehand in the setting down of objectives to be attained by the activity itself and the sustainable goals to be achieved.

For GOOS the overall global objectives for capacity building should be adopted. One would expect such objectives to have long-term consistency, and all encompassing. From these more specific, but compatible, goals would be developed for regional and then local levels, time and space scales being reduced accordingly, all fitting within an overall master scheme. The lack of objectives (benefits) agreed on by all parties to an activity will, almost inevitably, lead to unrealistic expectations and dissatisfaction on the part of some of the participants.

Each programme or project would have a specific objective or intended goals that can be used in retrospect, to judge its relative success. These would specify the results and expected schedule against which the success of the activity can be judged. The goals and objectives should be specified and accepted by the GOOS activity and participants, before embarking on a capacity building programme. It should be decided how and when results should be reported. Mutual agreement may begin with a proposal supported by a developing region, or government, requesting a capacity building activity that is GOOS-related and accompanied by expected benefits. That proposal would then be evaluated for feasibility, funding sources, and merit relative to other requests, among other factors. Assuming an agreement on a statement of activities and objectives is reached, the next step is agreement on a series of performance measures. Once the capacity building activities are initiated, performance reviews must be carried out at regular intervals. The oversight of this activity is one task of the GOOS Capacity Building Panel.

The organization or person(s) that receive the expected benefit would be best placed to accept the responsibility to prepare commentary on whether the results had met or had failed to meet expectations. For example, participants at training workshops would be expected to know and accept the goals before attending the course and should agree to report at an appropriate future date on progress. Reporting arrangements could be standardized, providing some flexibility was allowed to accommodate different types of training and regional differences. Measures might include:

(i) tracking the extent to which workshop trainees use the knowledge intended to be imparted;
(ii) assessing improvements in quantity and quality control of data generated by an activity;
(iii) assessing the beneficial use of observing system products in a particular region as a result of capacity building;
(iv) tracking increase in local government involvement (e.g., scholarships for training, new services, GOOS-related programmes); or
(v) assessing improvements to infrastructure related to marine sciences and GOOS.

Finally, beyond measuring the success of individual activities, the GOOS Capacity Building Panel has a responsibility for assessing performance of activities on a global scale.

Note 1: Extract from IOC Output and Performance Measures

To initiate, facilitate and co-ordinate at an intergovernmental level the development of major internationa education, training and technical co-operation activities (in support of observing and forecasting activities):

Input measures
(i) Expenditure on education, training and technical co-operation;
(ii) Sources and amounts of extra budgetary funding;
(iii) Number of staff managing education, training and technical co-operation activities;
(iv) Number of experts aiding in these activities.

Output measures
(v) Number and type of education activities;
(vi) Number and type of training activities;
(vii) Number and type of capacity building workshops;
(viii) Type and amount of technology transfer;
(ix) Number of reports on TEMA-GOOS activities;
(x) Number of publications on TEMA-GOOS activities;
(xi) Number of men/women participants;
(xii) Countries of people participating;
(xiii) Examples of key TEMA-GOOS achievements

5.4 THE NATIONAL APPROACH

To facilitate an active involvement in GOOS capacity building, countries should consider the creation of national GOOS coordinating or steering committees in which all of the key stakeholders (government departments, private sectors, and academic institutions) are brought together to define the user needs and find ways of meeting them. The chairman of this committee should act as a national focal point. This committee also acts as a national focus for GOOS capacity building. The national GOOS committees might be expected to:

- define user needs and specify data and products required to satisfy those needs;
- identify and suggest improvements to existing national capabilities;
- identify gaps in those capabilities and suggest corrections, including training and practical assistance as well as gap filling;
- promote communication among marine scientists, environmentalists, and coastal zone managers;
- encourage design and implementation of regional strategies for data acquisition, communication, synthesis, and dissemination of needed products;
- encourage pilot projects to demonstrate the usefulness of the GOOS approach;
- evaluate costs and benefits as a basis for persuading governments, donor agencies, and the private sector to support GOOS initiatives; and
- actively search for partners to initiate the GOOS capacity building process.

A more detailed approach to the establishment of national coordinating committees for GOOS is set out in Annex IV.

5.5 THE REGIONAL APPROACH

Regional cooperation increases programme visibility and can emphasize the importance of collective local priorities. Regional frameworks can also increase the effectiveness of scarce resources and the efficiency of the local observing, research, data management and prediction network.

Capacity building often is most effective when the region is entrained as a partner. Capacity building needs are formulated jointly by partners from industrialized and the relevant developing countries. (Here the national GOOS steering committees should be proactive.) Potential funding agencies (donors, private sector) should participate in this endeavour at an early stage. If possible, regional offices or officers based at an existing

regional office, should be staffed or augmented with individuals from the region. It is important to circumscribe the area of responsibility for a regional office/officer to avoid over commitment and false expectations. It is important to network with regional institutions (such as the regional IOC offices) and pertinent operational agencies.

GOOS will continue to evolve. Regional programme offices will help to sustain the capacity building activity by assisting with continuing upgrades of new communications, models, sampling technology, products, and other needs.

Regional organizations (e.g., SOPAC) already having operational responsibilities should be fully utilized by the GOOS system because it is essential to have access to staff, support systems, communications, data facilities, and other infrastructure, particularly in regions lacking such capabilities.

Needed are multi-year GOOS development plans (which can include a number of partnerships) that identify the needs of the users in the region, the requirements for GOOS implementation in the region, the capacity building needs related to that implementation, and sources of funding support. Regional representatives must be involved in developing all elements of these plans.

Finally, it is important to keep a keen eye on how these activities will support the implementation of the global GOOS. Regional activities just as national ones, are parts of the global jig-saw puzzle leading to a truly effective Global Ocean Observing System.

5.6 THE GLOBAL APPROACH

Building a global GOOS is a challenge. At present, GOOS development is progressing mostly in industrialized countries with well-developed marine science capability and a keen interest in, and need for, marine operational activities. This is to be expected, but unfortunately GOOS capacity building activities are often given low priority, even in these potential donor countries.

Another obstacle to be overcome is that many donor agencies do not understand the potential benefits for both the donor and recipient countries. Even so, change from short-term project funding to long-term, focused programmatic funding is happening in a few donor organizations. The consequence of the present difficulty and delay in obtaining support for capacity building is that developing countries often feel disappointed because follow-up activities sometimes take years to materialize.

Examples of classes of activities envisioned as being included in, or comprising, GOOS capacity building are given in Annex III.

6. ORGANIZATION FOR GOOS CAPACITY BUILDING

6.1 COMPOSITION OF THE PANEL

A strong and continuing link must be maintained between the GOOS Steering Committee and GOOS capacity building activities. The GOOS Capacity Building Panel should be constituted as a resources and steering committee reporting to the GOOS Steering Committee and through that committee to the Intergovernmental Committee for GOOS (I-GOOS).

The Panel should have one representative from each GOOS module panel and representation from the GOOS Steering Committee (including representation of countries needing assistance). The Panel chair should be independent of the GOOS organizational structure.

GOOS is intended to serve the needs of users. The Capacity Building Panel is one link between users and developers of GOOS. Thus, it is important to include in the membership of the Panel representatives of private sector users to provide guidance to the Steering Committee regarding user needs and to communicate GOOS plans and common requirements to users.

To promote understanding and strengthen support of GOOS capacity building, representatives of GOOS sponsoring agencies and potential donor agencies should be invited as affiliates to the Panel meetings. *Ex officio*

membership on the Panel should include that person at the IOC/GOOS Office with overall responsibility for GOOS capacity building and a representative of TEMA (who may be the same person representing the Office).

There must be adequate representation from the recipient countries in need of support. This may be achieved through any one of the above, or if such representation is not covered, then through the appointment of additional members.

6.2 TERMS OF REFERENCE

The terms of reference for the GOOS Capacity Building Panel are:

(i) to initiate, plan, and oversee the implementation on GOOS capacity building through the development of key demonstration projects carried out within the GOOS implementation process[1] . For this purpose, the Panel welcomes suggestions from interested nations or donor agencies for potential demonstration projects;

(ii) to develop a plan to be submitted to ODA organizations to obtain funding for GOOS-related capacity building activities[2] ;

(iii) to create awareness[3] of GOOS capacity building;

(iv) to develop guiding principles to be applied in GOOS capacity building activities[4] ;

(v) to develop key indicators for measuring the success of capacity building efforts[5] ;

(vi) to initiate and assist in the development of multi-year regional plans for GOOS capacity building, including partnerships with developed regional activities[6] ;

(vii) to consult and collaborate with the GOOS module advisory panels in the planning and implementation of capacity building and in the selection of demonstration and pilot projects on which capacity building efforts are to be focused.

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1 Required is a series projects closely related to development activities. As an example, the Global Ocean Data Assimilation Experiment offers opportunities for projects to strengthen data and information capabilities in developing countries. Examples are regional data centres such as SEACAMP in Singapore or RECOSCIX in Mombasa. Demonstration projects might also be formulated by major research programmes such as those of the WCRP or IGBP.

2 The IOC lacks funding adequate for all needed activities.

3 The uses of products and information from the oceans must begin with awareness at all levels in society of their value.

4 For example, there should be emphasis on new and future technologies and on the entrainment of younger people with the potential and time to benefit from capacity building.

5 These might include initiation of, and improvements in, production and quality of data and products.

6 As examples of partnerships, EuroGOOS might offer opportunities for Africa and Eastern Europe; ENSO research partners could join together and initiate related activities in the Pacific.

ANNEX I

DEFINITION OF IOC CAPACITY BUILDING

Recognizing that many coastal states lack the capabilities in marine science required for them to fully participate in, contribute to, or benefit from the four main themes of the IOC:

(i) to develop, promote and facilitate international oceanographic research programmes to improve our understanding of critical global and regional ocean processes and their relationship to the sustainable development and the stewardship of ocean resources;

(ii) to ensure effective planning, establishment and co-ordination of an operational global ocean observing system to provide the information needed for oceanic and atmospheric forecasting, for ocean and coastal zone management by coastal nations and for global environmental change research;

(iii) to provide the international leadership for education and training programmes and technical assistance essential to systematic observations of the global ocean and its coastal zone and related research;

(iv) to ensure that ocean data and information obtained through research, observation, and monitoring are efficiently handled and made widely available.

The IOC has developed a cross-cutting theme focused on the development of national capabilities in marine sciences and services. The IOC Programme for this building of capacity involves a wide range of activities, depending on the starting capacity (or level of ability) of the country concerned. The activities fall under the general headings of Training, Education, and Mutual Assistance, and are managed through the TEMA Programme, which includes technology transfer. A first step in building capacity is raising awareness of the activities involved, the benefits that may accrue from participation, and the likely costs.

ANNEX II

EXAMPLES OF CAPACITY BUILDING ACTIONS REQUIRED

Given the need for initial baseline networks of stations and sections as part of an integrated global observing system, priority should be given to creating, strengthening, and/or rehabilitating reference stations or sections in the waters around nations requiring assistance.

Equally high priority should be given to establishing or improving data receiving, distribution, and processing centres in nations requiring assistance to ensure full data acquisition and use. In the context of GOOS, there are a number of data centres managed by the IOC's Committee on International Oceanographic Data and Information Exchange (IODE). Many need upgrading to incorporate the full range of multi-disciplinary data. Special centres should be created in a few places to handle advanced processing and assimilation of oceanographic data into regional ocean and climate models. Such a centre is proposed by the Southeast Asian Centre for Atmospheric and Marine Prediction (SEACAMP) project serving the needs of Southeast Asia from Singapore.

It also is important to ensure that nations are capable of benefiting from and involved in environmental monitoring. This requires that:

(i) such countries have access to data and products along with the capacity to produce and utilize high-level products and data sets consisting of both satellite and in situ data;

(ii) the introduction of new facilities be matched by training and supporting their use, particularly focused on the generation of advisory services and products;

(iii) scientists from nations needing assistance be able to participate fully in the work of major national and international centres engaged in advanced data processing, as for seasonal and climate scale predictions; and

(iv) full use be made of existing capacity building programmes, such as IOC's Training Education and Mutual Assistance (TEMA) programme in the GOOS context, and START (the Global Change System for Analysis Research and Training) in the IGBP context.

ANNEX III

EXAMPLES OF CLASSES OF ACTIVITIES ENVISIONED AS BEING INCLUDED IN GOOS CAPACITY BUILDING

On the job training of individuals in both home and external institutions is a very effective method for providing either initial or refresher training to specialists.

Fellowships to individuals for scientific, technical, and engineering training/formal education can be very effective with long-lasting results.

Regional cooperative development projects directed at limited attainable objectives can be a cost-effective way of developing relevant capabilities and resources-for building capability in national institutions, this may be more cost effective than via individual national projects.

Assistance in securing resources needed for developing/enhancing infrastructure needed for specific GOOS-related activities, either for institutions or nations, should be on focus.

Short-term residential courses/workshops dealing with specialized subjects are effective means of training specialists; they may be regional or global in attendance. They may result in the award of appropriate accreditation (e.g., limited diploma) or international recognition from an international institution or a research or academic institution.

Courses taught by distance learning will become more common and should be considered as a cost effective means of training, if facilities exist.

Including strong capacity building components in global and regional research programmes can result in an excellent milieu for the training of specialists as well as enhancement of the research.

Creating awareness of the importance of the GOOS activities and of the need for capacity building is essential.

ANNEX IV

NATIONAL COORDINATING COMMITTEES FOR GOOS

At the second session of the GOOS Steering Committee, Beijing, April 1999, members agreed that individual countries should be encouraged to develop national groups to promote the development of GOOS. This could be done, as suggested by GOOS-AFRICA, by establishing National GOOS Coordinating Committees (NGCCs) to develop and strengthen the effectiveness of the national institutional infrastructures in support of operational oceanography and marine meteorology for all purposes, which will stimulate the development of GOOS on a national and regional basis. In principle NGCCs differ from National Oceanographic Committees in bringing together all of the potential stakeholders, both suppliers and users, including academia, all relevant branches of government, commerce and industry. Some nations already have such committees, which in some instances are outgrowths of or subcommittees to National Oceanographic Committees.

Based on the GOOS-AFRICA recommendation, NGCCs will be expected to:

(i) determine user needs and specify the data and products required to satisfy those needs;

(ii) identify and work to improve existing national capabilities, including human skills and available technology;

(iii) identify gaps in those capabilities, including inadequacies in present observing and data management systems, and work to correct them, focusing (a) on training and practical assistance related to meeting users' needs in the coastal zone and elsewhere, and (b) on formulating plans to fill gaps;(ii)Identify and work to improve existing national capabilities, including human skills and available technology;

(iv) pay special attention to exploiting the opportunities offered by the increasing number and variety of observations of the coastal zone and open ocean from space satellites;

(v) promote communication between marine scientists and coastal managers and other potential users of GOOS data and information through the development of national, regional and global electronic networking;

(vi) promote the design and implementation of regionally coordinated strategies for data acquisition, integration, synthesis and dissemination of products to improve coastal zone assessment, the assessment of other environments, and the forecasting and prediction of environmental change;

(vii) develop regional pilot projects to demonstrate the usefulness of the GOOS system in the coastal zones and surrounding oceans, and encourage participation in ongoing GOOS pilot projects;

(viii) evaluate costs and benefits as the basis for persuading governments, donor agencies and the private sector to support a data acquisition programme and associated capacity building;

(ix) promote GOOS development and expansion through appropriate communication.

ANNEX V

LIST OF ACRONYMS

EEZ	Exclusive Economic Zone
GOOS	Global Ocean Observing System
ICSU	International Council fo Science
I-GOOS	Intergovernmental Committee for GOOS
IGBP	International Geosphere-Biosphere Programme
IOC	Intergovernmental Oceanographic Commission (of UNESCO)
NGCC	National GOOS Co-ordinating Committee
ODA	Overseas Development Agency
OECD	Organization for Economic Co-operation and Development
SEACAMP	Southeast Asian Centre for Atmospheric and Marine Prediction
SOPAC	South Pacific Applied Geoscience Commission
START	Global Change System for Analysis Research and Training (IGBP)
TEMA	IOC Training, Education and Mutual Assistance programme
UNCED	United Nations Conference on Environment and Development
UNCLOS	United Nations Convention on the Law of the Sea
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WMO	World Meteorological Organization