



**Intergovernmental Oceanographic Commission**

# **Implementation Strategy for Capacity Building for the Global Ocean Observing System (GOOS)**

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### **Abstract**

The Implementation Strategy for Capacity Building for the Global Ocean Observing System (GOOS) has been produced in response to a requirement by the GOOS Steering Committee (GSC), and was approved by the 4<sup>th</sup> session of the GSC (March 14-16, 2001). It demonstrates how the GOOS Capacity Building Principles (GOOS Report 69, IOC/INF-1158) could or should be converted into actions to sustain capacity building for the long term. Key elements of the strategy are as follows:

- (i) The GSC must decide on the long-term objectives for the Capacity Building Programme;
- (ii) The GOOS Capacity Building Panel must decide on a framework for the short to medium term objectives of the Capacity Building Programme, which should be designed to meet national and regional users' needs, and formulate a work programme for approval by the GSC;
- (iii) The GOOS Project Office should work to obtain the support of both donor and recipient countries for the proposed programme;
- (iv) The Intergovernmental Committee for GOOS (I-GOOS) should develop arguments for a mechanism to provide the resource base for sustainable Capacity Building;
- (v) The GOOS Capacity Building Programme should exploit the potential benefits of working through partnerships;
- (vi) The GOOS Capacity Building Programme should be flexible, be evaluated, be capable of accepting all scales of assistance, and be creative;
- (vii) The GOOS Capacity Building Programme must be broadened so as to increase its scope and impact.

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## 1. INTRODUCTION

*The Principles of the GOOS Capacity Building* (GOOS Report No. 69, IOC/INF-1158, 2001 and Annex I of this document) set out the context for the capacity building needed to stimulate the growth and development of the Global Ocean Observing System (GOOS) world-wide. It recognizes that the ocean is a global commons whose health is critical to the planetary life support system, and that action to prevent “the tragedy of the commons”, and to maintain the ocean’s health, demands both national and international activity, including observations and forecasts. Building self-sustaining capacity requires a paradigm shift - to thinking and acting collectively, in an integrated and fully comprehensive way, for the long term- as described in the *Principles* document. It also requires an implementation strategy.

In response to this need, the Implementation Strategy contained in this document was developed by the successive chairs of the GOOS Capacity Building Panel, Geoff Holland and Geoff Brundrit, in consultation with Panel Members, with the Chairs of the GOOS Advisory Panels and the GOOS Steering Committee (GSC), and with the Director of the GOOS Project Office (GPO). The Strategy was first presented in draft to the third session of the GSC (GSC-III, Paris, May 10-12, 2000), before being finally approved by the fourth session of the GSC (GSC-IV, Vina del Mar, Chile, March 14-16, 2001).

Putting the Strategy into action requires understanding of what GOOS is (see IOC, 1998, Strategic Plan and Principles for the Global Ocean Observing System (GOOS), Version 1.0, GOOS Report No. 41, IOC/INF-1091, Paris, 17 pp.). GOOS is a *system of organization* initiated and implemented under the leadership of the Intergovernmental Oceanographic Commission (IOC) of UNESCO, with input in its development (where appropriate) by the World Meteorological Organization (WMO), the United Nations Environment Programme (UNEP) and the International Council for Science (ICSU). GOOS is NOT a programme, project or experiment in the conventional sense, although it may contain and contribute to the success of such entities. GOOS can be thought of as being a *structural overlay or template* upon the ocean observing activities of the world and the organizations, programmes and projects that support them. GOOS is designed to supply the required knowledge and information to managers, decision makers, scientists and other users. It developed in response to international pressures, particularly those coming through the United Nations Convention on the Law of the Sea (UNCLOS), through the United Nations Conference on Environment and Development (UNCED, Rio, 1992) and its Agenda 21, and through the World Climate Conference (1990).

A sustainable strategy to implement GOOS needs the participation of all countries. To that end, capacity must be built to enable all countries to participate in, contribute to and benefit from GOOS. Developed countries need to assist in building the capacity of developing countries not just as a form of aid, but also to give all countries the truly global picture needed to understand how the Earth system works and to forecast how it will behave.

The Implementation Strategy recognizes that the main driving forces determining the scope and structure of marine science world-wide in support of applications are ocean circulation, climate and global warming on the one hand, and exploitation of coastal waters on the other hand. Most developing countries lack the capacity for climate studies. Their governments expect their marine scientists to explore coastal waters and exclusive economic zones (EEZs) and to assess their resources, and to advise on sustainable management and on issues like shore protection and multiple use of habitats.

Sustainable exploitation of coastal seas, and the protection of coastal zones, require the development of new scientific capacity in many developing countries. Integration across the natural sciences is required, as is integration between them and the social sciences. This increasingly demands a modular approach to education and research rather than the traditional subject-oriented approach.

A Capacity Building Implementation Strategy in support of sustained and integrated ocean observations must allow all recipient governments to participate in, contribute to, and benefit from, the regional and the global observing network. It must have the support of both donor and recipient and satisfy the priorities of both.

It must have stable goals that will outlast urgent and local priorities. It must work to clearly stated requirements, and have clearly spelled out objectives aimed at local, regional and global levels. There must also be short- and medium-term objectives that contribute towards the longer term goals.

The Implementation Strategy must build local awareness, skills, infrastructure and institutions. It must have well designed accounting or follow-up of activities, enabling performance to be measured, adaptations to be made and focus to be retained. It must also have a mechanism to obtain the funds needed to implement and where necessary expand the system. Given the limited nature of the budgets of the GOOS sponsors for capacity building, and the magnitude of the requirement, capacity building must inevitably be carried out largely with donor funding that must be sought out.

The Implementation Strategy should be flexible, recognizing that different countries have different needs. It should be creative to leverage expertise, equipment, facilities, capital and funding sources to increase the scope and impact of the programme. It should capitalize on growing Internet access for disseminating information that can be used for training.

Finally, the Strategy should recognize that no one organization can by itself build all the capacity required. It should therefore aim to create partnerships with donors and recipients, and to exploit the various capacity building initiatives of major international and intergovernmental organizations and their regional offices.

## **2. THE ELEMENTS OF THE IMPLEMENTATION STRATEGY**

These elements and their associated goals and objectives should be achieved within the framework of the GOOS Principles for Capacity Building, and will be adopted and used to maintain a consistent Capacity Building Programme.

### **2.1 LONG-TERM OBJECTIVES**

***The GOOS Steering Committee must decide on the long-term objectives for the Capacity Building Programme.***

It is only by keeping the long-term objectives of the programme visible and constant that a sustainable result will be achieved.

Long-term goals must be defined bearing in mind the purpose of capacity building, which is to make possible the continued involvement of nations in GOOS. Capacity building includes education and training; the building of appropriate national and regional institutional support structures; the creation of networks; the provision of infrastructure elements (e.g., platforms, sensors, laboratory equipment, and facilities for data and information management); and providing access to communication networks for data telemetry, dissemination and exchange (e.g., the Internet, downloading and visualizing satellite data). Capacity building will be an integral component of GOOS activities including the design of the global network and pilot projects. A final component will be a general education element with the aim of increasing the public awareness of GOOS and of the anticipated social benefits of such a system.

Where infrastructure does not exist, strategies should be implemented to meet the following needs of nations:

- (i) the need to develop and maintain at least the minimum scientific capability to support and participate in GOOS-related activities;
- (ii) the need to raise understanding of the value of *in situ* and space-based observations of the ocean in solving socio-economic problems. Efforts must be made to educate the public and politicians regarding the benefits to be obtained from investing in developing, maintaining, and utilizing ocean observation systems;

- (iii) the need for ocean data, including satellite measurements and *in situ* measurements necessary for their calibration, validation, and augmentation (special efforts should be made to create and sustain baseline networks, in the coastal waters and EEZs, of high quality surface-based stations or sections in a wide range of climates. Many of these are likely to be in countries requiring assistance);
- (iv) the need to raise the ability of countries to contribute to and benefit from global observing systems. There must be a long-term investment in facilities for receiving, processing, and interpreting data from ocean and space-based sources to be accompanied 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).

## 2.2 SHORT- TO MEDIUM-TERM OBJECTIVES

***With advice from the Intergovernmental Committee for GOOS, the GOOS Steering Committee, regional GOOS bodies, the GOOS Advisory Panels and the GOOS Project Office, the GOOS Capacity Building Panel must decide on a framework for the short- to medium-term objectives for the Capacity Building Programme, which should be designed to meet national and regional users' needs, and formulate a suitable work programme for approval by the GOOS Steering Committee.***

The setting of clear goals and requirements for the short- to medium-term is an essential and initial capacity building strategy input required from the GOOS Steering Committee. In this context it is noted that the successes of the IOC's capacity building Training, Education and Mutual Assistance programme (TEMA) have been in those areas that have had clear requirements, a good example being the International Ocean Data and Information Exchange (IODE) programme, where a network of data centres was developed and made available to sustain capacity building efforts. Experience in the TEMA programme shows that where capacity building was not linked to established programmes, the results of training workshops and similar endeavours, although of short-term usefulness, rapidly evaporated and disappeared.

The Panel's goals and requirements should include concrete advice to the GOOS Project Office on what resources are required and how they may be obtained. A fully effective capacity building programme will require investment of substantial funds by external agencies to supplement the approximately \$0.5 million/year that the IOC has available centrally for its complete range of capacity building activities (including GOOS).

In building the short- to medium-term programme the Panel should recognize the advisability of linking training and education to instruments/observations/processing that are actually locally available at the time. The GOOS Steering Committee working with various GOOS technical panels is asked to provide advice on these short- to medium-term goals.

The third session of the GOOS Steering Committee agreed that data and information management should be high on the list of short- to medium-term priorities, as should training in modelling and space-based remote-sensing. An example of the short-term objectives relative to Africa can be found in Annex II.

## 2.3 DONOR SUPPORT

***Within the framework of the objectives provided by the GOOS Steering Committee in (2.1) and (2.2) above, the GOOS Project Office should work to obtain the support of both donor and recipient countries for the proposed programme.***

The GOOS Project Office should have information at hand to explain to potential donors the goals of the capacity building programme, the benefits of participation in the GOOS and, where possible, the results already achieved.

Marketing of the benefits of GOOS to local economies and living standards must continue to be of large importance to the capacity building effort. This marketing should explain the need for observing and forecasting systems and demonstrate the link between them and the management of ocean activities.

The capacity building programme will not be viable or sustainable without the good will and determination of both donor and recipient communities. Without the contribution of the recipient country a capacity building programme will wither as soon as aid is withdrawn. The most valuable aid programme is one that assists a country to fulfill a capacity building programme that it has already decided to be worthy of support and is anxious to implement itself. In addition, a national framework should be available for contributions from various sources, thus providing a focus for assistance rather than having many different capacity building programmes competing for the usually scarce indigenous resources.

Both donor and recipient organizations should act together to ensure that local personnel are assigned to work with consultants. This is to the benefit of both, and ensures that the transfer of experience and expertise will be two-way.

The GOOS Project Office should stimulate the development of GOOS at national levels, by advising countries to form National GOOS Coordinating Committees to develop and strengthen the effectiveness of the national institutional infrastructures in support of operational oceanography and marine meteorology. These committees should bring together all of the potential stakeholders, both suppliers and users, including academia, all relevant branches of government, commerce and industry. The Office should also develop a list of national GOOS contacts for communications on capacity building. It would be important for such a contact to be familiar with the aid programmes in his/her respective country.

The GPO will work with the national committees to support, develop, focus and enhance the capacity building programme, and to establish priorities. It will work with regional GOOS bodies to increase visibility, improve the efficiency and effectiveness of local networks and aid technology transfer. It will also work with the GOOS Sponsors (IOC, WMO, UNEP, ICSU), which can provide further assistance.

## 2.4 BUILDING THE RESOURCE BASE

*The Intergovernmental Committee for GOOS (I-GOOS) should develop arguments for a mechanism to provide the resource base needed for sustainable capacity building. Intergovernmental organizations should be able to influence the direction of aid programmes in general by identifying long-term objectives that can at least, be taken into account by the individual programmes.*

The monitoring of the global environment will soon become a priority for all governments. The actions needed to monitor global change will be increasingly discussed at senior levels in the United Nations. I-GOOS and related global monitoring interests should work together to build some sort of intergovernmental mechanism to provide the needed resource base for global change monitoring needs. The "common heritage of mankind" articles on resources from the international ocean, and even the carbon tax, show some possibilities for the way forward. Donor agencies could get together themselves to address the need to monitor the planet.

## 2.5 PARTNERSHIPS

*The GOOS Capacity Building Programme should exploit the potential benefits of working through partnerships.*

There is growing agreement that partnership projects offer the best hope for a way forward. In many cases such partnerships are encouraged through regional co-operation and the participation of countries with similar problems and priorities. Capacity building programmes are often generated in the region with mutually beneficial objectives agreed to by all partners, and should be relevant to the development of each host country in the framework of national obligations. The programmes should aim to strengthen scientific capacity in the host country and the region, by training on the job and other means.



The training can be built around jointly planned research projects, which are planned and executed jointly by all partners, making full use of the existing competence in the region. The projects should be scientifically based, multidisciplinary, and include social sciences as well as natural sciences. There should be long-term commitment, with financial contributions by all partners. The projects should be integrated into the scientific structure of the host country and its universities and R&D organizations, with connections to regional centres of excellence and training centres and networks. Partnership programmes need not be massive to succeed.

The strategy should exploit the various capacity building initiatives of potential partners such as IOC, WMO, ICSU, IGBP (International Geosphere-Biosphere Programme), CEOS (Committee on Earth Observation Satellites) and others, and the contacts that these organizations have within developing country regions, e.g. such as the IOC Regional Programme Office in Perth, Western Australia, for capacity building in the Indian Ocean and western Pacific; the IOC Office in Bangkok, Thailand, for capacity building in North-east and South-east Asia; the IOC Office in Cartagena, Colombia, for capacity building in the Caribbean, and so on. Examples are given in Annex V.

## 2.6 PROGRAMME ATTRIBUTES

*The GOOS capacity building programme should possess certain attributes.*

### (i) *The Capacity Programme should be flexible*

It is easy to suffocate programmes through the well-meaning placement of restrictions and rules. It must be recognized that capacity building will take place under many and widely different scenarios, from a visit by a Secretariat member or expert, to a multimillion-dollar bilateral programme complete with capital funds for equipment and the resources to establish operational infrastructure. The GOOS Capacity Building Implementation Strategy is intended to bring cohesion and direction to the framework under which these diverse events occur, not to impede or diminish their value. The GOOS Capacity Building Panel can assist by providing an initial assessments of proposals, as in Annex IV.

### (ii) *Projects in the Programme should be evaluated*

It should be a prerequisite for participation for governments, institutions and/or the individuals themselves, to undertake to report back to the GPO, at regular intervals after the training event, the value of the training received and the progress made towards GOOS objectives.

All GOOS capacity building programmes should include a requirement for such reporting in the relevant agreements.

The auditing and accountability for the capacity building programme should follow the lines laid down for performance appraisal in the GOOS Principles of Capacity Building.

### (iii) *The Capacity Building Programme must be capable of accepting all scales of assistance for programmes that are seen to contribute to the long-term goals for GOOS, whilst being firm in refusing to accept, as GOOS programmes, activities that are not consistent with those goals*

It should nevertheless be able to absorb programmes that initially will be below the stated quality goals of GOOS, when so doing enhances the participation in GOOS activities and provides data in areas where previously no data existed. In such circumstances the eventual upgrading of such observations to the global standards will be recognized as a future priority.

Where a choice of GOOS activities may be available for a country or in a region, the priorities of that country or region should be respected. If these priorities differ from those of the donor source the GPO should negotiate the best terms between the two parties.

**(iv) *The capacity building programme must be creative***

The GOOS capacity building programme must transcend the past methods of counting training courses and workshops if it is to achieve a breakthrough. Training workshops are extremely useful in a structured programme, but taken on their own provide limited access to the potential range of capacity building activities that could be considered. It will be up to the Capacity Building Panel members to discuss and recommend creative approaches to help with the problem.

**2.7 INCREASING THE SCOPE AND IMPACT OF THE GOOS CAPACITY BUILDING PROGRAMME**

***Finally, it is most important that the GOOS Capacity Building Programme should be broadened as much as possible so as to increase its scope and impact.***

The Capacity Building Panel, the Intergovernmental Panel for GOOS and the GOOS Steering Committee must suggest to the GOOS Project Office ways of leveraging expertise, equipment, facilities, capital and funding sources to this end.

Three annexes are attached which detail some approaches that have already been found to be valuable. The developing countries have a particular need for capacity building, and specific actions found to be useful for extending capacity building in these countries are given in Annex V. By contrast, the Land-Ocean Interactions in the Coastal Zone programme has focused on actions such as secondment, mentoring and scholarships involving individuals, to be found in Annex VI. Finally, some generic approaches with wide applicability are given in Annex VII.

**Table 1: Elements of assistance in capacity building in marine science**

TRAINING	SUPPORT	COMMUNICATION	INSTITUTIONAL INFRASTRUCTURE	JOINT RESEARCH PROJECTS
<ul style="list-style-type: none"> <li>• fellowships (overseas or in the region)</li> <li>• advanced specialized training courses (e.g. technical or modelling)</li> <li>• training on the job</li> </ul>	<ul style="list-style-type: none"> <li>• advisors</li> <li>• instruments</li> <li>• research vessels (including maintenance and running costs)</li> <li>• literature</li> </ul>	<ul style="list-style-type: none"> <li>• regional and global meetings and workshops</li> <li>• electronic information and communication systems</li> <li>• scientific journals</li> <li>• awareness raising</li> </ul>	<ul style="list-style-type: none"> <li>• universities</li> <li>• research institutes</li> <li>• national and regional organizations</li> </ul>	<ul style="list-style-type: none"> <li>• joint cruises</li> <li>• joint projects</li> </ul>

**Table 2: Current activities involving GOOS-related capacity building through the IOC**

DIRECT TRAINING	RELATED TRAINING	BUILDING REGIONAL GOOS BODIES (1999-2000)	PROPOSED REGIONAL AWARENESS RAISING (2001)	SOME AS YET UNMET REGIONAL NEEDS
<ul style="list-style-type: none"> <li>• GLOSS (Global Sea Level Observing System) Training Workshop</li> <li>• NEAR-GOOS data and information management course</li> <li>• RAMP (Rapid Assessment of Marine Pollution) training courses</li> </ul>	<ul style="list-style-type: none"> <li>• HAB (Harmful Algal Bloom) training</li> <li>• IODE data and information management training</li> </ul>	<ul style="list-style-type: none"> <li>• PIRATA regional meeting, Casablanca</li> <li>• PIRATA Western Extension meeting, Fortaleza</li> <li>• MedGLOSS workshop, Haifa</li> <li>• MedGOOS workshop, Rabat</li> <li>• IOCARIBE GOOS workshop, San Jose</li> <li>• PacificGOOS coastal workshop, Apia</li> </ul>	<ul style="list-style-type: none"> <li>• East Africa GOOS workshop, Nairobi</li> <li>• SEAGOOS Workshop, Seoul</li> <li>• Black Sea GOOS workshop, Poti</li> <li>• IOCARIBE-GOOS workshop, Miami</li> <li>• SEREAD, South Pacific</li> </ul>	<ul style="list-style-type: none"> <li>• African tide gauge network</li> <li>• Remote Sensing Capabilities for African coasts</li> <li>• S.E.Pacific coastal warning system</li> <li>• S.W.Atlantic coastal warning system</li> <li>• ? eastern Baltic?</li> </ul>

**Table 3: Current activities involving GOOS-related capacity building through JCOMM and/or WMO**

DIRECT TRAINING	BUILDING GLOBAL SYSTEMS AND CAPABILITIES	REGIONAL DEVELOPMENT PROJECTS	VOLUNTARY COOPERATION PROGRAMMES
<ul style="list-style-type: none"> <li>• Port Meteorological Officer Training Workshops</li> <li>• Wave and Storm Surge Modelling/Forecasting Training Workshops</li> <li>• Training workshops on applications of ocean remote sensing</li> </ul>	<ul style="list-style-type: none"> <li>• MPERSS Seminars/workshops</li> <li>• Sea-ice remote sensing workshops</li> </ul>	<ul style="list-style-type: none"> <li>• SEACAMP</li> <li>• WIOMAP</li> <li>• Others in future</li> </ul>	<ul style="list-style-type: none"> <li>• Shipboard systems</li> <li>• Coastal metocean stations (including tide gauges)</li> </ul>

## ANNEX I

### A SUMMARY OF THE PRINCIPLES FOR GOOS CAPACITY BUILDING

The Implementation Strategy is designed to guide implementation of the Principles for GOOS Capacity Building, which are in essence:

- (i) the capacity building programme will have, as its prime directive, a focus on increasing the national participation in GOOS activities and on the improvement of operational oceanographic and related services to the users and peoples of all countries;
- (ii) the capacity building programme will maintain consistent goals over a long-term;
- (iii) emphasis will be on the development of local expertise, so as to ensure sound advice to policy-makers for the sustainable development of marine resources and preservation of the marine environment;
- (iv) for a sustainable capacity building programme, a partnership must be forged between the donor and the recipient organization(s) or country(ies);
- (v) capacity building activities must be tailored to the requirements of the targeted organization, country or region. In all cases the active involvement of the recipient is essential;
- (vi) clear methods must be used to measure how effective each activity is in meeting its goals;
- (vii) for all activities, attention must be paid to the interaction among local, regional and global systems, without which the full benefits of GOOS cannot be achieved;
- (viii) where possible regional cooperation should be used to maximize resources, to encourage mutually beneficial activities amongst countries with similar requirements and to establish robust regional systems;
- (ix) where effort shall be made to entrain the support of governments, international organizations, the private sector, and other donors;
- (x) creation of awareness in the minds of the public and policy makers is essential for raising national and international support.

## ANNEX II

### THE IMMEDIATE PRIORITIES OF THE GLOBAL OCEAN OBSERVING SYSTEM IN AFRICA

As examples of short-term objectives, the following ideas are offered from the report of the GOOS-AFRICA Workshop that formed part of the PACSICOM Conference (Maputo, July 1998) (see GOOS Report 62, IOC, 1999). The Workshop recommended investment in the following top priority activities to provide a sound marine data base in support of SICOM (sustainable integrated coastal management) in Africa. These four recommendations have the weight of governmental support behind them as they form part of the PACSICOM Resolutions and the Maputo Declaration, signed by 53 African countries and their Ministers:

- (i) to form an Africa-wide network of National Ocean Data Centres that are properly equipped and staffed by trained personnel, whose first responsibility will be the rescue in digital form of the presently widely-scattered and more or less unavailable observational data on African coastal seas, so as to provide a sound information base for local and regional coastal planning. (This objective is already being addressed by the IOC's ODINAFRICA Project – see Annex III);
- (ii) to upgrade and expand the present African network of sea-level stations for the measurement of tides and sea-levels, and to train the technical professionals manning those stations in the analysis and interpretation of the data, so as to enable the production of advice for decision makers on potentially hazardous and costly changes in the local marine environment- such as sea-level rise;
- (iii) to encourage the formation of a network of specialists trained in the use of remotely-sensed ocean data from space satellites, and to ensure the increased access to regional satellite receiving stations in Africa, so as to ensure that coastal managers have ready access to the rapidly increasing wealth of spatial data on the coastal environment;
- (iv) to facilitate the further implementation of modern electronic communication systems such as Internet connections and data transfer mechanisms, so as to promote effective communication and to make data and information more readily available for coastal planning. (This is partly being addressed by the IOC's ODINAFRICA Project).

## ANNEX III

### EXAMPLES OF PARTNERSHIPS

One example is the Ocean Data and Information Network for Africa (ODINAFRICA) project funded jointly by the Government of Flanders and the IOC, which aims to support of the development of African marine science by: creating a network of oceanographic data and information centres across Africa; by supporting and developing national marine science databases; by training scientists in ocean data and information management; and by providing appropriate computer equipment and Internet access. This programme and its precursor have already led to the establishment of new data centres in Kenya, Madagascar, Mauritius, Mozambique, Seychelles and Tanzania. This shows how a technical body can assist in the delivery of regional and funding agency objectives.

Another example is the Global Climate Change Project in the Caribbean, funded by the Global Environment Facility of the World Bank, and which involves the development of a state-of-the-art network of tide gauges to monitor sea-level change in relation to climate change around the Caribbean, as the basis for forecasting potential coastal problems. The executing agency is the Organization of American States. The recipients are mostly small island states. The US National Oceanic and Atmospheric Administration (NOAA) acts as lead agency for installation of the network.

A third example, supported by the World Bank in many developing areas of the world, is the Large Marine Ecosystem (LME) programme, which uses the identification of marine ecosystems to characterize common regional priorities. This project is well funded because it is readily understandable, addresses the objectives of both the funding agency and the recipient countries, and will leave behind a legacy of well-trained marine scientists and new infrastructure and institutions in support of marine science.

A fourth example is the Partnership for Observations of the Global Oceans (POGO) – a partnership of major marine academic and government research institutions - to develop new approaches to training in operational oceanography (see [www.oceanpartners.org](http://www.oceanpartners.org)).

A final example is the Scientific Educational Resources and Experience Associated with the Deployment of Argo Drifting Floats in the South Pacific Ocean (SEREAD). This relates the tracking of floats with high school level educational materials delivered via the Internet, all managed by the International Ocean Institute (IOI) at the University of the South Pacific. The project is now supported by the IOI, the Argo Science Team, POGO, NOAA, UNESCO's Apia office, NIWA, SOPAC and the IOC Perth Office.

## ANNEX IV

### INITIAL ASSESSMENT OF CAPACITY BUILDING PROPOSALS

At the outset, the Capacity Building Panel should be charged with assessing proposals for inclusion in the capacity building programme. A process such as the one below can be envisaged:

- (i) the proposal is received;
- (ii) the proposal is evaluated according to the following (suggested) criteria:
  - are the objectives and management scheme for the proposal clearly identified?
  - are the objectives achievable? Will they be sustainable and contribute to the overall goals of GOOS as laid down by the GSC?
  - does the proposal have the backing of the recipient countries (participants)?
  - are the countries (participants) willing to evaluate the results and is the necessary process in place for this?
  - are the donors (funding sources) committed and agreed on the anticipated results?
- (iii) if the criteria are not met can suitable amendments be made?
- (iv) a decision is made to accept or reject the proposal.

## ANNEX V

### GOOS CAPACITY BUILDING FOR DEVELOPING COUNTRIES

Dialogue with developing countries over the years has identified the following capacity building needs that should be considered in developing a GOOS capacity building programme. The GPO could act as a broker in such arrangements:

- train M.Sc. and Ph.D. courses abroad in co-operation with their home universities, with these based on research topics and material of the home country;
- tailor curricula of universities in developed countries to the needs of developing country postgraduates, e.g. via joint programmes with tropical universities giving international courses in marine science that put major emphasis on the problems of coastal management in tropics/subtropics;
- make marine science education available at low cost to many students through Internet-based degree course leading to modular Masters degree in marine science;
- build capacity through research, e.g. put students from developing countries on developed world research ships;
- make locally available multi-purpose research vessels and platforms with interchangeable pay loads;
- broaden the education of local scientists by enabling them to participate in global/regional meetings and activities;
- strengthen local science through regional co-operation;
- get developed country scientists working in tropical coastal fields in combined research with local scientists;
- support the development of regional centres of excellence in teaching and research;
- provide communication systems for teaching and data exchange, including Internet connection fees;
- create a critical mass of science capacity within individual regions by exploiting regional training networks like those developed under SCOR and START;
- support advanced training courses and workshops dealing with modern methodologies and new approaches (modelling);
- train managers/lawyers/administrators in aspects of the application of marine science for coastal management;
- create networks of specialists trained in the use of data acquired by remote-sensing from space satellites;
- encourage developing countries to get their largely analog data records out of widely distributed files, digitised, and onto the web in forms suitable for analysis and exchange with other local or regional scientists;
- support regional meetings essential for information flow and to develop co-operation in research and monitoring;
- help developing country scientists to publish in top quality international journals;
- provide libraries with key journals.

In addition the following could be considered; the Strategy could:

- contribute to the development of regional analysis centres through which training can be repeated to create sustainability;
- set up an Internet brokerage service so that surplus equipment (computers/tools/instruments) and personnel needs can be matched to those willing to donate;
- consider the development of a grant system enabling returning students to start work immediately on a project on their return to their home country.



## ANNEX VI

### THE LOICZ APPROACH TO REGIONAL ASSISTANCE

The following models, from LOICZ (Land-Ocean Interactions in the Coastal Zone project of the IGBP) may also be found useful:

(i) Key scientists committing time and leading networks (regional or thematic)

LOICZ has about 140 nationally funded research projects that are "contributed" to LOICZ. National agendas and priorities are influenced by a national LOICZ or IGBP committee. This is fairly loose, but effective in generating a broad spectrum of science contribution and LOICZ acts to hold thematic and regional workshops which capture and focus these outcomes from the networked and other scientists.

(ii) Seconded or lead scientists

Other than its SSC members LOICZ has about 12 or 15 scientists scattered in regions of the world who act as de facto network leaders or thematic "directors" - in essence these are LOICZ's "seconded" people. They get together with LOICZ management through various targeted workshops (thematic, regional) and by electronic means, coordinated by the LOICZ International Project Office (IPO). A little money greases the wheels. For example, three leading researchers are involved in LOICZ nearly full-time. They wish to be and are willing contributors, are at very senior level and generate science fully directed at a pragmatic goal in LOICZ. They use and find support funds for an informal network (global; which also seeks support funds for elements of their total science purpose). The LOICZ IPO has agreements with them and their institutes and provides the 'grease'. In each case, LOICZ funds (about US\$10-20k) annual support and gets enormous multiplier effects and achievements.

(iii) Regional mentors

LOICZ has also sought external funding (UNEP, APN) and developed a network of scientific focal points in Mexico (for Latin America), Philippines (for Asia), Cape-Town (for Africa) and India (for South Asia). Here LOICZ involves key scientists on thematic areas, one or two people per site; they deliver science and work with a regional network of people. LOICZ provides US\$4000 p.a. for salary assistance and US\$4000 p.a. for support funds per site. The sites are used for training and associated LOICZ science yield, often supporting this with a little funding. This is a huge success (established about 18 months ago). LOICZ includes and supports these people in various thematic and regional workshops (separately funded by LOICZ and external funds) and works with these focal points to get support from regional and global funding agencies for project proposals. The latter are always small proposals (say, \$20 -50k; one or two years and high delivery) and with the proposal quality very attractive to the funders. In 2000, LOICZ picked up 4 of these from one regional funder alone.

(iv) Scholars

The LOICZ IPO has sought bigger project funding for integrating projects across LOICZ, with some success. These are less than US\$1 million, take a bit of work from the Office with the global network of LOICZ people, but are pitched at the low end of dollars given by the target funding agency. A major attraction is the inclusion of capacity building through outplacement scholarships ranging from weeks to a year as part of the science delivery. The scholars form an additional set of bases in regional networks on their return, and LOICZ works with them to get further national support or regional support funding where possible.

LOICZ also has had some success in gaining scholarship funds from other sources, such as IGBP's START programme for capacity building. The regional people see these as highly valuable for career and capacity purposes - and in a sense, a reward for commitment to LOICZ.

## ANNEX VII

### **FURTHER USEFUL APPROACHES TO CAPACITY BUILDING**

The following examples may be found useful in developing GOOS capacity building programmes in particular countries.

Donor agencies should allow resources for, and request the recipient country to nominate, shadow managers/consultants to work with designated experts on an aid programme. Too often a stranger comes in, spends a few weeks looking around then disappears to write a report. Having a "shadow" in the country should provide continuity, indigenous knowledge, training and experience (both ways), plus the ability to use the same indigenous shadow managers to work with other programmes rather than starting over from scratch.

Many countries want to be involved in the planning and decisions of global activities. A national or multilateral donor programme should be sought to supply the relatively modest funds required to second competent scientists from developing countries to the GOOS and related Project Offices. The period for such secondments could be for 1-4 year periods, providing either removal and living expenses and/or salary support in the host location. This would have the two-way benefit of training, building up an understanding in a developing country, bringing indigenous expertise into the global office, and easing Secretariat workload problems.

Set up an institutional north/south and/or south/south-twinning programme. Many universities have sabbatical arrangements and the receiving country could perhaps pick up per diem expenses to have highly qualified lecturers exchanged for semesters, etc. If this were organized regionally, a whole course may be able to be run with rotational lecturers, for the same cost as a training workshop.

There are also some special needs, particularly in the European context, in Eastern Europe and Northern Asia, where the marine science institutions of the former Soviet Union are in a very difficult situation. In order to maintain the existing human and material potential, solidarity by the international marine science community is called for. Without external support much of the research capabilities, skills and information will erode and only a very small fraction of the young generation will decide to enter marine science. Retaining and reforming viable scientific infrastructure and manpower in those regions is of similar importance to building new science capacity in other parts of the world.

## ANNEX VIII

### LIST OF ACRONYMS

CEOS	Committee on Earth Observation Satellites
EEZ	Exclusive Economic Zone
GLOSS	Global Sea-Level Observing System
GOOS	Global Ocean Observing System
GPO	GOOS Project Office
GSC	GOOS Steering Committee
HAB	Harmful Algal Bloom
ICSU	International Council for Science
IGBP	International Geosphere-Biosphere Programme
I-GOOS	Intergovernmental Committee for GOOS
IOC	Intergovernmental Oceanographic Commission (of UNESCO)
IOCARIBE	IOC Sub-Commission for the Caribbean and Adjacent Regions
IODE	International Ocean Data and Information Exchange
IOI	International Ocean Institute
LME	Large Marine Ecosystem programme
LOICZ	Land-Ocean Interactions in the Coastal Zone
MedGLOSS	Mediterranean Global Sea-Level Observing System
MedGOOS	Mediterranean GOOS
MPERSS	Marine Pollution Emergency Response Support System (WMO)
NEAR-GOOS	N.E. Asian Region GOOS
NIWA	National Institute of Water & Atmospheric Research Ltd. (New Zealand)
NOAA	National Oceanic and Atmospheric Administration (U.S.A.)
ODINAFRICA	Ocean Data and Information Network for Africa
PACSICOM	Pan African Conference on Sustainable Integrated Coastal Management
PIRATA	Pilot Research Array in the Tropical Atlantic
POGO	Partnership for Observations of the Global Oceans
RAMP	Rapid Assessment of Marine Pollution
SCOR	Scientific Committee on Oceanic Research
SEACAMP	Southeast Asian Centre for Atmospheric and Marine Prediction
SEAGOOS	Southeast Asian GOOS
SERREAD	Scientific Educational Resources and Experience Associated with the deployment of Argo Drifting floats
SICOM	Sustainable Integrated Coastal Development
SOPAC	South Pacific Applied Geoscience Commission
SSC	Scientific Steering Committee (of LOICZ)
START	Global Change System for Analysis Research and Training (IGBP)
TEMA	Training, Education and Mutual Assistance (IOC)
UNCED	United Nations Conference on Environment and Development
UNCLOS	United Nations Convention on the Law of the Sea
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WIOMAP	Western Indian Ocean Marine Applications Project
WMO	World Meteorological Organization