

Building an Integrated Coral Reef Monitoring Network

– Lessons from the GCRMN South Asia

OLE VESTERGAARD¹ & BEN CATTERMOUL²

¹Project Coordinator, Intergovernmental Oceanographic Commission of UNESCO (2000–04)

²Regional GCRMN South Asia Coordinator, Colombo, Sri Lanka (2002–03)

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ABSTRACT

The Global Coral Reef Monitoring Network (GCRMN) has been operating in India, Maldives and Sri Lanka since late 1997 with the goal to establish a regional network of people and institutions to collect coral reef information for integrated and poverty-oriented reef management planning and policy-making. This paper briefly summarizes the activities and experiences of the 'GCRMN South Asia' from its first five years of operation, including a capacity building framework developed to assist identify, collect and use coral reef information to inform and influence management and policies. Important messages of the paper are that effective coral reef monitoring and management structures need to consider first and foremost the needs of the people who depend on the reefs for their survival. Secondly, it is critical that information of all types (ecological, socioeconomic, cultural, political and institutional) is available in a range of formats to develop holistic policies and management solutions. Through the activities presented below, a set of lessons relating to gathering, organizing, and disseminating that critical information to end-users have emerged, which may be useful in future work within and outside the region.

INTRODUCTION

Recent studies show that coral reefs underpin the livelihoods of millions of people worldwide, especially in Asia, the Pacific, East Africa and the Caribbean (Whit-

tingham *et al.*, 2003). In some areas, particularly small island states, the dependence is extremely high. Many of these people are very poor and regularly depend upon the reefs as a *keystone resource*. Others depend on the reefs as a *safety net* at certain times of the year to ensure they escape the worst of poverty. These people are extremely vulnerable to reef degradation and many are starting to become poorer (IMM, 2003a).

In recent decades, however, the coral reef ecosystems in South Asia have come under increasing pressure from environmental stress, unsustainable fisheries and harvesting methods, climate related coral bleaching and diseases, land-based sources of pollution, sedimentation, dredging and coral mining, and from inappropriate coastal development caused by insufficient planning, management, and policy decisions (Rajasuriya *et al.*, 2004). These negative impacts erode the livelihoods provided by healthy coral reefs to local people. The impacts vary among stakeholder groups, but in general the poorest stakeholders are finding that their livelihoods are declining more than other coastal stakeholders and they are the least able to respond to this change.

If coral reef management are to be successful on the longer-term, it has to effectively address the needs and aspirations of the poor people depending on reefs, ensuring the benefits are equitably distributed among all

stakeholder groups. Almost any form of resource management will affect the way people interact with reef resources, and dramatic changes in their access to reefs are likely to influence their livelihoods. And where people's livelihoods are marginal and subjected to stress and conflict, this will likely seriously affect their ability to pursue a sustainable livelihood. To avoid this situation, informed and holistic reef management that address the concerns of local reef users is vital.

Building capacity for integrated coral reef monitoring, aiming not only to collect ecological and socio-economic data on status and trends, but also synthesise and disseminate this information into planning and policy processes, is an important step in achieving this goal.

This paper briefly presents the activities and experiences of the GCRMN South Asia, including the project approach, which has evolved from a mainly environmental focus to a more holistic development-environment approach, and presents some experiences that may assist further coral reef monitoring and management planning.

GCRMN SOUTH ASIA PURPOSE AND PROJECT SET-UP

In 1995, the Global Coral Reef Monitoring Network (GCRMN) was formed by a range of international organisations and institutions to raise awareness on the global reef decline and provide better information on reef status and user practices to managers and policy makers.

The GCRMN South Asia (GCRMN SA) was formed in 1997 as a regional node of GCRMN by the governments of India, Maldives and Sri Lanka in response to the International Coral Reef Initiative's 'Framework for Action' (ICRI 1995) addressed at a regional ICRI workshop in Bandos Island, Maldives.

Addressing the close linkages that exist between the health of coral reef ecosystems and the welfare of poor coastal communities that rely on them, the overarching goal of GCRMN South Asia were to *'reduce poverty*

amongst coastal communities in South Asia', with the specific project purpose to *'inform and influence management planning and policies towards more sustainable and equitable exploitation of coral reefs'* (For a detailed definition of the concepts of 'equity' and 'sustainability' used by GCRMN South Asia, please refer to DFID 1999).

To achieve this purpose, the project set out to deliver the following specific *outputs*:

- (i) Enhanced capacity among national and regional partners to develop integrated coral reef monitoring programmes;
- (ii) Monitoring systems for the ecological and socio-economic aspects of coral reefs operational at target sites adapted for local and national use;
- (iii) Processes for more effective use of coral reef monitoring information to contribute to coral reef management planning;
- (iv) Increased regional awareness and understanding of issues related to sustainable use of coral reefs.

Training in ecological and socioeconomic reef monitoring, tailored information dissemination and regional networking have been facilitated by a succession of GCRMN Regional Coordinators from a project office based in Colombo, Sri Lanka working in close collaboration with National GCRMN Coordinators appointed in India (based at the Ministry of Environment & Forestry with Zoological Survey of India, ZSI), Maldives (based at the Marine Research Centre, MRC, Ministry of Fisheries) and Sri Lanka (based at the Natural Aquatic Resources Agency, NARA, Ministry of Fisheries).

Financial support, including a regional coordinator position, has been provided by UK Department for International Development (DFID), and technical and managerial support provided by the Intergovernmental Oceanographic Commission (IOC) of UNESCO and IMM Ltd (a UK based development and policy group acting on behalf of DFID), with local administrative assistance from the IUCN Sri Lanka office. Additional guidance has been received from a range of sources, in-

cluding the Global GCRMN Coordinator and DFID technical advisors.

GCRMN South Asia Capacity Building Framework

Building capacity to achieve above four outputs has been the focus of GCRMN SA over its first five years. Consultations, training, pilot monitoring, awareness raising, and formal and informal networking have contributed to the establishment of a regional network of institutions and skilled people across the region. Between late 1997 and 2003, more than 150 people from national agencies and NGOs were involved in 26 planning meetings, training workshops and field activities across the region. A capacity building framework has been developed to provide the skills to produce and use coral reef information to inform and influence management planning and decision-making (figure 1 on next page). It involves four interrelated requirements:

1. Understanding Information Needs

Government agencies, NGOs or local communities may all be responsible for particular aspects of coral reef ecosystems, and it's rarely a single entity that oversees and understands all aspects of managing the resource. All the stakeholders need information to fulfil their role in the decision-making processes, and they often need it in a different format to help them achieve their specific objectives. *Therefore*, in order to effectively inform each different stakeholder, the following must be specifically recognised: Who needs to be influenced? What information is required? What is the best information format? How is the information effectively disseminated?

2. Building Capacity to Collect and Analyse Information

Coral reef management presents decision makers with complex issues relating to the status of both the ecosystem itself, the diversity of stakeholders using it, and the institutions governing the resource. Information about each level of complexity must be collected, analysed and presented in a form that is accessible to decision makers. *Therefore*, the network partners need capac-

ity, skills and knowledge to collect and analyse information that effectively represents both environmental, social and economic status and trends.

3. Developing Information Systems

Information management systems such as databases and websites assist reef managers in storage and exchange of monitoring data and information, but integrated reef management also needs formal and informal linkages and conduits between institutions and people to enhance information flows. *Therefore*, to effectively inform and influence management planning and policy making, the GCRMN SA network must have *both* the data systems to store, manage and analyse monitoring information, *and* the networking capacity and human and institutional relationships that enables effective dissemination of this information.

4. Informing and Influencing Reef Management

Coral reef decision makers represent different sectors; have different objectives and differing levels of understanding of coral reef ecosystems and their stakeholders. A variety of reef management information is therefore required in a range of different formats. Very often, however, it is left to the information 'producer' to decide what information to collect, its format and dissemination, without always realising the requirements of the information 'user'. As a result, much reef information informs a too narrow range of stakeholders. *Therefore*, the GCRMN SA partners need the skills and understanding to produce and disseminate a range of information to a range of different users, in tailored formats, at strategic times, if they are to effectively inform and influence management planning and decision-making.

Understanding Information Needs in Reef Management

Planning meetings, consultations and skills in monitoring and analysing local ecological, socioeconomic and cultural conditions surrounding reefs and their use, including stakeholder's different needs and aspirations, has

Poverty reduction among coastal communities in South Asia



Information that effectively informs and influences resource use, management and policy making at local, national and international levels enabling equitable and sustainable coral reef use



Building capacity to produce and use information on environmental and socio-economic conditions of coral reefs and their use

4. Develop skills to use coral reef status information to inform and influence reef management planning and policy making

- Training in informing and influencing management and policy processes
- Link information providers with end users
- Promote the use of Informing & influencing strategies

2. Develop capacity to collect coral reef information

Provide training and guidance in:

- Ecological monitoring (survey designs, dive training, taxonomy)
- Socio-economic monitoring and reef livelihood assessments
- Data analysis & interpretation

Support pilot ecological monitoring and reef livelihoods assessments at demonstration sites

3. Develop systems for information sharing

- Facilitate networking among institutions and people
- Develop coral database in consultations with all stakeholders
- Establish national Coral Reef Fora
- Communicate via website, newsletter, other media
- Distribute publications
- Education and awareness raising in local language

1. Understand information needs in effective management planning

Through workshop and consultations, build understanding of:

- Processes governing the management and use of coral reefs
- Diversity of stakeholders in these processes and their information needs
- Local and national institutions and decision structures relating to coral reefs

Figure 1. GCRMN South Asia capacity building framework.

gradually enhanced the partners understanding of the information requirement of integrated reef management and the decision-processes governing coral ecosystems.

To help understand the political and institutional aspects of coral reef planning and decision-making, GCRMN SA commissioned national studies in each country (Cattermoul et al, 2003) identifying key information needs and institutional planning and decision-processes. The studies contain information on: (i) Current policies and policy instruments for the management of reef ecosystems at the national, and community levels; (ii) A description of the institutions, and their specific roles, that are responsible for the formulation and implementation of policies, legislation, and projects; (iii) The sorts of decisions that are made by these different institutions and the type and form of information needed by those institutions to plan and implement their roles in relation to reef ecosystems management; (iv) The information systems these institutions use to generate, store, analyse, use and disseminate the information; (v) The gaps in the current systems including: information quality and quantity; information detail; its appropriateness for use; and the skills, attitudes, and knowledge to implement systems; (vi) Recommendations on how skills and systems might be improved to satisfy these needs during a future phase of GCRMN SA. It is recommended to undertake similar studies in order to design and effectively utilise monitoring efforts in a given geographic area.

Key Lessons Learned

- It is essential that information provided to decision makers is provided in a format that decision makers can utilise. Implementing a study of decision-making processes in the early stages of developing an information network will provide a valuable framework for planning other initiatives such as skills enhancement, management information systems development, and dissemination strategies.

- Decision makers are influenced by many factors beyond scientific evidence. These may include wider government policy, political gain, economics, and social welfare.
- Participatory monitoring (both ecological and socio-economic) can be an effective way of enhancing local community's understanding of coral reef ecosystems and their use, thus enabling them to play a more active role in management, policy, and decision-making processes. Likewise, local communities and stakeholders often have valuable information that should be incorporated in the policy and management planning processes.

Building Capacity to Collect and Use Coral Reef Information

Coral reef management presents decision makers with complex issues relating to the status of both the ecosystem itself, the diversity of stakeholders using it, and the institutions governing the resource. Information about each level of complexity must be collected, analysed and presented in a form that is accessible to decision makers. The GCRMN SA delivered training workshops and guidance in both ecological monitoring and socioeconomic monitoring.

Ecological Monitoring

Training in ecological monitoring techniques, coral taxonomy, scuba diving, survey design and data analysis were provided in India, Maldives and Sri Lanka in 1998–1999, followed by pilot monitoring at demonstration sites in each country (figure 2). Emphasis was placed on using the common GCRMN survey method and data formats (English *et al.*, 1997), allowing comparison between sites. More recently, the less labour intensive ReefCheck survey method (Hodgeson *et al.*, 2004) have been introduced and are now commonly used for routine monitoring across the region, complementing detailed GCRMN monitoring surveys at selected permanent sites.

GCRMN SA assisted formulation of national Monitoring Action Plans, with strategies for supporting and

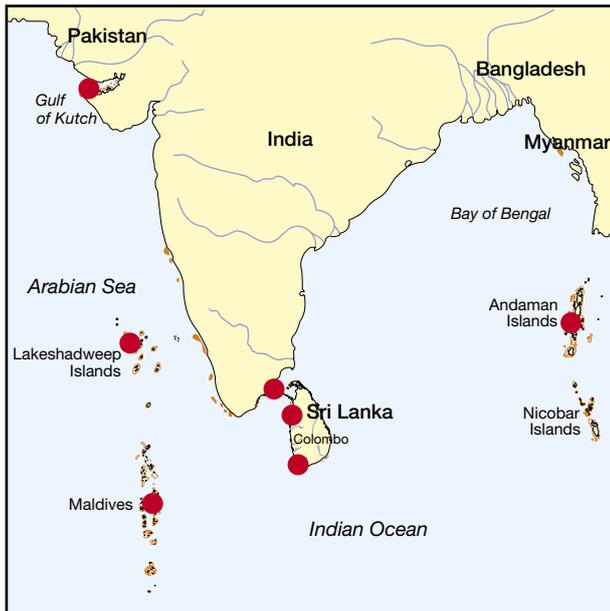


Figure 2. GCRMN South Asia training and monitoring demonstration sites indicated in red circles; *India*: South Andaman Island, Gulf of Manar, Agatti Island (Lakshadweep), Gulf of Kutch; *Maldives*: Male Atoll, Vavuu Atoll; *Sri Lanka*: Unawatuna, Kandakulya. Training and demonstration site monitoring is an important step in raising the awareness of reef issues at both local and high levels. India, for example, where coral reef monitoring and management had previously been very limited, now has developed a national reef monitoring program (ICRMN) and scientific centres across the country. In Sri Lanka, the training helped further develop and consolidate previous efforts.

implementing reef monitoring activities, in consultation with government departments in each country. These have been implemented only partly, though, and ecological monitoring has been undertaken by government agencies at varying levels of intensity through valuable collaboration with programs such as CORDIO ('Coral Reef Degradation in the Indian Ocean' supported by SIDA-SAREC), which has supported routine monitor-

ing in the region since 1998. The utilisation of early GCRMN training, skills and networking in other regional projects is a good example of collaboration and cost-effective sharing of competences and resources. Support for ecological monitoring to GCRMN partners has also been provided by AusAID, Asian Development Bank (ADB), and recently the Global Environmental Facility (GEF).

Socioeconomic Monitoring and Reef Livelihood Assessments

Socioeconomic reef monitoring on people's interaction with reefs represents a key requirement for implementing strategies for sustainable and equitable resource use, and has been a core focus of GCRMN SA. The common GCRMN Socioeconomic Monitoring manual (Bunce *et al.*, 2000), which was partly developed at a large regional workshop at Kadmat Island, India, September 1998, has been used as a key training resource in South Asia. Training in participatory monitoring surveys, site selection and development of protocols tailored to the local conditions were held in Gulf of Mannar and Sri Lanka, followed in 2000–2001 by training at demonstration sites in Sri Lanka, Maldives, South Andaman Island and Lakshadweep Islands, India. 12-month pilot surveys were undertaken by local groups funded by GCRMN SA at sites where ecological reef monitoring were already taking place, bringing together multidisciplinary information for use as baselines for longer-term monitoring.

Participatory monitoring was also used to raise awareness among local stakeholders and enable their participation in management decision processes. In Mahatma Gandhi Marine National Park, Wandor, South Andaman Island, for example, an important goal of the socioeconomic monitoring was to stimulate greater involvement of local communities in future conservation strategies, and a major outcome of site-specific surveys was the development of dialogues with the local communities. In Agatti Island, Lakshadweep, socioeconomic surveys recorded knowledge on traditional reef use practices from senior generations.

Findings from these surveys are reported in a series of papers and reports, of which some has been translated and distributed in local dialects (Hoon, 2002; MRC, 2003; Singh *et al.*, 2002). The information also contributed to the IMM-implemented, DFID-funded *Reef Livelihoods Assessment* project on how different local communities benefit from reef resources and how they assess those benefit flows in terms of their wider livelihoods (reported in 'Poverty & Reefs', Whittingham *et al.*, 2003).

Key Lessons Learned

- Socio-economic monitoring and ecological monitoring should be viewed as an integrated activity. But appropriate institutions to undertake for socioeconomic and ecological monitoring are not likely to be the same. It is therefore essential that dialogue and collaboration between different institutions are established at the outset of monitoring to ensure information is closely integrated. A division between socioeconomic and ecological disciplines is unlikely to be perceived as meaningful by local stakeholders and could lead to confusion.
- Developing the capacity of national government institutions to provide in-house training and guidance can assist fulfil the long-term training requirements of a constantly changing workforce. Providing a readily accessible supply of training material that caters to different levels of skills and knowledge can complement national training efforts.
- Participatory monitoring requires incentives for local participants both on the shorter and longer term. In the short term, financial incentives may be used, but the impact and sustainability of such inputs must be carefully considered. In the long term, the demonstration of effective impacts of monitoring is an important aspect of participation.
- Participants should not just be seen as a source of information but as the actors determining the agenda for monitoring and analysing the results of that monitoring.

- It is rarely possible or constructive to recommend one uniform approach to socioeconomic monitoring. Social and economic conditions and the patterns of reef use will vary among locations, and an approach that suits one location may not work in another.
- Using locally-based institutions with a pre-existing role and relationship with the community will assist establishing a monitoring programme and help ensure that information feeds into the policy process or management efforts more effectively. The more precisely the monitoring meets the information requirements at the local and national levels, the more likely is it used and will receive long-term national support.

Principles for Poverty-Oriented Coral Reef Monitoring and Management

Over the evolution of GCRMN SA, the project approach evolved from an initial mainly environmental (ecological monitoring) focused to a more holistic development-environment approach, addressing the purpose of 'poverty reduction' by promoting holistic and people-centred reef monitoring and management (for further background and theory, see IMM, 2003a, b). The following principles were adopted, which are recommended always to consider in development of a poverty-oriented monitoring network:

- The probability of achieving a sustainable future for coral reef ecosystems is greatly reduced in areas where poverty persists. The network therefore *aims to be Poverty Focused*: (i) It recognises the coastal poor as a very important sub group of coral reef stakeholders; (ii) It understands linkages between poverty and coral reef exploitation; (iii) It recognises the need to include the very poor and marginalised in reef management processes.
- The network seeks the views of the local resource stakeholders in the management process and therefore *aims to be People-centred*: (i) It understands the diversity of stakeholders, their needs and aspirations; (ii) It understands the impact of policy and institutional arrangements upon resource users; (iii) It fully involves people and respects their view; (iv) It defines success not only in terms of international and nation-



- al development objectives but also in terms of the priorities of vulnerable reef-dependent stakeholders;
- (v) It recognises the inherent potential of the poor (indigenous knowledge, skills, attitudes and relationships) and builds upon this.
 - The network seeks to *promote Micro – Macro Linkages*:
 - (i) It aims to develop linkages between macro level policy and institutions to community level organisations;
 - (ii) It aims to ensure that high-level policy making processes involve the local communities and consider local social, cultural, economic, and environmental conditions;
 - (iii) It aims to ensure that high-

level policy is informed by lessons learnt and insights gained by donor projects, management initiatives and other interventions at the local level.

- The diversity of stakeholders that affect and are affected by the benefits from coral reefs covers a wide spectrum of sectors, ranging from fisheries and tourism to agriculture and industry. All of these sectors must be engaged in the process of change if coral reef management initiatives are to meet with success. The network therefore *aims to be Holistic*: It embraces the complexity of the issues facing coral reefs and reef dependent communities that exist across a diversity of sectors.



Figure 3. a) Socioeconomic training workshop, Andaman Islands; b) Socioeconomic survey, Andaman Islands; c) Parrot fish for sale at a local market, Chennai, India; d) Pricing the crab catch, Gulf of Mannar, India; e) Andaman Islands, India; f) Ecological reef monitoring; g) ‘A Tomorrow of our Coral Reefs’, IUCN exhibition, Colombo, Sri Lanka.

Photo: EMMA WHITTINGHAM, PHILIP TOWNSLEY, K. VENKATARAMAN, JOS HILL and OLE VESTERGAARD.

- The issues facing coral reef ecosystems and their stakeholders are complex and characterised by a wide diversity of stakeholders; they will not be solved with isolated interventions. The network therefore seeks to *promote Partnerships*: It recognises the need for multi-agency cooperation, including representatives from both the public and private sectors, as well as and community organisations.

Developing Systems for Information Sharing

Effective systems for sharing and using reef status information in management planning and decision-making

entails not only a database and a set of information products; institutional networking and personal linkages that develops through local, national and regional level collaboration, trust and sharing are integral to an effective information system, as briefly highlighted below:

a. Local, Regional and International Networking

Formal and informal networking and sharing of expertise among network partners, government departments, NGO's, private sector and stakeholders at both local and national level is required for effectively producing and disseminating socioeconomic and ecological informa-

tion into management and policy processes. The structure of GCRMN SA is designed to facilitate transfer of information for use in management planning by local and national partners, as well as to inform international coral fora (figure 4). By collaboration at training workshops, national and regional meetings, and international fora such as ICRI meetings and scientific symposia, a growing level of cohesion has developed among the network partners, representing a valuable platform for developing and implementing management activities. Through serving as a common focus for coral reef-related activities, the GCRMN SA project has brought together a large group of stakeholders and created synergies with other coral reef initiatives and coastal management projects. For example, early GCRMN monitoring in Kandakulya and Unawatuna, Sri Lanka guided the ADB Coastal Resource Management Project (CRMP) in development of local management strategies. In Maldives, the ecological monitoring established with the Marine Research Centre assisted work of AusAID on marine protected areas in Addu Atoll.

b. Database Development

in Consultation with Users and Stakeholders

GCRMN SA partners early expressed a need for a coral reef database to store and exchange reef monitoring information across the region and to serve as a repository for documents, training material, survey protocols, details on related projects and as a contact directory for regional coral reef experts, NGOs, and agencies working with coral reef issues.

The development process involved extensive and in-depth participation of data providers and users from each country to determine the required content, structure and functions, aiming to develop a system tailored national requirements. The final database structure is 90% similar between the three countries, but certain features are adapted to specific national terminologies and features. The prototype version has features such as a protocol for socioeconomic survey data and geographical mapping functions. Manuals and training has been provided in all three countries and data entry of existing data (e.g. fish-



Figure 4. GCRMN South Asia logo *Act locally, Inform globally*. Coral reef status information is disseminated via national status reports and the biannual global GCRMN status reports (e.g., Wilkinson 2004), CORDIO status reports, project documents and scientific papers. Networking with international coral reef research and management communities have been established by partners attending international fora such as the International Coral Reef Symposia (Bali 2000, Okinawa 2004); ITMEMS II (Philippines 2003); or ICRI general meetings and regional workshops (Cebu 2000, Maputo, 2001, Cancun 2002). Logo designed by Prasanna Weerakody, Sri Lanka.

eries statistics) has been commissioned at government agencies. The prototype version can be downloaded from the GCRMN SA website. It is not yet fully functioning in the region and further progress requires coordination support and establishment of infrastructures for regional dataflow and technical support. One step further has been taken in India, where the database has been further adapted to national needs and is now hosted at the Ministry of Environment & Forestry in Delhi.

The fact that a regional database infrastructure has not yet been fully implemented is due partly to the extensive resources it requires, but also the time needed to build strong relationships and mutual trust between network partners at a level where they are willing to share detailed data. However, engaging several institutions in

the early design process has helped build such relationships and should facilitate future database development and data exchange.

c. National Coral Reef Stakeholder Fora

In 2002, the GCRMN SA, jointly with the South Asia Cooperative Environment Programme (SACEP) and CORDIO South Asia, initiated a national Coral Reef Forum in both Sri Lanka and Maldives, serving as fora for discussions and learning among a broad spectrum of coral reef stakeholders, including resource users, NGOs, researchers, government departments, international donors and private sectors (e.g. hotel owners, dive operators and aquarium fish traders). The fora have met 1–2 times per year. At its second meeting, held in November 2002, the Sri Lanka Coral Reef Forum received official endorsement by the 1st Secretaries of the Ministry of Environment and Natural Resources and the Ministry of Fisheries and Ocean Resources, respectively, and support and strong commitment was expressed to integrate efforts between departments and sectors (see further details in ‘Forum News’ on the website). For these expressions of good will to develop further, the national fora can be useful instruments to generate future collaboration and activities.

d. Information Products and Publications

GCRMN SA has produced a large amount of information to inform and influence individuals and organisations about coral reefs and related management and policy issues, and has facilitated interaction with stakeholders through a range of information products, including:

- (i) a *project website* serving as regional information centre with news, documents and contacts (www.gcrmn.org);
- (ii) a *project library* with handbooks, scientific papers, technical guidelines, project reports and awareness material on coral reef issues and coastal management compiled in the project office, Colombo. A bibliography is available from the project website and hardcopies of documents can be forwarded upon request;

- (iii) a *project Newsletter* with updates on project development and international coral reef news presented in a regional newsletter and national ‘Forum News’, printed and distributed to partners across the region;

- (iv) *Local language reports* with findings and results of socioeconomic assessments translated into local dialects (e.g. Hoon, 2002) for dissemination to local managers, officials, school teachers, NGO’s and wider public.

e. Education and Awareness Raising

Awareness raising and education materials to inform local reef users as well as schoolchildren include message boards, leaflets, exhibitions, field guides and presentations at meetings. A national mobile school exhibition – *A Tomorrow for Our Coral Reefs* – touring schools in Sri Lanka with posters and videos in local languages and a research colloquium and national art competition for school children was organised in 2001 by IUCN Sri Lanka, jointly with GCRMN SA and CORDIO SA, in association with the Ministry of Ports, Shipping and Fisheries, to raise awareness on the status of coral reef ecosystems, their value and vulnerability, and the need for equitable and sustainable management.

Key Lessons Learned

- There is a tendency for organisations and individuals to work in isolation. A motivating external, neutral entity can bring people and institutions together who would otherwise not interact naturally.
- Much information produced is not disseminated widely enough to fulfil its potential. Systems such as a database, a regional document library, and an organisation work directory can help, as well as informal networks between people and institutions.
- When developing a database, equal emphasis should be given to the systems and skills needed to collect, enter, transfer, manage, and use the information. A weakness in any part of this process is likely to halt the entire system.

- It is likely that external support will be required to assist both the development and the establishment of a database. National governments will need to recognise its value before they commit national resources to it.

Developing Skills in ‘Informing and Influencing’ Management and Policy Processes

Building skills in *using* reef monitoring information to ‘inform and influence’ coral reef management and decision processes is essential to achieve the overall purpose of better informed reef management.

In three national GCRMN SA workshops, participants explored the complexity of producing different types of information and how to respond systematically to the complexity of information requirements in terms of informing and influencing a diversity of stakeholders with different backgrounds and objectives, and developed case-specific strategies for different coral reef issues. Through parallel work of IMM Ltd on a DFID-funded ‘Sustainable Coastal Livelihoods’ project, an ‘informing and influencing framework’ was developed and subsequently tested in the national GCRMN SA workshops. The framework includes a series of stepwise considerations: (1) Are key stakeholder groups involved? (2) What is their role or stake in the management objectives? (3) Is there any action or change required by the stakeholders? (4) Is there information required to achieve this change? (5) What is the best media to address specific the information needs? (6) Does this information already exist and, if so, where?

Reports with experiences from the three workshops are available from the GCRMN SA website, with further theory and background in IMM 2003c.

Key Lessons Learned

- In many situations, a wide range of reef-related information exists, but is not used effectively. Given the high cost of collecting and analysing data, every effort should be made to maximise the use of existing knowledge before embarking on extensive monitoring efforts.

- If information generated by research is to bring about change in policies and policy implementation, it needs to be made available in many different forms tailored to the diversity of different stakeholders involved.
- Informing and influencing strategies should be considered as an integral part of a research-planning process. Using a framework to cope with complexity in a structured way can greatly improve the effectiveness of the project / research outputs.

SOME CONSIDERATIONS FOR FUTURE DEVELOPMENT

After five years of operation, the national network partners conducted a comprehensive review of the impact of the GCRMN SA activities on reef monitoring in the region (see GCRMN South Asia Review, 2003). It concluded that important progress was achieved towards raising awareness and building capacity to provide information on equitable and sustainable coral reef management issues in the region. Partners concluded that coral reef issues are being more seriously considered at both local and national levels and that the network objectives appear to be more firmly anchored in national policy agenda’s. Over the years, GCRMN SA has progressively evolved to address different information requirements of reef management in South Asia and is slowly becoming driven by the countries themselves.

An important learning aspect of the first years of activities is that it indeed took five years to just establish the GCRMN SA as an institution, or process, within the region. That is how long it takes to build respect and confidence among the wide range of people and institutions the project has worked with. And a key output from the activities are primarily increased dialogues between partners and formal and informal networking in the three countries, which are currently laying the foundation for new coral reef efforts. The acceptance of GCRMN SA as an institution serving national and local needs, rather than an isolated project fulfilling primarily international priorities, is fundamental to sustaining this

impact. It is hoped that future coral reef initiatives in the region can build on the participation and ownership established. Continued support for collaborative efforts, for example through the national Coral Reef Fora, would be useful to further integrate reef management and policies.

Still there is scope for increasing the government support for routine ecological and socio-economic monitoring in all three countries, in particularly to address poverty issues in a natural resource management context. The project review recommended first and foremost to further evolve reef monitoring that takes fully into account the needs and aspirations of the poorest reef users. Emphasis on holistic approaches, training in socio-economic monitoring, support for reef livelihoods assessments and development of alternative livelihoods are important priorities. A people-centred approach to resource management is likely to increase the chance of management success. Resource management should be viewed as an instrument within a larger framework of coastal development with poverty reduction as the overall goal. Otherwise there is a tendency for the poor to be viewed as an obstacle, rather than as part of the solution. Developing a wider appreciation of the linkages between poverty and the status of coral reef, and how healthy coral reef ecosystems can contribute to national objectives of poverty reduction, may further commitments from governments towards reef monitoring and management.

It appears that the efforts and outputs of GCRMN SA and related projects have had some influence on the regional and international policy climate towards poverty issues within coral reef management. Along with the development of GCRMN and CORDIO, the regional intergovernmental body for environmental affairs, SACEP, has expressed increasing will to engage actively in coral reef issues, including addressing local people and livelihoods aspects. Similarly, calls for pro-poor strategies in reef management have been expressed in recent documents of ICRI partners, most notably in the ICRI statement 'Global Vision for Local Action' (ICRI CPC, Sey-

chelles, April 2005). These are all positive developments. It is important to note, however, that the local reef users will feel little change in their situation unless the good words and intentions are followed up with action on the ground.

Guidance and training in integrating local reef users and pro-poor aspects in the planning, design and implementation of marine protected areas would be a useful step to ensure equitable and sustainable management outcomes. As part of this, future efforts could aim at refining and implementing approaches for targeted information dissemination to reef stakeholders, managers and policymakers. Further, national studies of policy and institutional aspects of coral reef planning and decision-making processes may be useful in this work, including addressing the diversity of stakeholders associated with reefs and build further awareness of the complexity of coral reef issues.

There still is a need for technical guidance and a modest regional coordination to drive these efforts. Further interaction with international coral reef efforts such as ICRI, developing efforts of SACEP, as well as the global coral reef data repository ReefBase, may stimulate further commitments of the Governments of South Asia to address coral reef issues. Emphasis should be placed on *two-way* communication, ensuring new knowledge and useful tools are feed back into national and local coral reef activities.

Today, GCRMN SA activities are being continued with coordination support through CORDIO South Asia and IUCN Global Marine Program from IUCN's Asia Regional Office in Colombo, Sri Lanka. Support is provided to continue ecological monitoring at permanent sites in the region, as well as part of the previous socioeconomic assessment initiated in Lakshadweep Reef, India. With the momentum achieved through the DFID-IOC/UNESCO implemented GCRMN South Asia Project, the National Coral Reef Fora will be continued to maintain dialogues between local authorities, NGOs, researchers and the private sector, and to further the development of a regional coral reef database system.

Learn More

Documents available from the GCRMN South Asia project website at www.gcrmn.org include:

1. GCRMN SA Informing & Influencing Strategy – Guidance for Future Interventions (2003)
2. Understanding Information Needs – Country Reviews of Information Needs for Coral Reef (2003)
3. GCRMN SA Planning Framework
4. GCRMN SA Coral Reef Database overview
5. GCRMN SA Partner Review (2003)
6. Agatti Island, Lakshadweep, Socioeconomic study (Hoon, 2003)
7. Vaavu Atoll, Maldives, Socioeconomic study (MRC, 2003)
8. Wandor, South Andaman Island, Socioeconomic study (Singh *et al.*, 2002)
9. Whittingham, E., Campbell, J., & Townsley, P., (2003) *Poverty and Reefs*. DFID-IMM-IOC/UNESCO.

GCRMN South Asia contacts:

- Arjan Rajasuriya, Sri Lanka National Coordinator, National Aquatic Resource Agency (NARA), Colombo, Sri Lanka, email: arjan@nara.ac.lk
- K. Venkataraman, India National Coordinator, Zoological Survey of India, Chennai, India. email: dugong@md2.vsnl.net.in
- Hussein Zahir, Maldives National Coordinator, Marine Research Center, Malé, Maldives, email: hzahir@mrc.gov
- Jerker Tamelander, Regional Coordinator, IUCN Regional Marine Program – CORDIO-GCRMN South Asia, Colombo, Sri Lanka, email: jet@iucnsl.org

Address: GCRMN South Asia Project Office, IUCN Sri Lanka, 53 Horton Place, Colombo 7, Sri Lanka

Phone: +94 11 2694094, Ext 406. *Fax:* +94 11 2682470

Most recently, the regional monitoring expertise and network capacity has contributed to rapid assessments of the impact of the Indian Ocean tsunami on 26 December 2004. The joint coordination of the IUCN Regional Marine Programme, CORDIO and GCRMN was key in mobilizing coral reef assessment teams throughout the region, and regular reports to policy makers, scientists and the general public were issued from early January 2005. The IUCN/CORDIO/GCRMN network also contributed significant sections to the regional report prepared by UNEP and to the development of a

methodology for assessment of tsunami impacts on coral reefs for ICRI and ISRS. In addition to the networking and coordination mechanism, the reef monitoring capacity built and the baseline information gathered in the region through GCRMN and CORDIO activities since the 1990s has proven invaluable after the tsunami. Many times the only information available originates in these initiatives and their collaboration with government and non-government institutions such as MRC, NARA, SDMRI and RWMC. This reemphasizes the need for continued strengthening of monitoring capacity and

programmes, and importantly also provides an impetus to further develop GCRMN as an inclusive and efficient network of institutions and individuals in the region.

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