



United Nations  
Environment Programme



UNEP/GEF South China Sea  
Project



Global Environment  
Facility

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***Reversing Environmental Degradation Trends  
in the  
South China Sea and Gulf of Thailand***

**REPORT**

**Third Meeting of the Regional Working Group for  
the Seagrass Sub-component**

***Kota Kinabalu, Malaysia, 25<sup>th</sup> – 28<sup>th</sup> March 2003***

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## **Report of the Meeting**

### **1. OPENING OF THE MEETING**

#### **1.1 Welcome address**

1.1.1 The Project Director opened the meeting on behalf of Dr. Klaus Töpfer, the Executive Director of the United Nations Environment Programme (UNEP) and Dr. Ahmed Djoghlaif, the Director, Division of Global Environment Facility Co-ordination (UNEP/DGEF). He welcomed the participants to the meeting, and highlighted some of the achievements of the past year, in particular the significant co-financing for the project received from the Government of China.

1.1.2 He noted that the Project Steering Committee had, during its second meeting in December 2002, made a number of significant decisions including: the decision to adopt a portfolio of 24 demonstration sites by the end of the year; the decision to include the Focal Ministry and Specialised Executing Agency Logos on the Project website; and their agreement to adopt the approach and guidelines for selection of demonstration sites proposed by the Regional Scientific and Technical Committee.

1.1.3 He noted that other key decisions for the longer term included the agreement to develop a strategy for long-term sustainable financing; the approval of the processes for engaging a wider range of institutions and stakeholders in project activities and the agreement to establish two regional task forces one composed of legal experts and one composed of environmental economists to advise the regional working groups and provide a regional overview of these matters.

1.1.4 Dr. Pernetta advised the group of the importance of the work before the present meeting which sets the foundation for successful completion of the planned adoption of a regional portfolio of demonstration sites by the Project Steering Committee in December. He noted that following agreement by the Project Steering Committee of the process, it was the responsibility of the Regional Working Group on Seagrass to finalise the detail of the selection procedures during the course of this week and thus provide guidance to the Focal Points on priorities for the development of demonstration site proposals.

#### **1.2 Introduction of members**

1.2.1 Dr. Pernetta welcomed Mr. Suy Serywath alternate for Mr. Kim Sour from Cambodia to his first meeting and invited members to introduce themselves to the meeting. The list of participants is attached as Annex 1 to this report.

### **2. ORGANISATION OF THE MEETING**

#### **2.1 Election of Officers**

2.1.1 Dr. Pernetta reminded the meeting of The Rules of Procedure, adopted during the first regional working group meeting, which state that, the Regional Working Group on Seagrass shall elect, from amongst the members, a Chairperson, Vice-Chairperson and Rapporteur to serve for one year. He noted further that the rules also state that, officers shall be eligible for re-election no more than once. Professor Xiaoping Huang, and Dr. Suvaluck Satumanatpan who have served as Chairperson and Vice-Chairperson during 2002 were therefore eligible for re-election. Dr. Kirkman, the previously elected Rapporteur has recently retired, and is no longer a member of the Group.

2.1.2 Mr. Kamarruddin bin Ibrahim, Focal Point from Malaysia, suggested and members agreed that new officers should be elected on an annual basis and proposed Dr. Miguel Fortes as the Chairperson and Mr. Tri Edi Kuriandewa from Indonesia as the Vice-Chairperson. Mr. Xiaoping Huang proposed Dr. Chittima Aryuthaka as Rapporteur and these members were elected to their respective offices by acclamation.

## **2.2 Documents available to the meeting**

2.2.1 Dr. Fortes expressed his appreciation at being elected Chairperson, and invited the Secretariat to introduce the documentation available to the meeting. Dr. Pernetta introduced the documents, available in both hard copy and on CD-ROM. He noted that the published reports of the second round of regional meetings were available in hard copy and that all the documentation for the meeting had been made available by e-mail and had been posted on the website in advance of the meeting. Additional documents tabled by Focal Points at the meeting were noted and added to the list of documents (UNEP/GEF/SCS/RWG-SG.3/INF.2). The revised list of documents is attached as Annex 2 to this report.

## **2.3 Organisation of work**

2.3.1 Dr. Pernetta briefed participants on the administrative arrangements for the conduct of the meeting, and the proposed organisation of work (UNEP/GEF/SCS/RWG-SG.3/INF.3). Formal sessions of the meeting would be conducted in English and in plenary although it is envisaged that, sessional working groups will be formed to complete the various reviews and analyses required under agenda item 7. A joint session will also be held together with the Regional Working Group on coral reefs (RWG-CR) to consider jointly, matters relating to the selection of demonstration sites.

2.3.2 Mr. Kamarrudin advised the meeting that there would be a field trip to a nearby seagrass site on the 28<sup>th</sup> March, which Dr. Ridzwan Abdul Rahman had kindly arranged. Dr. Ridzwan had also extended an invitation to participants to a dinner with the Coral Reef Working Group on the evening of the 26<sup>th</sup> March, on behalf of the Borneo Marine Research Institute, whilst UNEP would host a joint dinner for the two Working Groups on 27<sup>th</sup> March.

## **3. ADOPTION OF THE MEETING AGENDA**

3.1 The Chairperson invited members to consider the provisional agenda prepared by the Secretariat as document UNEP/GEF/SCS/RWG-SG.3/1, propose any amendments or additional items for consideration, and adopt the agenda. There being no proposals for addition or amendment the agenda was adopted as proposed and is attached in Annex 3 to this report.

## **4. OPENING REMARKS FROM THE FOCAL POINTS FOR SEAGRASS FROM EACH PARTICIPATING COUNTRY**

4.1 The Chairperson invited the focal points from the SEAs to provide a short overview of their progress subsequent to the second meeting of the RWG-SG and to highlight any additional documentation tabled at the meeting.

4.2 Dr. Suvaluck Satumanatpan advised the meeting that much of the work in Thailand subsequent to the last meeting had involved meetings and discussions with stakeholders at potential demonstration sites and with the necessary site characterisations, which were available to the meeting.

4.3 Dr. Nguyen Van Tien advised the meeting that the Vietnamese national committee had completed the questionnaire on metadata, and completed 35 site characterisations in GIS format. They had also worked extensively on the criteria for selecting demonstration sites.

4.4 Dr. Hutomo Malikusworo explained that he had assisted the Indonesian Seagrass group to select demonstration sites, and to put the data into the GIS format. The Indonesian Seagrass group had also refined the policy strategy and management plan, the legal and institutional arrangements for seagrass, and were in the process of planning national workshops on policy and legal arrangements. Mr. Kuriandewa added that for this meeting they had chosen 7 demonstration sites, based on transboundary significance, accessibility, and management potential, and prioritised three of these sites. They had used mainly information from the COREMAP project, and have not validated data as yet through site visits.

4.5 Mr. Suy Serywath advised the meeting that in Cambodia, information on seagrass is scarce. The national seagrass and coral reef committee had conducted meetings with local staff and institutions and NGOs, and had selected 4 sites for further intensive work although a total of thirteen sites had been characterised.

4.6 Mr. Xiaoping Huang advised that China has characterised 4 sites and prepared site based GIS databases whilst 2 sites have so far been fully characterised with text reports available to the meeting.

4.7 Mr. Kamarruddin stated that project implementation in Malaysia presents formidable problems due to the delayed start but noted that Dr. Pernetta had visited Malaysia and that the focal points had all received an initial tranche of funds. He noted however that additional administrative procedures need to be completed in order for the Focal Points to access the money, and requested the Project Director to draft a letter to the Treasury to satisfy these internal requirements. In response Dr. Pernetta advised that if he received details today of what was required he would draft an official letter to assist in overcoming these difficulties.

4.8 Dr. Fortes informed the meeting that the Philippines have completed the review of national data and information, they have made some national inputs to the GIS database and the meta-database, while the review of national legislation including institutional arrangement, had been finalised and a causal chain and threat analysis had been conducted for 4 sites. The Committee had finalised a Philippine National Seagrass Management plan, and he noted that he would share more details of these developments later in the meeting.

## **5. REPORTS FROM THE PROJECT CO-ORDINATING UNIT (PCU) REGARDING OVERALL PROGRESS TO DATE**

### **5.1 Status of end-year progress reports, expenditure reports, and budgets**

5.1.1 The Chairperson invited Mr. Kelvin Passfield to introduce document UNEP/GEF/SCS/RWG-SG.3/4 containing a summary of the current status of budgets and reports from the Specialised Executing Agencies in the participating countries. Mr. Kelvin Passfield highlighted the difficulties of the PCU and problems consequent upon the failure of the Focal Points to meet agreed timelines and submission dates and noted that the Project Steering Committee had agreed that the SEAs would present these reports in future, within 10 working days of the due date (30<sup>th</sup> June and 31<sup>st</sup> December).

5.1.2 In reply to a question from Dr. Fortes on the apparent lack of substantive reports from the Philippines, Mr. Passfield explained that the report was based on electronic and hard copy files currently available in the PCU and noted that with the turnover of staff in the PCU some electronic files had been misplaced. Drafts of reports submitted by the Philippines to the last RWG meeting had been apparently overlooked, for which he apologised.

5.1.3 Some discussion followed regarding progress on the legislation and economic valuation reviews. Dr. Pernetta briefed members on the decision of the Project Steering Committee to establish two regional task forces, one for legal matters and one covering issues relating to economic evaluation of coastal resources. He outlined the proposed mode of operation of these task forces and the relationship between their work and the work of the regional working groups. The first meetings of these task forces were to be convened in June or July this year, and would review the outputs from each country, and provide suggestions if and as required to each country.

5.1.4 Dr. Pernetta noted that, to date there had been nominations from only three countries for members of these task forces. The Chairperson suggested that, nominations should be sent to the PCU as soon as possible, including name, institution, email address, and expertise roster form.

5.1.5 Dr. Suvaluck stated that one problem with legal and economic experts that she had dealt with was that they have little expertise in matters relating to the coastal zone. Dr. Fortes noted in this connection that it was important to work alongside these experts and give them appropriate advice

and background regarding the project and the substantive issues being addressed through the various activities.

## 5.2 Status of planned substantive outputs from the national level activities

5.2.1 In introducing the agenda item Mr. Passfield noted that Annex 12 of the second meeting report (UNEP/GEF/SCS/RWG-SG.2/3) indicated that the following outputs were to be prepared by the Focal Points in advance of the third meeting:

- |  |               |
|--|---------------|
| • Review of past and on-going projects             | November 2002 |
| • Complete questionnaires on site characterisation | January 2003  |
| • Complete questionnaire on metadata               | January 2003  |
| • Review economic valuation criteria               | January 2003  |
| • Review threats at site level                     | January 2003  |
| • Review national legislation                      | November 2002 |
| • Causal chain analysis list (for threats)         | January 2003  |

5.2.2 He noted that documentation received by the Secretariat from the Focal Points up to the end of February was listed in appendix 1 of the list of documents (UNEP/GEF/SCS/RWG-SG.3/INF.2) and that electronic copies of all reports and documents received from the countries were provided on CD-ROM, together with hard copies of the site characterisations for reference of each member during discussion under agenda item 7. He noted further that arrangements were being made to provide all members with electronic copies of the presentations made and documents tabled at the meeting.

5.2.3 Mr. Passfield noted that the indicative measure of output quantity (cost per page) was just that, indicative, and that, it was intended for internal use as a comparative measure of the productivity of the various Specialised Executing Agency. He noted that these numbers were now outdated and that a review of the quality of the outputs was also required to satisfy the requirements of the funding agency.

5.2.4 The Project Director then briefed members on the decisions of the Project Steering Committee regarding the implementation of the independent peer review of country reports approved by the second meeting of the Project Steering Committee. It is proposed that the Project Co-ordinating Unit manage an independent review of project outputs to ensure their quality and acceptability internationally and that knowledgeable experts from the region be commissioned to review the reports and to provide concrete criticism and advice. In the interests of objectivity these reviews will be conducted anonymously and the names of the reviewers will not be disclosed by the PCU when the substance of the review is passed back to the focal point concerned.

5.2.5 Dr. Fortes noted the proposal that, by the end of March, all products (with the exception of the review of national legislation and administrative arrangements) received by the PCU, will be dispatched for such review and proposed that the meeting consider the proposed schedule when finalising the programme of work and timetable. The proposed schedules is as follows:

- PCU formats the reports and sends them for review by March 30<sup>th</sup>.
- No less than two, independent, peer reviewers will review each output.
- The reviewers will complete the substantive reviews no later than April 30<sup>th</sup> and send to the PCU.
- The PCU will evaluate the review and dispatch the review together with advice to the appropriate Focal Point.
- The Focal Points will be expected to revise the documents in the light of the reviewer's comments within thirty working days of dispatch of the comments.
- Following revision and return to the PCU, the reports will be converted to pdf format and lodged on the project website at <www.unepscs.org>

5.2.6 Finally it was noted that in the case of the reviews of national legislation and institutional arrangements these will be dispatched to the task forces for review, but it was agreed that members would seek advice from legal experts regarding the reviews of legislation prior to their submission to the regional task force.

## **6. REVIEW AND EVALUATION OF NATIONAL OUTPUTS ACCORDING TO THE AGREED WORKPLAN**

### **6.1 Past and on-going activities including economic valuation**

### **6.2 Review of national data and information, creation of national meta-database and national inputs to the regional GIS database**

### **6.3 Review of national legislation, institutional and administrative arrangements**

6.3.1 The Chairperson proposed and the meeting agreed to cover the three sub-items concurrently. Dr. Fortes then invited the focal points from the SEAs to provide a short overview of their reports.

6.3.2 On behalf of China, Professor Huang made a presentation covering the review of past and on-going activities, followed by the overview of economic valuation. He indicated a provisional figure of around \$17,000 per ha. as the estimated value of seagrass in China. He presented an overview of the status of the review of national legislation, and noted that he would welcome input from the regional task force on legislation in finalising this report.

6.3.3 He noted that China had submitted 7 metadata-base forms, completed four GIS site characterisations, and completed 4 GIS maps of these seagrass sites. He presented the GIS maps of Hepu seagrass beds, Xincun Gulf, Li An Gulf in Hainan, and Liusha Gulf in Guangdong.

6.3.4 The Chairperson congratulated Professor Huang on behalf of the participants for his excellent presentation, which included maps and photographs that represented the most comprehensive set of information known from China concerning the status of seagrass habitats.

6.3.5 Mr. Serywath presented a progress report on behalf of the Cambodian Committee. He noted that since 1998 some research has been conducted under the Ministry of Environment. The report on the review of national data and information for seagrass in Cambodia contains some information regarding two seagrass areas at Koh Kong, one of 17,000 ha, and one of 21,000 ha. In Kampot there is one area of 24,000 ha, and in Kep another site though they have not yet determined the size.

6.3.6 He noted that the review of past and ongoing projects had revealed that most projects related to socio-economic and environmental aspects, and that economic valuation was difficult, but that the committee was addressing this under 4 sub-headings, i.e. transboundary, aquatics, tourism, and transportation.

6.3.7 Mr. Serywath noted that threats at the site level included; trawling, aquaculture particularly seaweed farming, and cutting mangroves resulting in increased sedimentation in seagrass beds. He outlined the findings of the review of legislation, which included information on the Constitution, draft fisheries law, forestry law, tourism law, environmental law, transportation law, land law, and other less relevant laws. Mr. Serywath ended with a resume of threats to be examined in the causal chain analysis.

6.3.8 The Chairperson congratulated Mr. Serywath on his report, considering the scarcity of information available. Dr. Hutomo suggested that Mr. Serywath use the direct and indirect use approach to economic valuation, and also offered some suggestions on the causal chain analysis. Dr. Pernetta noted that the areas given for the seagrass beds were very large, and suggested that there may be an error in estimation. Mr. Passfield also commented that for some countries GIS site characterisations, the latitude and longitude co-ordinates implied huge areas.

6.3.9 Mr. Kuriandewa made a presentation of Indonesian data for seagrass relevant to the South China Sea, though the table format of past and ongoing activities covered the whole of Indonesia. He commented that there are a number of potential demonstration sites that do not occur in the South



China Sea area. He presented maps of the locations of the seven sites characterised to date, and informed the meeting that the committee has prioritised 3 of these sites for possible demonstration sites. He completed his presentation with the table of legislation relevant to seagrass in Indonesia.

6.3.10 Mr. Kamarruddin informed the meeting of a plan for a jointly managed area by the Philippines, Indonesia, and Malaysia, the Sulo-Suluwesi Marine Ecoregion (SSME) and asked if there were significant Indonesian seagrass beds in the area. Dr. Hutomo Malikusworo advised that there was a significant seagrass bed in Derawan, East Kalimantan, but this was just outside the South China Sea area.

6.3.11 Dr. Suvaluck presented the Thai review of past and on going projects and noted that the report was complete but that some of the report is still in Thai. The national committee has been working on the economic criteria, and after a meeting with a number of institutions in February, a number of researchers had expressed interest in working on seagrass valuation. Dr. Suvaluck was very pleased with the interest shown in valuing the seagrass and other coastal habitats based on the value of the fisheries and total economic value of sites. She noted that they had arrived at a tentative value of seagrass beds of 1.4 million baht per Rai (1,600 m<sup>2</sup>).

6.3.12 Dr. Suvaluck then presented site characterisations data for six proposed sites, and the criteria developed for national ranking. These presentations included a review of the threats at each site. She noted that the GIS questionnaires have been 90% completed, and maps have been produced as shape files (Arcview). The national meta-database currently has 6 entries, and work is continuing. The review of National Legislation suggests that there is no legislation directly related to seagrass, but that a number of national policies are relevant to the conservation and sustainable use of seagrass habitats.

6.3.13 The Chairperson thanked Dr. Suvaluck for her comprehensive presentation and Dr. Pernetta added his appreciation for the clarity of the presentation, which clearly indicated that Dr. Suvaluck and her committee had invested substantial time and effort since the last meeting. There followed some discussion of the data that had been presented, how reliable and complete it was, and its relationship to the projects goal of reversing degradation suffered by seagrass. It was acknowledged that while the data available may not be comprehensive at this stage, there was a need to use available data and to begin to address the issues and problems which were well recognised by everyone.

6.3.14 Dr. Nguyen Van Tien presented the report from Viet Nam on past and ongoing projects, referring to the table from his report and followed with a presentation of the legislation and policies, stating that there is almost no policy or legislation specifically referring to seagrass. Some fisheries legislation and environmental protection legislation is relevant, though ineffective.

6.3.15 Dr. Tien then presented the site characterisations from Viet Nam, starting with Phu Quoc Island. He said that at least 10 families are known to have recently caught dugong in this area, and this is a significant problem. He suggested that Phu Quoc would be a good demonstration site because of the biodiversity, and as it was an important site for threatened species. Site characterisations were then presented for the Con Dao area, which had been chosen as one of the two coastal areas of Viet Nam in the Global Representative System of Marine Protected Areas review of the World Bank. The third site presented was Phu Quy island.

6.3.16 Mr. Kamarruddin briefly outlined the approach to be used by Malaysia in order to try and catch up with other countries as soon as possible. He presented a map showing the general distribution of seagrass beds in Malaysia, and a table showing the distribution and size of seagrass beds in Peninsular Malaysia. There were some other seagrass beds around other parts of the country, but at this stage he could not provide exact locations and areas covered.

6.3.17 He informed the meeting that contractors have been identified to produce the required outputs for the project however, contracts have not yet been issued.

6.3.18 Dr. Fortes outlined progress in the Philippines since the last meeting and informed the meeting that electronic copies of all reports were now with the PCU. He began with the review of past

and ongoing activities, including the economic valuation, which was broken down into direct and indirect use values. He also informed the meeting on the number of references available on seagrasses in the Philippines.

6.3.19 He explained that the Philippines committee had started with an initial 10 sites, which will be included in a GIS database. This list had been reduced to a priority list of 5, which may be further reduced to 3 sites for more detailed characterisation. He showed maps of the locations of the 5 sites, and outlined the threats to these sites, with sedimentation and unsustainable and destructive fishing practices being the major threats.

6.3.20 Dr. Fortes then presented a separate causal chain analysis at site level for siltation, unsustainable fishing practices, and non-transparency of the navy. For the review of legislation, he noted that the Philippines has one legal instrument directed specifically to seagrass, and another 245 pieces of legislation that had varying degrees of relevance to seagrass.

## **7. CHARACTERISATION OF NATIONAL SEAGRASS SITES AND THEIR REGIONAL PRIORITISATION**

7.1 The Chairman invited the Project Director to introduce this item and Dr. Pernetta made two presentations, introducing to the meeting the principles and procedures agreed and approved by the Regional Scientific and Technical Committee and the Project Steering Committee concerning the nature of proposed demonstration sites, their description and ranking for determination of regional priorities. For the first presentation he referred to document UNEP/GEF/SCS/RSTC.2/10/Amend.1.

7.2 Dr. Pernetta explained that the development of full proposals for demonstration sites will involve considerable effort and it is unlikely that proposals can be properly developed for more than three to five sites in each country. He said that it was necessary therefore, to complete an initial ranking of sites during this meeting, in order to provide guidance to the national committees on those sites for which concrete proposals should be prepared.

7.3 Dr. Pernetta advised the group of the decision of the Project Steering Committee at its last meeting to increase the number of demonstration site proposals from 9 to 24, with the 15 additional sites to be funded using funds raised from other sources, including Government co-financing. In this regard, he informed the meeting of the adoption by the Project Steering Committee of an action plan to develop a strategy for sustainable financing that would focus during this year on raising co-financing for the demonstration sites.

7.4 Dr. Fortes asked whether the group should be encouraging the preparation of site proposals to demonstrate the connectivity between habitats. Dr. Pernetta agreed that there was some merit in this, and that when a demonstration site is proposed it may be appropriate to apply a score in the ranking for sites that are associated with more than 1 habitat type.

7.5 In response to a question from Mr. Kuriandewa on the criteria for site selection, Dr. Pernetta reminded the meeting that the GEF focus in funding this project was biodiversity, and therefore a higher emphasis could be directed towards biodiversity in site selection. Mr. Kuriandewa then expressed some concern that the Indonesian sites may fall behind in the scoring, as they have been unable to collect all the data originally listed due to a lack of fieldwork funds. Dr. Pernetta said that in fact there would probably be a much, reduced list of parameters as other countries also would not be able to provide data for all parameters.

7.6 Dr. Pernetta then made the second presentation, introducing to the meeting the concept of cluster analysis and regional ranking. This presentation was based on document UNEP/GEF/SCS/RSTC.2/8, which was originally presented at the second meeting of the Regional Scientific and Technical Committee meeting and drew heavily on the preliminary analysis that had been completed by the Regional Working Group on Mangroves at their meeting two weeks before. This information was drawn from annexes 4, 5, 6, and 7 of the meeting report, document UNEP/GEF/SCS/RWG-M.3/3, which are included in the meeting documents.

7.7 Dr. Pernetta presented the tabulation of raw data compiled at the third meeting of the mangrove, working group held in Bali in early March. He explained the rationale for removing some columns of data based on an absence of data, and also explained that columns for some of the parameters that were not available but were considered important were to be filled for the final analysis by April 7th.

7.8 Mr. Passfield then presented a table based on Annex 7 of the first meeting report, containing parameters that were initially to be included in the site characterisations. Participants were requested to take this table and overnight enter whatever data they have available from their sites. This would be reviewed the following morning, and parameters for which no data were available, and which were not considered crucial to site selection and ranking, would be removed during the initial discussion.

### **Special Joint Session of the Regional Working Groups on Coral Reefs and Seagrass**

7.9 On the morning of 26<sup>th</sup> March a joint session between the Regional Working Groups on Coral Reefs and Seagrass was convened. The Project Director opened the special joint session, and stated that during the second round of regional working group meetings various members had expressed the desire to have such a joint session for collaboration and discussion of issues of mutual interest. He noted that the programme for the session was flexible and that the purpose was to share experiences between the two groups and to perhaps discuss the overlap in coverage of site characterisations at the national level and implications for the choice of demonstration sites. In particular, the group might wish to discuss how to handle sites that contain multiple habitats, and how these should be developed with regard to the agreed site selection process.

7.10 Following this, Dr. Pernetta invited, Dr. Miquel Fortes and Mr. Abdul Khalil, the Chairs of the Regional Working Groups for Seagrass and Coral Reefs respectively to co-chair the session.

7.11 Dr. Fortes and Mr. Khalil assumed the joint chair and following a brief round of introductions Dr. Fortes invited participants to identify issues for discussion and opened the floor for any suggestions or proposals that members felt required joint discussion. He noted that, it would be useful for the group to hear an overview of the experiences of the coral reefs working group with the application of the cluster analysis and perhaps hear from the secretariat regarding the outcome of the joint mangrove wetlands discussions. It was agreed that any additional issues would be dealt with, if and when, they arose. During discussion it was noted that the RWG-CR had given primary importance to indicators of biological diversity, rather than to connectivity of habitats although allowance was made in the ranking scheme for including scores reflecting the diversity of habitats at a particular site.

7.12 Dr. Alino suggested that transboundary sites, as well as sites that covered more than one habitat should be discussed and Dr. Fortes asked what criteria the coral reef group had identified as indicators of regional priority. In the ensuing discussion, the SSME area, Philippines/Sabah area, and an area around Batam adjoining Singapore, Malaysia, and Indonesia were mentioned as examples of transboundary areas that may be considered for development of demonstration proposals. It was also noted that seagrass and coral reefs often occupy adjacent areas, and that there would be advantages in having sites covering both habitats. Dr. Huang mentioned that the 2 habitat types are very different in terms of appropriate management regimes, and that it was too early to discuss the connectivity between these two habitat types in the case of China.

7.13 The Batam area connecting Malaysia, Indonesia, and Singapore was noted as having important stocks of globally threatened species including dugong, and turtles and that these animals were dependent on the seagrass beds in the area.

7.14 Dr. Tuan asked why we needed to separate biodiversity, connectivity, management, and other parameters. Dr. Hutomo noted that as this was a GEF project, biodiversity needed to be given prominence amongst the criteria for site selection. A number of participants indicated that they were looking at sites common to two or more habitats.

7.15 Dr. Pernetta noted that it was the role of the National Technical Focal Point and National Technical Working Group to ensure coordination between national activities in each component and

sub-component of the project, so that confusion and conflicts do not arise. Dr. Pernetta reminded the participants as to how the choice of habitats had been decided, noting that the Transboundary Diagnostic Analysis had concluded that mangroves were the most threatened habitat bordering the South China Sea whilst the biological and socio-economic importance of seagrass habitats were not well understood.

7.16 He noted that although the site characterisation process was focussed on individual habitats, once a decision had been taken to develop a demonstration site proposal this should be based on a functional management unit that would reflect administrative boundaries since it should involve directly both the local communities and local government in developing the proposal and managing the site. Consequently it would be necessary to develop an overall management framework that took account of all habitats within the area to be managed.

7.17 Dr. Fortes enquired about the transboundary area between the Philippines and Sabah that had been mentioned earlier. This prompted Dr. Ridzwan to present an overview of the North Borneo Islands Marine Managed Area (NBIMMA) that had been recently gazetted as a marine park by the Sabah Government. Dr. Pernetta sought clarification regarding the status of the boundary between the two EEZ's and for clarification regarding management initiatives on the Philippines side of the boundary. It was the consensus of participants that this particular boundary was accepted by both parties, and was not a matter for dispute. The Philippines participants noted that although they had originally intended to include this area amongst their sites it had not been included to date due to the political unrest in Palawan.

7.18 Mr. Kamarrudin then showed some slides of satellite tracking studies of turtle migration from Redang Island in West Malaysia to the area around the NBIMMA, 2000km in 36 days from Thailand to the Sulu Sea. Professor Ridzwan concluded that potentially this would be a valuable site, which if adopted in the framework of the project could focus initially on management activities in the Malaysian areas that might serve as a platform for development of Philippines activities and then joint management.

7.19 Dr. Tuan asked if anybody in the group had any experience in transboundary management of sites. Mr. Khalil noted that the Turtle Islands Habitat Protection Area represented such a joint programme designed to manage turtles and had demonstrated the transboundary importance of national management of some resources and habitats.

7.20 Dr. Pernetta stated that he was not aware of any transboundary ecosystem that was managed through a single management mechanism but that the normal mode was for each country to manage the area under their own jurisdiction and then to include some bilateral mechanism for joint discussion and agreement of individual actions and priorities.

7.21 Dr. Fortes, informed the meeting of several transboundary management examples of which he was aware, including the Antarctic treaty; a bilateral agreement on joint management of disputed islands between Russia and Japan; and the joint management programme between the Philippines and Indonesia for yellowfin tuna stocks. Dr. Ridzwan informed the meeting of joint arrangements that permitted the sale of a limited number of turtle eggs in Malaysia harvested on the Philippines side of this area under a joint agreement that included arrangements for setting quotas.

7.22 Dr. Tuan mentioned an area only three kilometres from the Cambodian border that Viet Nam was proposing, which would have obvious transboundary significance, whilst Mr. Sour mentioned the Koh Kong sites, where Cambodia is considering a joint site including both habitats, which would have transboundary significance with Thailand. They had also considered some sites close to Viet Nam that might be selected and the following discussion suggested that a joint proposal could be developed including both Viet Nam and Cambodia. In response to a query from Dr. Tuan, Dr. Pernetta advised that a proposal for a transboundary demonstration site from two countries would be looked upon very favourably.

7.23 Dr. Pernetta noted the urgent need for simple national maps indicating the site locations, in order to determine if sites are in or outside of the SCS and the possibilities for aggregating proposals.

7.24 Professor Huang indicated that there was a seagrass area in China close to Viet Nam that is very important for turtles and dugongs.

7.25 Prof. Chou pointed out that consideration could be given to a site that did not transcend national boundaries but play an important role in connectivity to the region or harbours biological diversity of regional or global significance (possible example is the Natunas).

7.26 Dr. Fortes sought clarification as to how funds would be disbursed where a site encompassed two habitats or was a transboundary site. Dr. Pernetta noted that there were no hard and fast rules or any decisions regarding the magnitude of funds, which should be dispersed to individual sites. He noted that expensive sites would be disadvantaged given the limited budget but that this should not result in proponents cutting the budgets to unrealistically low levels. In the case of transboundary sites he suggested that it would be simpler to disburse money to a single entity in each country rather than attempting to establish joint funds.

7.27 In response to a question on how funds would be disbursed if a site were across 2 habitats managed by different Government Departments, Dr. Pernetta said that UNEP would prefer to disburse funds to a single entity, which would then be responsible for sub-contracting appropriate stakeholders according to the activities envisaged and the contributions of each set of stakeholders.

7.28 A question was raised regarding the required co-financing ratio, and how to approach government to ask for co financing. In response Dr. Pernetta stated that the minimum level of cash co-financing would be one to one but that the overall co-financing ratio should be higher since there was the additional in-kind contribution reflected in the proportion of the governments regular budgets that were applied to the envisaged activities.

7.29 There being no further issues raised by the participants, Dr. Fortes and Mr. Khalil thanked the participants for their useful contributions to the discussions and the session was concluded at 1145 on 26<sup>th</sup> March.

### **Resumption of the meeting of the Regional Working Group on Seagrass**

7.30 Following completion of the data tabulations by participants overnight, these were combined into a single table for all sites from all countries, which is attached as Table 1 in Annex 4. This was projected on the LCD projector, for participants to discuss and resolve any difficulties regarding the manner in which individual focal points had recorded the information and agree on those parameters to be included in the cluster analysis.

7.31 It was agreed that for the cluster analysis, density expressed as shoots per square metre, would be discarded since only one country had recorded such information. Although not complete, percent cover would be retained and some estimates were inserted for Thailand based on the expert opinion of the group.

7.32 Seahorses were considered a very important component of the seagrass fauna and a good indicator of stress as they are subject to high demand. However the lack of information on the number of species resulted in the decision to include this parameter as simple presence or absence in the final analysis. It was noted however that for the present exercise, insufficient values were included in the table to permit estimation of missing values and hence the parameter would not be included in the initial analysis.

7.33 The number of echinoderm genera and species were removed since these represented duplications of information contained in other data columns. The parameter, "Urchin genera", was removed since this represented a duplication of the species column, and "holothurian genera", was changed to species. Echinoderm density was also deleted.

7.34 In view of the scarcity of information and the enormous variation in estimates it was agreed to delete the column containing gastropod density, but retain the number of species.

7.35 In order to avoid duplication of information in the columns relating to rare, endangered, and migratory species it was agreed that migratory species would include turtles, and that endangered species would include dugong. Depth range was changed from the absolute measurements to a difference between lowest and highest depth, although it was recognised that the determination of this value had been made in different ways by different observers.

7.36 A number of other parameters were considered worth including, but due to insufficient data, it was agreed that these could not be included at this stage. The final agreed set of parameters for inclusion in the cluster analysis is included in Table 2 of Annex 4. Whilst Table 3 of the same annex presents the final data set used in the cluster analysis.

7.37 During the review of the raw data and the selection of parameters to be included in the cluster analysis, it became apparent that much of the data were not directly comparable, due to different methods and sources of information being used. For example, the number of endangered species was particularly high in Viet Nam, and it was discovered that the Viet Nam Red Data Book of locally endangered species had been used rather than the IUCN global listing. It was agreed that the global listing was the source that should be used in determining whether a species was or was not rare or endangered and the preliminary listing prepared by the PCU for the fisheries component of threatened and near threatened species in the South China Sea (Annex 5 of document UNEP/GEF/SCS/RWG-F.2/3) was tabled for reference of the members. This is appended as Annex 5 to this report.

7.38 Best estimates were then made to complete the table for the cluster analysis and estimated values are shaded in Table 3 of Annex 4. It was noted that these data and missing data for the parameters not included at this stage should be provided to the PCU within the next three weeks or so if the preparation of demonstration site proposals was to proceed on schedule. The members agreed to finalise the submission dates when considering the work plan under agenda item 8.

7.39 Following an initial review of the raw data table contained in Table 3 of Annex 4 the data were entered into the SPSS statistical package and a cluster analysis run of the untransformed data. The resulting dendrogram is presented in Figure 1 of Annex 6. It can be seen that the result is dominated by the values for area, which range from sites of less than 10 hectares to sites apparently as large as 2,500 hectares.

7.40 Following this a series of transformations were undertaken, firstly logarithmic transformation of the area, followed by logarithmic transformation of the values for both area and percentage cover (Figure 2). It was noted that sites number 9, 22, and 23 were outliers in these analyses and a discussion followed concerning the reasons for their dissimilarity. In the case of site number 9 Termiang it was noted that, the depth range of 14 metres was the largest recorded and that the percentage cover was very low, 10%. In the case of sites 22 and 23, Phu Quoc and Con Dao Islands several peculiarities were identified including the high number of "rare" species recorded. In the case of Phu Quoc it was noted that the island was some 40 kilometres long with seven large seagrass beds located at various points around the margin. It was noted that the area of individual seagrass beds around this island was large, up to 800 hectares and following an extensive discussion it was agreed that these should in fact be entered as individual sites rather than *en bloc*.

7.41 Questions were raised regarding the actual area of seagrass at the Cape Bolinao site in the Philippines, since it was the view of several members that the value of 2,500 hectares seemed rather high. This led to an extensive discussion on what constituted a seagrass site since the GIS questionnaire set a lower limit of 1 hectare but no upper limit and no guidance had been agreed regarding the aggregation of small beds that were adjacent to one another. It was agreed that where seagrass beds were distinct from one another, but occurred within a reasonable distance of one another such that there would be easy movement of animal species and or propagules between the beds then these could be aggregated up to the limit of the appropriate administrative unit.

7.42 It was agreed to remove site number 9, Temiang Island from the analysis since it had very low cover, but following discussion on Phu Quoc Island, Con Dao Island and Cape Bolinao, it was agreed to leave these in for the sake of the exercise. It was noted however, that, the data for these

sites would need to be carefully checked, and in some cases where the sites contained a number of large seagrass beds, these should be submitted as separate sites for purposes of the cluster analysis.

7.43 The cluster programme was re-run with the area and percentage cover logarithmically transformed and the depth transformed as square root plus one. The resultant dendrogram (Figure 3 of Annex 6) was felt by all members to be an adequate reflection of reality based on their experience of seagrass beds in the region.

7.44 In commencing discussion of the ranking process, namely determination of the indicators and weighted scores the vice-chairperson referred participants to annexes 4, 5, 6, and 7 of document UNEP/GEF/SCS/RWG-M.3/3, which contain the results of the cluster, rank, and prioritisation work for potential mangrove demonstration sites in the South China Sea. He then invited the Project Director to provide some background on the process described in these annexes.

7.45 Dr. Pernetta noted that this process constituted the second and third steps of the entire process described in document UNEP/GEF/SCS/RSTC.2/8 and that whilst the set of indicators and weighting for the environmental class of indicators could be undertaken in a comparatively objective manner the weighting for the socio-economic class of indicators would always contains some subjective elements.

7.46 Participants then discussed the indicators they wished to use in the environmental class, and reviewed the data table used in the site characterisation process. Following an extensive discussion of the relative weights that should be assigned to each indicator members agreed on the scores contained in Table 1 of Annex 7.

7.47 The members considered the indicators that should be used for socio-economic characterisation and their relative weight, finally agreeing upon the indicators and weights contained in Table 2 of Annex 7 of this report. Members then agreed to enter the appropriate data for their sites into the tables overnight for initial review at the commencement of the final session of the meeting.

7.48 The preliminary rank scores for all sites based on data currently available are presented in Tables 3 and 4 of Annex 7. It can be seen that values for a number of indicators, particularly those in the socio-economic class of indicators (Table 4) could not be assigned at this time.

## **8. PREPARATION OF SITE SPECIFIC PROPOSALS FOR DEMONSTRATION SITES INCLUDING THE REVIEW OF THREATS AT SITE LEVEL AND IDENTIFICATION OF THE PROXIMATE AND ULTIMATE CAUSES OF DEGRADATION**

8.1 The Vice-Chairperson, Mr. Kuriandewa invited the Project Director to introduce document UNEP/GEF/SCS/RWG-SG.3/6, which contains the format and guidance for the focal points for seagrass in preparing site-specific proposals for demonstration sites. He explained that the reason for developing this format was to ensure that all proposals were in a comparable format, thus making them easier for the PSC members and potential donors to analyse.

8.2 Various questions were raised initially including a query regarding whose signature should go on the front summary page of the proposal. Dr. Pernetta advised that this could be either the NFP or the NTFP.

8.3 In response to a question on how a site outside the South China Sea would be considered, Dr. Pernetta told the meeting that sites adjoining the SCS might be considered, but that, sites further away would almost certainly be considered ineligible for GEF support by the Project Steering Committee. This should not prevent proponents from submitting potential demonstration site proposals from outside the South China Sea if these were, existing activities that could be added to the regional portfolio of sites, at little or no cost to the Project.

8.4 Dr. Pernetta proceeded to review the document page by page, explaining the contents in more detail and providing guidance as to how it should be completed, and what level of detail should be presented in the accompanying annexes.

8.5 Finally, Dr. Pernetta referred the meeting to the preliminary guidelines regarding completion of the causal chain analysis, threat analysis, and management interventions for potential demonstration sites, which were included in document UNEP/GEF/SCS/RWG-SG.3/6. He noted that this document had been presented to the second RSTC meeting in December, 2002. Dr. Pernetta advised the meeting that the activities associated with the preparation of demonstration site proposals will comprise the bulk of the work of the focal points leading up to the fourth meeting of the RWG-SG.

8.6 Dr. Huang asked when these proposals needed to be prepared, to which Dr. Pernetta replied that a first draft was needed for review by the PCU no later than September 1<sup>st</sup>, and a camera ready copy would be required by October 1<sup>st</sup>, 2003 for distribution to potential donors and for consideration at the RSTC and PSC meetings in December. He stated that he believed 3 or 4 proposals would be the maximum that it would be possible for any one focal point to prepare to a suitable standard by these dates.

## **9. REVISION OF THE WORKPLAN AND ACTIVITIES FOR THE REGIONAL WORKING GROUP ON SEAGRASS**

9.1 During the first and second meetings of the Regional Working Group a flow chart of activities and work plan and timetable were developed and agreed. However it is noticeable that some countries have been unable to meet the deadlines for submission of outputs as originally planned. In the light of the discussion and agreements reached under prior agenda items, the meeting reviewed and revised the work plan and schedule of meetings extending to January 2004.

9.2 Dr. Pernetta went through the work plan line by line, and reviewed the progress of participants for each output, making the point that all proposals must be in final form in advance of the Regional Scientific Conference if they are to be presented to donors in an acceptable form. Most of the participants reported that they had submitted drafts of all the required reports, but they wished to submit final versions. Following discussion it was agreed that the PCU would distribute for review whatever versions of the reviews of past and ongoing projects and data and information were available by 31<sup>st</sup> March and following the independent review the PCU would transmit the outcome to the authors by the end of April such that the reports can be finalised by 30<sup>th</sup> June 2003. The revised workplan and timetable are attached as Annex 8 to this report.

9.3 Members noted that all demonstration site proposals must be in final form by 1<sup>st</sup> October 2003. It was agreed that all missing data for the cluster analysis and ranking procedures would be provided to the Project Co-ordinating Unit no later than April 15<sup>th</sup> for analysis in advance of the Regional Scientific and Technical Steering Committee meeting in May. The Project Co-ordinating Unit would conduct the analysis, review the results and provide a report to the members of the Regional Working Group within 10 working days of the receipt of the final set of data. This report would include the outcome in terms of relative priority of the different demonstration sites and hence provide guidance to the focal points upon which site proposals should be prepared for the first tranche.

## **10. DATE AND PLACE OF THE FOURTH MEETING OF THE REGIONAL WORKING GROUP ON SEAGRASS**

10.1 Members were invited to consider and agree upon the proposed time and place for the fourth meeting of the RWG-SG, noting that the overall schedule of meetings approved by the Project Steering Committee currently has the fourth meeting scheduled for September 23<sup>rd</sup> to 26<sup>th</sup>, 2003. Members indicated that they had no conflicting commitments during this period and agreed to the dates as proposed.

10.2 The previous offer of Professor Huang to host the next meeting was noted, and SanYa and Bei Hai were noted as possible venues. The exact location of the meeting would be determined by the PCU, in consultation with Professor Huang.

10.3 The Project Director drew to the attention of the members the fact that, PEMSEA has, in collaboration with the Government of Malaysia scheduled a major East Asian Seas Congress during



the week commencing 8<sup>th</sup> December, which conflicts with the approved dates for the Regional Scientific Conference and fourth meeting of the Regional Scientific and Technical Committee.

10.4 Members were invited to discuss potential conflicts and to consider possible alternative dates for the Regional Scientific Conference. Members had no conflict of interest and suggested that the PCU consider possible changes in date in consultation with the RSTC.

## **11. ANY OTHER BUSINESS**

11.1 Members were invited to consider and discuss any further items of business under this agenda item. Mr. Kamarruddin noted that it would be necessary to develop and agree a detailed work plan for the Malaysian team.

11.2 In reply to a question from Mr. Kamarruddin on sites for which very little data were available, Dr. Pernetta answered that these would be unlikely to be selected as a demonstration site because of the lack of information, but funds may be available in future to collect data such that the site could be considered in future.

## **12. ADOPTION OF THE REPORT OF THE MEETING**

12.1 The Rapporteur, Dr. Chittima introduced the draft report of the meeting prepared by the Secretariat, which was considered, amended and adopted as it appears in this document.

## **13. CLOSURE OF THE MEETING**

13.1 There followed an exchange of courtesies during which the Vice-Chairperson and Project Director thanked participants for their hard work and constructive inputs to the meeting and members expressed thanks to the Secretariat and to the Malaysian hosts for the successful preparation and organisation of the meeting.

13.2 The Vice-Chairperson closed the meeting at 1700 on 28<sup>th</sup> March 2003.

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## ANNEX 2

### List of Documents

#### Discussion documents

UNEP/GEF/SCS/RWG-SG.3/1	Provisional agenda
UNEP/GEF/SCS/RWG-SG.3/2	Provisional annotated agenda
UNEP/GEF/SCS/RWG-SG.3/3	Draft report of the meeting (to be prepared during the meeting)
UNEP/GEF/SCS/RWG-SG.3/4	Current status of budgets and reports from the Specialised Executing Agencies in the participating countries.
UNEP/GEF/SCS/RWG-SG.3/5	Preliminary seagrass site characterisations for consideration during the 3 <sup>rd</sup> meeting of the Regional Working Group on Seagrass.
UNEP/GEF/SCS/RWG-SG.3/6	Guidelines for the preparation of demonstration site proposals and format for use in their presentation.
UNEP/GEF/SCS/RWG-SG.3/7	Schedule of meetings and current workplan for the Regional Working Group on Seagrass.
CD-ROM	National reports and site characterisations for coral reefs and seagrass (see the Appendix 1 for the list of seagrass related reports).

#### Information documents

UNEP/GEF/SCS/RWG-SG.3/INF.1	Provisional list of participants
UNEP/GEF/SCS/RWG-SG.3/INF.2	Provisional list of documents
UNEP/GEF/SCS/RWG-SG.3/INF.3	Draft programme
UNEP/GEF/SCS/RSTC.2/8	Draft proposal for regional criteria and procedures to be used in ranking and selecting demonstration sites in the framework of the UNEP/GEF Project entitled: <i>"Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand."</i>
UNEP/GEF/SCS/RSTC.2/10/Amend.1	Guidance to the PSC on the nature and types of potential demonstration sites to be established within the Framework of the UNEP/GEF Project
UNEP/GEF/SCS/RWG-M.3/3 Annexes 4, 5, 6 & 7	Cluster Rank and Prioritisation of potential Mangrove demonstration sites in the South China Sea.
UNEP/GEF/SCS/RWG-W.2/3	Second Meeting of the Regional Working Group on the Wetlands Sub-component for the UNEP/GEF Project <i>"Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand"</i> . Report of the meeting. UNEP/GEF/SCS/RWG-W.2/3 Shenzhen, China, 4 - 7 September 2002.
UNEP/GEF/SCS/RWG-M.2/3	Second Meeting of the Regional Working Group on the Mangroves Sub-component for the UNEP/GEF Project <i>"Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand"</i> . Report of the meeting. UNEP/GEF/SCS/RWG-M.2/3 Ho Chi Minh City, Viet Nam, 10 - 13 September 2002.

UNEP/GEF/SCS/RWG-LbP.2/3	Second Meeting of the Regional Working Group on the Land-based Pollution Component for the UNEP/GEF Project <i>"Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand"</i> . Report of the meeting. UNEP/GEF/SCS/RWG-LbP.2/3 Batam, Indonesia, 18 - 21 September 2002.
UNEP/GEF/SCS/RWG-F.2/3	Second Meeting of the Regional Working Group on the Fisheries Component for the UNEP/GEF Project <i>"Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand"</i> . Report of the meeting. UNEP/GEF/SCS/RWG-F.2/3 Phuket, Thailand, 7 - 11 October 2002.
UNEP/GEF/SCS/RWG-CR.2/3	Second Meeting of the Regional Working Group on the Coral Reef Sub-component for the UNEP/GEF Project <i>"Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand"</i> . Report of the meeting. UNEP/GEF/SCS/RWG-CR.2/3 Sihanoukville, Cambodia, 23 - 26 October 2002.
UNEP/GEF/SCS/RWG-SG.2/3	Second Meeting of the Regional Working Group on the Seagrass Sub-component for the UNEP/GEF Project <i>"Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand"</i> . Report of the meeting. UNEP/GEF/SCS/RWG-SG.2/3 Hue, Viet Nam, 28 - 31 October 2002.
UNEP/GEF/SCS/RSTC.2/3	Second Meeting of the Regional Scientific & Technical Committee for the UNEP/GEF Project <i>"Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand"</i> . Report of the meeting. UNEP/GEF/SCS/RSTC.2/3 Nha Trang, Viet Nam, 11 - 13 December 2002.
UNEP/GEF/SCS/PSC.2/3	Second Meeting of the Project Steering Committee for the UNEP/GEF Project <i>"Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand"</i> . Report of the meeting. UNEP/GEF/SCS/PSC.2/3 Hanoi, Vietnam, 16 - 18 December 2002.

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## Appendix 1

### List of Substantive Reports Relating to the Seagrass Sub-component, Received by the Project Co-ordinating Unit as of February 1<sup>st</sup> 2003.

Supplied to the third meeting of the Regional Working Group on Seagrass,  
as pdf files on cd-rom.

Documentation has been received by the Secretariat from the Focal Points up to the 15th of March as follows:

#### Cambodia

Report of National Data and information for Seagrass in Cambodia, 9pp  
Table of past and ongoing activities, 3pp.

#### Reports Tabled during the meeting

- Review of National Data/Information for Seagrass in Cambodia, 15pp.

#### China

Legal aspects, 9pp.  
Threats and management suggestions, Hainan Province, 12pp.  
Relevant data and information on Seagrass, 6pp.  
Management plans, Guangdong Province, 7pp.  
Surveys and data, 8pp.  
Surveys and historical data, Guanxi province, 11pp.  
Economic Evaluation, 10pp.

#### Reports Tabled during the meeting

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#### Indonesia

Review of National Data: The Status of Indonesian Seagrass Ecosystem (October 2002), including chapters on economic valuation and legal aspects, 66pp.  
Policy, Strategy, & Action Plan for Management of Seagrass Ecosystem in Indonesia, 13pp.  
Legal aspects (in Indonesian), 18pp.  
Site Characterisations (in GIS format), 56pp

#### Reports Tabled during the meeting

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#### Philippines

#### Reports Tabled during the meeting

- Puento Gialera – Philippines, 9pp.
- Bolinao – Philippines, 9pp.
- Ulugan Bay – Philippines, 9pp.
- Prierto Princess/Honda Bay Palawan – Philippines, 9pp.
- Draft – Philippine National Seagrass Management Program 2002-2012, 9pp.
- Chronology of National and Local Legislation Relevant to the Concerns of Seagrass, 11pp.
- G. Causal Chain Analysis, 1pp.

### **Thailand**

Seagrass Valuation. A discussion document on technique, 10pp.  
Review of National Legislation, 8pp.  
Draft National Report on the Seagrasses of Thailand, 4pp.  
Tabulation of past and ongoing projects, 9pp.

### **Reports Tabled during the meeting**

-

### **Vietnam**

1. Development of Seagrass Metadatabase for Vietnam. (October 2002), 66pp.  
Not a metadatabase at all. Contains site characterisations for 9 seagrass sites.
2. Review of Data and information on seagrasses in Vietnam (October 2002), 92pp.
  - Contains chapters on
  - Review of past and ongoing activities, 4pp.
  - Legislation and policies, 4pp.
  - Seagrass restoration, 7pp.
  - Exploitation and use, 1pp.
  - Habitat value of Seagrass, 7pp.
  - Biodiversity, 5pp.
  - Seagrass biology, distribution, and primary production, 22pp.
  - Ecology and distribution, 7pp.
  - Species composition, 2pp.
  - Threats, 14pp.
3. Review of Economic Valuation Criteria of Seagrasses in Vietnam Jan 2003, 7pp.
4. Review of threats to Seagrass in Vietnam Table, specific seagrass beds, (Jan 2003), 5pp.
5. National Seagrass Report, 102pp.

### **Reports Tabled during the meeting**

- Site Specific Information Characterization of Seagrass Site: Phu Quoc Islands, 18pp.

## **ANNEX 3**

### **Agenda**

- 1. OPENING OF THE MEETING**
  - 1.1 Welcome address**
  - 1.2 Introduction of members**
- 2. ORGANISATION OF THE MEETING**
  - 2.1 Election of Officers**
  - 2.2 Documents available to the meeting**
  - 2.3 Organisation of work**
- 3. ADOPTION OF THE MEETING AGENDA**
- 4. OPENING REMARKS FROM THE FOCAL POINTS FOR SEAGRASS FROM EACH PARTICIPATING COUNTRY**
- 5. REPORTS FROM THE PROJECT CO-ORDINATING UNIT (PCU) REGARDING OVERALL PROGRESS TO DATE**
  - 5.1 Status of end-year progress reports, expenditure reports, and budgets**
  - 5.2 Status of planned substantive outputs from the national level activities**
- 6. REVIEW AND EVALUATION OF NATIONAL OUTPUTS ACCORDING TO THE AGREED WORKPLAN**
  - 6.1 Past and on-going activities including economic valuation**
  - 6.2 Review of national data and information, creation of national meta-database and national inputs to the regional GIS database**
  - 6.3 Review of national legislation, institutional and administrative arrangements**
- 7. CHARACTERISATION OF NATIONAL SEAGRASS SITES AND THEIR REGIONAL PRIORITISATION**
- 8. PREPARATION OF SITE SPECIFIC PROPOSALS FOR DEMONSTRATION SITES INCLUDING THE REVIEW OF THREATS AT SITE LEVEL AND IDENTIFICATION OF THE PROXIMATE AND ULTIMATE CAUSES OF DEGRADATION**
- 9. REVISION OF THE WORKPLAN AND ACTIVITIES FOR THE REGIONAL WORKING GROUP ON SEAGRASS**
- 10. DATE AND PLACE OF THE FOURTH MEETING OF THE REGIONAL WORKING GROUP ON SEAGRASS**
- 11. ANY OTHER BUSINESS**
- 12. ADOPTION OF THE REPORT OF THE MEETING**
- 13. CLOSURE OF THE MEETING**



## **ANNEX 4**

### **Tabulation of Raw Data Relating to Identified Seagrass Sites Bordering the South China Sea**

#### **Background**

Focal Points in the Specialised Executing Agencies were requested to assemble data and information relating to seagrass sites bordering the South China Sea in GIS format and/or using the agreed lists of data and information requirements developed during the first two regional working group meetings. These were brought to the third meeting of the regional working group for use in the preliminary cluster analysis and these data are presented in Table 1.

#### **Review of the data**

In reviewing the data it became apparent that certain parameters which had originally been identified as being critical to site characterisation were in fact not readily available. Only two countries had data relating to density of shoots for example, whilst data relating to mammal abundance and planktonic larvae were not presented for any site. These parameters were not used in the subsequent analyses and it was agreed that certain parameters should not be included in the cluster analysis, these columns are shaded in grey in Table 1.

A review of the data contained in Table 1 indicates that certain data sets represent correlated items and the inclusion of both sets of data would automatically weight the final dendrogram. Such paired data sets include the numbers of species and genera of, crustacea, and echinoderms. The inclusion of indices reflecting the biological diversity within these taxa is justified since each major taxon serves as an indicator of diversity in different components of the seagrass food-web, however inclusion of both genera and species numbers was not justified. The RWG-SG agreed that in these instances only the data on species numbers would be used in the initial cluster analysis. It was further agreed that in the final analysis the presence or absence of seahorses rather than the numbers of species or genera would be included and Gower's Index of similarity would be applied to the data sets.

#### **Transformations and estimations of data**

Table 2 presents the data for those parameters that should be included in the final cluster analysis. In the case of columns where less than 50% of the cells contained real data it was decided to eliminate these parameters from further consideration at this stage. Therefore the parameters relating to seahorse presence or absence, numbers of species of crustacea, gastropods, siganids, holothurians, urchins and starfish were eliminated from further consideration.

The final set of data used in the analysis is presented in Table 3 and includes data for 8 parameters and 25 sites: 4, China; 7 Indonesia; 4, Philippines; 6, Thailand; 4, Viet Nam. Shaded cells are cells for which empirical data were absent, but for which an expert estimate was made by the regional working group in order to retain both the parameter and the site in the initial cluster analysis. Too little data were available for the Cambodian sites to justify their inclusion in the preliminary analysis.

Initially data were used without transformations and subsequently the data for area and percentage cover were log transformed whilst the depth range was transformed using the square root plus one. The transformed data are presented in Table 1 of Annex 5.

Table 1 Data compilation from site characterisations based on the agreed set of parameters. Shaded columns indicate those parameters to be excluded from the final cluster analysis

[illegible]

Data compilation from site characterisations based on the agreed set of parameters. Shaded columns indicate those parameters to be excluded from the final cluster analysis

[illegible]

Table 2 Final agreed set of parameters for use in the cluster analysis

[illegible]

Table 3 Final data set used in the preliminary cluster analysis. Shaded cells contain estimates

No.	Site Name	Area (ha)	depth range	No. of Seagrass species	% cover	No. of Penaeid species	Number of other ecosystems	Number of rare species	Number of endangered and threatened species
1	Makhoam Pom Bay	250	1	2	60	4	0	0	1
2	Kung Krabane Bay	700	4	5	80	4	1	0	1
3	Trat	13	3	5	30	6	2	0	1
4	Tungka Bay	1,080	1	1	70	6	2	0	1
5	Sarat Thani	500	3	6	40	2	1	0	1
6	Pattani Bay	273	3	4	70	8	1	0	1
7	Galang Baru	15	4	8	40	3	2	0	1
8	Medang-Mesanak	5	2	7	35	3	2	0	1
9	Temiang	5	14	2	10	3	2	0	1
10	Senayang-Kentar	10	4	8	21	3	2	0	1
11	Limbong Bay	10	4	5	32	3	2	0	1
12	Trikora Beach	15	2	9	99	3	2	0	1
13	Mapor	20	3	8	50	3	2	0	1
14	Cape Bolinao	2,500	2	9	75	7	2	1	0
15	Puerto Galera	114	5	9	95	3	2	1	2
16	Ulugan Bay	11	3	8	100	4	2	0	0
17	Puerto Princesa Honda Bay	670	2	8	90	7	2	0	0
18	Hepu seagrass bed	540	4	3	80	5	1	6	1
19	Liusha seagrass bed	900	3	2	90	5	2	0	0
20	LiAn seagrass bed	300	3	5	75	3	2	0	0
21	Xincun seagraas bed	200	2	4	80	3	2	0	0
22	Phu Quoc Island	1,500	6	9	45	8	3	6	0
23	Con Dao Island	200	10	10	35	4	3	6	3
24	Phu Quy Island	300	3	6	50	4	1	3	4
25	Cam Ranh Bay	800	1	6	60	3	2	0	0

## ANNEX 5

## Preliminary List of Threatened and Near Threatened Species for the South China Sea

Scientific name	Common name	IUCN cat. (v3.1)*
<i>Aetobatus narinari</i>	Spotted eagle ray	DD
<i>Alopias vulpinus</i>	Thin tail thresher shark	DD
<i>Anoxypristis cuspidata</i>	Knifetooth sawfish	En
<i>Atherinomorus lineatus</i>	Line silverside	Vu
<i>Butis butis</i>	Duckbill sleeper	NT
<i>Carcharhinus amblyrhynchoides</i>	Graceful shark	NT
<i>Carcharhinus amblyrhynchos</i>	Grey reef shark	NT
<i>Carcharhinus borneensis</i>	Borneo shark	En
<i>Carcharhinus brevipinna</i>	Spinner shark	NT
<i>Carcharhinus hemiodon</i>	Pondicherry shark	Vu
<i>Carcharhinus leucas</i>	Bull shark	NT
<i>Carcharhinus limbatus</i>	Blacktip shark	NT
<i>Carcharhinus longimanus</i>	Oceanic whitetip shark	NT
<i>Carcharhinus melanopterus</i>	Blacktip reef shark	NT
<i>Carcharhinus obscurus</i>	Dusky shark	NT
<i>Carcharhinus plumbeus</i>	Sandbar shark	NT
<i>Carcharias taurus</i>	Sand tiger shark	Vu
<i>Carcharodon carcharias</i>	Great white shark	Vu
<i>Cephalopholis boenak</i>	Chocolate hind	DD
<i>Cheilinus undulatus</i>	Humphead wrasse	Vu
<i>Cromileptes altivelis</i>	Humpback grouper	DD
<i>Dalatias licha</i>	Kitefin shark	DD
<i>Doryrhamphus dactyliophorus</i>	Ringed pipefish	DD
<i>Eleotris melanosoma</i>	Broadhead sleeper	NT
<i>Epinephelus lanceolatus</i>	Giant grouper	Vu
<i>Eurypegasus draconis</i>	Short dragonfish	DD
<i>Galeocerdo cuvier</i>	Tiger shark	NT
<i>Glossogobius biocellatus</i>	Sleepy goby	NT
<i>Glyphis gangeticus</i>	Ganges shark	Cr
<i>Glyphis glyphis</i>	Speartooth shark	En
<i>Hexanchus griseus</i>	Blunt-nose six-gill shark	NT
<i>Hippocampus barbouri</i>	Barbour's seahorse	Vu
<i>Hippocampus comes</i>	Tiger tail seahorse	Vu
<i>Hippocampus fuscus</i>	Sea pony	Vu
<i>Hippocampus histrix</i>	Thorny seahorse	Vu
<i>Hippocampus kuda</i>	Spotted seahorse	Vu
<i>Hippocampus mohnikei</i>	Japanese seahorse	Vu
<i>Hippocampus spinosissimus</i>	Hedgehog seahorse	Vu
<i>Hippocampus trimaculatus</i>	Longnose seahorse	Vu
<i>Isurus oxyrinchus</i>	Shortfin Mako shark	NT
<i>Lagocephalus gloveri</i>	Kuro sabafugu (Jap)	DD

Scientific name	Common name	IUCN cat. (v3.1)*
<i>Liza melinoptera</i>	Otomebora mullet	En
<i>Notorynchus cepedianus</i>	Broadnose seven-gill shark	DD
<i>Papillogobius reichei</i>	Indo-Pacific tropical sand goby	NT
<i>Pegasus laternarius</i>	Sticklebacks and seamoths	Vu
<i>Pegasus volitans</i>	Longtail seamoth	DD
<i>Prionace glauca</i>	Blue shark	NT
<i>Pristis microdon</i>	Largetooth sawfish	En
<i>Pristis pectinata</i>	Smalltooth sawfish	En
<i>Pristis zijsron</i>	Longcomb sawfish	En
<i>Rhincodon typus</i>	Whale shark	Vu
<i>Scoliodon laticaudus</i>	Spadenose shark	NT
<i>Solegnathus hardwickii</i>	Hardwicke's pipefish	Vu
<i>Solegnathus lettiensis</i>	Gunther's pipe horse	Vu
<i>Sphoeroides pachygaster</i>	Blunthead puffer	Vu
<i>Sphyrna lewini</i>	Scalloped hammerhead	NT
<i>Sphyrna mokarran</i>	Great hammerhead	DD
<i>Sphyrna zygaena</i>	Smooth hammerhead	NT
<i>Syngnathoides biaculeatus</i>	Alligator pipefish	DD
<i>Taeniura lymma</i>	Bluespotted ribbontail ray	NT
<i>Takifugu niphobles</i>	Puffers and filefishes	DD
<i>Takifugu poecilonotus</i>	Puffers and filefishes	DD
<i>Takifugu xanthopterus</i>	Puffers and filefishes	DD
<i>Teramulus kieneri</i>	Kiener's silverside	DD
<i>Thunnus alalunga</i>	Albacore tuna	DD
<i>Thunnus obesus</i>	Big eye tuna	Vu
<i>Triaenodon obesus</i>	Whitetip reef shark	NT
<i>Urogymnus asperrimus</i>	Porcupine ray	Vu
<i>Xiphias gladius</i>	Swordfish	DD
<b>Marine mammals</b>		
<i>Balaenoptera borealis</i>	Coalfish whale	En
<i>Balaenoptera musculus</i>	Blue whale	En
<i>Balaenoptera physalus</i>	Finbacked whale	En
<i>Megaptera novaeangliae</i>	Humpbacked whale	Vu
<i>Orcaella brevirostris</i>	Irawaddy dolphin	DD
<i>Dugong dugon</i>	Dugong	Vu
<b>Marine Turtles</b>		
<i>Caretta caretta</i>	Loggerhead turtle	En
<i>Chelonia mydas</i>	Green turtle	En
<i>Dermochelys coriacea</i>	Leatherback turtle	Cr
<i>Eretmochelys imbricata</i>	Hawksbill turtle	Cr
<i>Lepidochelys olivacea</i>	Olive ridley turtle	En

\*IUCN categories criteria version 3.1, 2001. Cr = critically endangered; En = endangered; Vu = vulnerable;

NT=, near threatened; DD = data deficient. The term "threatened" includes categories Cr, En and Vu.

**Sources.** For fishes, Fishbase 2000, ICLARM- The World Fish Centre.

For Marine mammals and reptiles; IUCN 2002. 2002 IUCN Red List of Threatened Species.

## ANNEX 6

### Dendrograms Resulting from the Preliminary Cluster Analyses Conducted During the Third Meeting of the Regional Working Group on Seagrass

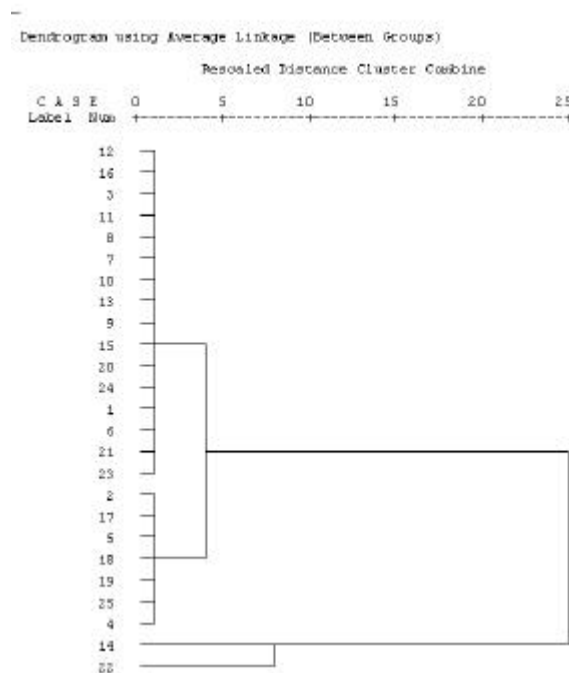
#### Introduction

The purpose of the cluster analysis is to group sites on the basis of their similarity, thus enabling ranking and selection of demonstration sites from different groups to ensure that as wide a range of conditions as possible are included within the final selection of demonstration sites.

#### Results

Table 3 of Annex 4 presents the data available for inclusion in the preliminary analyses representing 25 sites from 5 countries. The cluster programme from the SPSS package was utilised for these preliminary analyses and Figure 1 presents the outcome using average between groups linkage, for these data without transformation.

Figure 1 Dendrogram using average linkage between groups based on the untransformed data presented in Table 3 of Annex 4



It can be seen that this figure fails to distinguish similarities amongst the majority of the sites and appears to be strongly influenced by the figures for total area of the site, and percentage cover. This results in the majority of sites (16) falling into one cluster with a second cluster of 7 sites and two outliers. The two outliers are the sites with largest areas 2,500 and 1,500 hectares, whilst the remaining two groups represent sites of area between 500 and 1080 hectares and between 10 and 300 hectares.

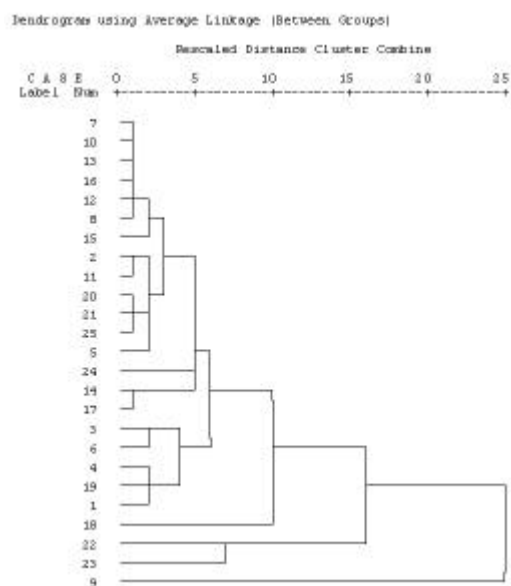
The outcome is neither very informative nor helpful for the intended purpose hence it was decided to transform the data for area of the site, and percentage cover using a log transformation. The transformed data are presented in Table 1 and the resultant dendrogram is shown in Figure 2. It can be seen from Figure 2 that one site, Temiang in Indonesia, lies outside the remaining set, reflecting the large depth range of 14 metres.



Table 1 Logarithmic Transformation of Area and Percentage Cover. Shaded cells contain estimates agreed by the RWG-SG

No.	Site Name	Area (ha)	depth range	No. of Seagrass species	percent cover	No. of Penaeid species	Number of other ecosystems	Number of rare species	Number of endangered and threatened species
1	Makhoam Pom Bay	2.40	1.00	2.00	1.78	4.00	0.00	0.00	1.00
2	Kung Krabane Bay	2.85	4.00	5.00	1.90	4.00	1.00	0.00	1.00
3	Trat	1.11	3.00	5.00	1.48	6.00	2.00	0.00	1.00
4	Tungka Bay	3.03	1.00	1.00	1.85	6.00	2.00	0.00	1.00
5	Sarat Thani	2.70	3.00	6.00	1.60	2.00	1.00	0.00	1.00
6	Pattani Bay	2.44	3.00	4.00	1.85	8.00	1.00	0.00	1.00
7	Galang Baru	1.18	4.00	8.00	1.60	3.00	2.00	0.00	1.00
8	Medang-Mesanak	0.70	2.00	7.00	1.54	3.00	2.00	0.00	1.00
9	Temiang	0.70	14.00	2.00	1.00	3.00	2.00	0.00	1.00
10	Senayang-Kentar	1.00	4.00	8.00	1.32	3.00	2.00	0.00	1.00
11	Limpong Bay	1.00	4.00	5.00	1.51	3.00	2.00	0.00	1.00
12	Trikora Beach	1.18	2.00	9.00	2.00	3.00	2.00	0.00	1.00
13	Mapor	1.30	3.00	8.00	1.70	3.00	2.00	0.00	1.00
14	Cape Bolinao	3.40	2.00	9.00	1.88	7.00	2.00	1.00	0.00
15	Puerto Galera	2.06	5.00	9.00	1.98	3.00	2.00	1.00	2.00
16	Ulugan Bay	1.04	3.00	8.00	2.00	4.00	2.00	0.00	0.00
17	Puerto Princesa Honda Bay	2.83	2.00	8.00	1.95	7.00	2.00	0.00	0.00
18	Hepu seagrass bed	2.73	4.00	3.00	1.90	5.00	1.00	6.00	1.00
19	Liusha seagrass bed	2.95	3.00	2.00	1.95	5.00	2.00	0.00	0.00
20	LiAn seagrass bed	2.48	3.00	5.00	1.88	3.00	2.00	0.00	0.00
21	Xincun seagrass bed	2.30	2.00	4.00	1.90	3.00	2.00	0.00	0.00
22	Phu Quoc Island	3.18	6.00	9.00	1.65	8.00	3.00	6.00	0.00
23	Con Dao Island	2.30	10.00	10.00	1.54	4.00	3.00	6.00	3.00
24	Phu Quy Island	2.48	3.00	6.00	1.70	4.00	1.00	3.00	4.00
25	Cam Ranh Bay	2.90	1.00	6.00	1.78	3.00	2.00	0.00	0.00

Figure 2 Dendrogram using average linkage between groups based on logarithmic transformations of the data for area and percentage cover presented in Table 1 above

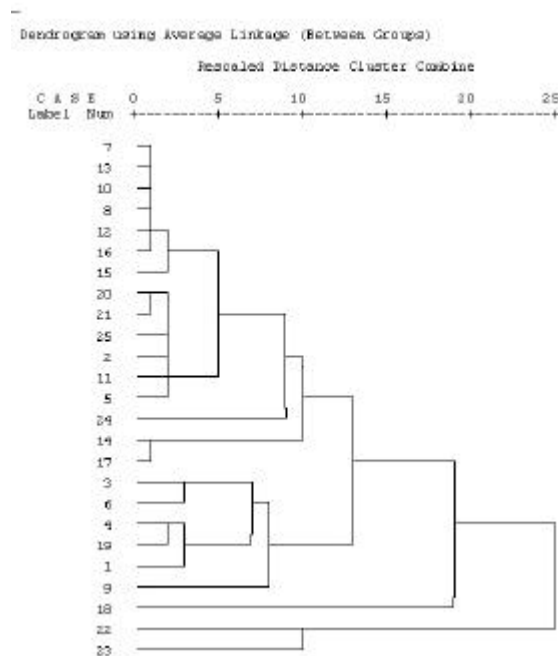


It was decided to transform the depth range using the square root plus one and these data are presented in Table 2. The resulting dendrogram (Figure 3) shows that Temiang is no longer an outlier being somewhat similar to four of the sites from Thailand. This figure suggests that sites 18, 22 and 23 form outlier groups, which may reflect the unusually high numbers of "rare" species recorded from these three Vietnamese sites. During discussion it was noted that the Vietnamese had used the national Red Data book in defining rare, endangered and threatened species rather than the IUCN Red Data Book and these numbers will need to be checked prior to the final analysis.

Table 2 Logarithmic Transformation of Area and Percentage Cover, and transformation of the depth range using (square root +1). Shaded cells contain estimates agreed by the RWG-SG

No.	Site Name	Area (ha)	depth range	No. of Seagrass species	% cover	No. of Penaeid species	No. of other ecosystems	No. of rare species	Number of endangered and threatened species
1	Makhoam Pom Bay	2.40	2.00	2.00	1.78	4.00	0.00	0.00	1.00
2	Kung Krabane Bay	2.85	3.00	5.00	1.90	4.00	1.00	0.00	1.00
3	Trat	1.11	2.73	5.00	1.48	6.00	2.00	0.00	1.00
4	Tungka Bay	3.03	2.00	1.00	1.85	6.00	2.00	0.00	1.00
5	Sarat Thani	2.70	2.73	6.00	1.60	2.00	1.00	0.00	1.00
6	Pattani Bay	2.44	2.73	4.00	1.85	8.00	1.00	0.00	1.00
7	Galang Baru	1.18	3.00	8.00	1.60	3.00	2.00	0.00	1.00
8	Medang-Mesanak	0.70	2.41	7.00	1.54	3.00	2.00	0.00	1.00
9	Temiang	0.70	4.74	2.00	1.00	3.00	2.00	0.00	1.00
10	Senayang-Kentar	1.00	3.00	8.00	1.32	3.00	2.00	0.00	1.00
11	Limpong Bay	1.00	3.00	5.00	1.51	3.00	2.00	0.00	1.00
12	Trikora Beach	1.18	2.41	9.00	2.00	3.00	2.00	0.00	1.00
13	Mapor	1.30	2.73	8.00	1.70	3.00	2.00	0.00	1.00
14	Cape Bolinao	3.40	2.41	9.00	1.88	7.00	2.00	1.00	0.00
15	Puerto Galera	2.06	3.24	9.00	1.98	3.00	2.00	1.00	2.00
16	Ulugan Bay	1.04	2.73	8.00	2.00	4.00	2.00	0.00	0.00
17	Puerto Princesa Honda Bay	2.83	2.41	8.00	1.95	7.00	2.00	0.00	0.00
18	Hepu seagrass bed	2.73	3.00	3.00	1.90	5.00	1.00	6.00	1.00
19	Liusha seagrass bed	2.95	2.73	2.00	1.95	5.00	2.00	0.00	0.00
20	LiAn seagrass bed	2.48	2.73	5.00	1.88	3.00	2.00	0.00	0.00
21	Xincun seagrass bed	2.30	2.41	4.00	1.90	3.00	2.00	0.00	0.00
22	Phu Quoc Island	3.18	3.45	9.00	1.65	8.00	3.00	6.00	0.00
23	Con Dao Island	2.30	4.16	10.00	1.54	4.00	3.00	6.00	3.00
24	Phu Quy Island	2.48	2.73	6.00	1.70	4.00	1.00	3.00	4.00
25	Cam Ranh Bay	2.90	2.00	6.00	1.78	3.00	2.00	0.00	0.00

Figure 3 Dendrogram using average linkage between groups based on logarithmic transformations of the data for area and percentage cover and transformation of the depth range using (square root +1) presented in Table 2 above. Shaded cells contain estimates agreed by the RWG-SG



## Conclusions

It is apparent that, the data need to be carefully verified prior to the conduct of the final cluster analysis, and hence full species lists for all the taxa used must be provided for each site. It was agreed to use Gower's Index of Similarity and to include the presence or absence of seahorses rather than numbers of species and/or genera in the final analysis.

## ANNEX 7

### **Ranking Indicators and Weights for Determination of Priority within Clusters of Potential Demonstration Sites, and Results of Preliminary Ranking of Seagrass Sites Bordering the South China Sea**

#### **Background**

The second meetings of the Regional Scientific and Technical Committee and the Project Steering Committee agreed to a three-step process of selecting demonstration sites based on, an initial clustering of similar sites followed by, ranking and determination of the priority of sites within clusters.

The Focal Points in each Specialised Executing Agency assembled, in advance of the third Regional Working Group meeting, data and information required to characterise seagrass sites bordering the South China Sea. These data and information were based on the needs identified during the first regional working group meeting and listed in Annex 7 of the meeting report<sup>1</sup>. The table is reproduced here as appendix 1 for comparative purposes.

Examination of this table clearly indicates that the range of data and information, envisaged to be assembled, in characterising seagrass sites, was both comprehensive and overlapping in terms of various aspects of each major class of parameter. In considering the indicators to be used in ranking the priority of sites within each cluster two major considerations were applied, the first the over-riding need for transparency in the process of site selection, and secondly, the need to ensure that data were comparable for all sites considered by the focal points in each country. The necessity for transparency in the process means that the indicators used in ranking sites must be simple, and non-overlapping in terms of the inherent characteristics covered by each indicator type. Hence the use of multiple indicators such as genera and species of the same larger taxon should be avoided, as should the use of any indicator, however important it might theoretically be, if such data cannot be supplied for the majority of sites.

#### **Choice of Indicators**

Discussion of the choice of indicators was based on the preliminary sets of data and information assembled for 25 seagrass sites and made available to the third meeting of the Regional Working Group on Mangroves. These data are presented in Table 1 of Annex 4.

As noted in the meeting report, data and information for some parameters such as rates of change in vegetation cover had not been assembled for most sites and such parameters were excluded from the cluster analysis. In some cases these have also been excluded from the choice of indicators used in the ranking process whilst in others they have been more broadly defined and included in the choice of indicators.

Table 1 lists the indicators selected by the Regional Working Group as being indicative of biological diversity, transboundary, regional and global significance.

The weighting to be assigned to the classes of indicator reflects the consensus view of members concerning the relative importance of each class. Hence the indicators of biological diversity were considered to merit the greatest weight overall, 60 points from the total of 100. It should be recognised that in reality the indicators of transboundary, regional and global significance are in fact also indicators of biological diversity, hence this set of indicators is strongly weighted towards the biological characteristics of the sites concerned.

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<sup>1</sup> UNEP, 2002. *Report of the First Meeting of the Regional Working Group for the Seagrass Sub-component of the Project Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand*. UNEP GEF/SCS/RWG-SG.1/3 Bangkok, Thailand, 6 – 8 May 2002.

Table 1 Indicators and weight for biological diversity, transboundary, regional and global significance

Class of Indicator	Indicator scale				
	Score				
1. Area maximum 25 points					
1.1 Total area (ha) maximum 15 points	<20	21-100	101-300	301-500	>500
Score	3	6	9	12	15
1.2 Percent coverage maximum 10 points	<20	21-40	41-60	61-80	>80
Score	2	4	6	8	10
2. Biological diversity 60 points					
2.1 Species diversity Score maximum 52 points					
2.1.1 Seagrass species	<2	3-4	5-6	7-8	>8
Score Maximum 15 points	3	6	9	12	15
2.1.2 Gastropods	<20	21-40	41-70	71-100	>100
Score Maximum 5 points	1	2	3	4	5
2.1.3 Penaeid shrimps	0	1-3	4-5	6-7	>7
Score Maximum 8 points	0	2	4	6	8
2.1.4 Sea Urchins	0	1-2	>2		
Score Maximum 4 points	0	2	4		
2.1.5 Siganids	0	1-2	3-4	>4	
Score Maximum 8 points	0	2	5	8	
2.1.6 Holothurians	0	1-5	>5		
Score Maximum 8 points	0	4	8		
2.1.7 Starfish	0	1-3	>3		
Score Maximum 4 points	0	2	4		
2.2 Community diversity Score maximum 8 points					
2.2.1 Number of other aquatic ecosystems	1	2	>2		
Score Maximum 8 points	3	5	8		
3. Transboundary significance 5 points					
3.1 Number of migratory aquatic species					
Score Maximum 5 points	score 1 point per species				
4. Regional/Global significance 10 points					
4.1 Number of endangered & critically endangered aquatic species					
Score Maximum 10 points	score 1 point per species				

Within each class of indicator a series of one or more specific indicators were identified on the basis of the outcome of the initial site characterisations, hence indicators were not included when it was apparent that the information and/or data were difficult to assemble as evidenced by the frequency of missing data in the preliminary set.

Following a careful analysis of the range of values demonstrated by the site data available to the meeting, the Regional Working Group then considered the number of divisions and weighting that would be appropriate to assign to any individual site value.

Table 2 lists the indicators selected by the Regional Working Group as being indicative of socio-economic conditions including indicators of national priority, stakeholder involvement and threats. As in the case of the environmental indicators, the Regional Working Group discussed and agreed the comparative weight that should be assigned to each class of indicator, then to individual indicators within each class, finally deciding on the divisions and weights that should be assigned to the observed values at any one site.

It was noted that a number of the indicators listed in Table 2 were highly subjective and it is clear that the proposals for demonstration sites will need to present quite detailed reasoning as to why particular scores have been assigned.

Table 2 Indicators for socio-economic considerations including indicators of national priority, stakeholder involvement and threats to be used in the ranking of seagrass sites bordering the South China Sea

Class of Indicator		Indicator scale			
		Score			
1. Threats maximum 10 points					
		High	Medium	Low	None
1.1	From destructive fishing				
Score – max 5		1	2	3	5
1.2	From pollution				
Score – max 5		1	2	3	5
2. National significance/priority-Government support maximum 16 points					
2.1	National priority	Low	medium	high	
Score – max		5	10	16	
3. Financial considerations /co-financing maximum 22 points					
3.1	Project cost (\$US)	>150,000	150,000	<150,000	
Score – max 10		3	6	10	
3.2	Co-financing commitment	<1/1	1/1	>1/1	
Score – max 12		4	8	12	
4. Stakeholders involvement maximum 22 points					
4.1	Local government (in cash/in-kind)	Low	medium	high	
Score – max 6		2	4	6	
4.2	Central government (in cash/in-kind)	Low	medium	high	
Score – max 4		1	2	4	
4.3	NGOs/Civil Society (in cash/in-kind)	Low	medium	high	
Score – max 6		2	4	6	
4.4	Private Sector (in cash/in-kind)	Low	medium	high	
Score – max 6		2	4	6	
5. Management potential maximum 30 points					
5.1	Accessibility	low	medium	high	
Score – max 10		3	6	10	
5.2	Existing institutional framework	low	medium	high	
Score – max 10		3	6	10	
5.3	Existing information	low	medium	high	
Score – max 10		3	6	10	

### Results of Preliminary Ranking of Seagrass Sites Bordering the South China Sea

Having agreed upon the nature of the indicators and the weight to be assigned to them the site characterisations available to the third meeting of the Regional Working Group on Seagrass were scored according to the agreed indicators and weights, presented and discussed above.

The outcome of the preliminary ranking for all twenty-nine seagrass site characterisations with respect to the environmental indicators is presented in, Table 3, and with respect to the socio-economic indicators, in Table 4. Due to the incomplete nature of the data sets, together with differences in the definitions of the indicators used by each focal point it is not possible to obtain final rank scores at the present time. Where the data set for a particular site is incomplete then the preliminary rank score will be automatically lower, this is particularly evident in the case of the Thai, Cambodian and Indonesia sites where up to 6 of the environmental indicators cannot be scored.

Table 3 Scores for environmental indicators in respect of seagrass sites bordering the South China Sea

Site Name	Area		Species Diversity							Community Diversity	Transboundary Significance	Regional & Global Significance	Total
	Area (ha)	% cover	No Seagrass Spp.	No Gastropod Spp.	No Penaeid shrimp Spp.	No Urchin Spp.	No Siganid Spp.	No holothurian Spp.	No starfish Spp.	No. of other ecosystems	No. of migratory Spp.	No. of endangered and threatened Spp.	
THAILAND													
Makhoam Pom Bay	9	6	3	n/a	4	n/a	n/a	n/a	n/a	3	n/a	1	26
Kung Krabane Bay	15	8	9	1	4	n/a	2	n/a	n/a	5	n/a	1	45
Trat	3	4	9	n/a	6	n/a	n/a	n/a	n/a	5	n/a	1	28
Tungka Bay	15	8	3	n/a	6	n/a	n/a	n/a	n/a	5	n/a	1	38
Sarat Thani	12	4	9	4	2	2	2	4	4	3	n/a	1	47
Pattani Bay	9	8	6	2	8	n/a	8	0	2	3	n/a	1	47
INDONESIA													
Galang Baru	3	4	12	1	2	n/a	n/a	n/a	n/a	5	n/a	1	28
Medang-Mesanak	3	4	12	1	2	n/a	n/a	n/a	n/a	5	n/a	1	28
Temiang	3	2	3	1	2	n/a	n/a	n/a	n/a	5	n/a	1	17
Senayang-Kentar	3	4	12	1	2	n/a	n/a	n/a	n/a	5	n/a	1	28
Limbong Bay	3	4	9	1	2	n/a	n/a	n/a	n/a	5	n/a	1	25
Trikora Beach	3	15	15	1	2	n/a	n/a	n/a	n/a	5	n/a	1	42
Mapor	3	6	12	1	2	n/a	n/a	n/a	n/a	5	n/a	1	30
PHILIPPINES													
Cape Bolinao	15	8	15	n/a	6	n/a	5	4	2	5	n/a	n/a	60
Puerto Galera	9	10	15	n/a	2	n/a	2	4	2	5	n/a	2	51
Ulugan Bay	3	10	12	n/a	4	n/a	2	n/a	n/a	5	n/a	n/a	36
Puerto Princesa/ Honda Bay	15	10	12	n/a	6	n/a	5	4	4	5	n/a	n/a	61

Table 3 continued.

[illegible]



Table 4

[illegible]

Table 4 continued. Scores for Socio-economic indicators in respect of Seagrass sites bordering the South China Sea

[illegible]

Table 4 presents the rank scores for the socio-economic classes of indicator and it can be seen that only Thailand had assembled the data necessary to assign rank scores at this time. The absence of data from the other countries is not unsurprising, since at this stage the details of proposed interventions have still to be finalised and hence the extent of community involvement, co-financing support and other indicators are difficult to estimate at the present time.

## **Conclusion**

The regional working group agreed on the use of this selection of indicators in a two tier process with the indicators in Table 1 be used as the primary means of ranking regional importance of sites within the clusters and the indicators in Table 2 being applied at a later stage when final decisions regarding the choice of sites are being made.

The assignment of rank according to the agreed classes of indicators and their respective weighting can be finalised rapidly provided that, the focal points submit the missing data to the PCU promptly.

# Appendix 1

## Parameters, Indicators, Data and Information Requirements for Characterising, Seagrass Sites for the UNEP/GEF Project “Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand”

Parameters	Indicators	Data & Information Requirements	Units	Remarks
<b>Geographical</b>				
Location	Seagrass bed	Central position of areas<10 ha GPS boundary or number (min. 4) paired coordinates for larger areas; end points for linear strips	Lats and longs	Provide location map
Area - extent	Seagrass bed	> 1ha	ha	Large scale map
<b>Physical/chemical</b>				
Substrate type	Substrate Class of seagrass <sup>2</sup>	Particle size class	Micron-cm 3 categories	
Sediment Quality	Organic matter	Historic & available data	mg/g	
	Heavy Metals		mg/l, µg/l	
	Nitrate		mg/l, µg/l	
Exposure	Fetch, current	Typhoons, wind speed, direction, frequency	Km, km/h	
Monsoon exposure				
Tidal regime		Range; type (diurnal, semi-diurnal, mixed)	m	
Depth	light	Tape measure Light meter	m µE/ m <sup>2</sup> /sec	
Salinity	Distance to freshwater inflow, hyper salinity	GPS Refractometer Salinity meter	km ppt	
Water Quality	Heavy metals, POPs, nutrients,	Historic & available data	mg/l, µg/l	
	Algal blooms	Historic & available data	mg/l	
Dredging and reclamation,	Suspended sediment	Sediment traps Secchi disks	g/ m <sup>2</sup> /d m	

<sup>2</sup> Seagrass classes are based on substrate type namely: sandy coralline (exposed); muddy (non-exposed); transition (mixed; sandy-muddy).

Parameters	Indicators	Data & Information Requirements	Units	Remarks
<b>Biological</b>				
Diversity	Seagrass	Number of species	#	
	Seagrass	Density of each species	g/m <sup>2</sup>	
	Penaeids	Number of species	#/ m <sup>2</sup>	
	Gastropods	Number of species	#/ m <sup>2</sup>	
	Seahorses	Number of species	#/ m <sup>2</sup>	
	urchins	Number of species	#/ m <sup>2</sup>	
	Siganids	Number of species	#/ m <sup>2</sup>	
	holothurians	Number of species	#/ m <sup>2</sup>	
	starfish	Number of species	#/ m <sup>2</sup>	
	Presence of endangered <sup>3</sup> and/or threatened species e.g. Dugong, turtles, seahorses, giant clams	Provide details of presence or absence and abundance where possible.	#/ha	
Productivity	seagrass		mg/ g/ d	
Associated habitats	Mangrove, coral & assoc. habitats, estuaries, freshwater	Km to nearest associated habitat		
<b>Socio economic</b>				
Poverty	Low standard of living	statistics	Income/person/yr	
Pop'n pressure	Population size	Density	No.people/km <sup>2</sup>	
	Population growth	Growth rate	Increase per annum	
	<b>Distance</b>	km of Seagrass bed to centre of nearest coastal centre of population	km	
Fishing damage	Damaged seagrass	Seagrass Density biomass area	shoots/m <sup>2</sup> g/ m <sup>2</sup> m <sup>2</sup>	
Over fishing	Declining resource catch	Resource statistics	cpue	
Trampling, gleaning	Seagrass damage Density of gleaned organisms		Density shoots/m <sup>2</sup> # / h #/ m <sup>2</sup>	

<sup>3</sup> Use the IUCN criteria for endangered, threatened, and commercially threatened species.

Parameters	Indicators	Data & Information Requirements	Units	Remarks
Management status	managed		Yes or No	Describe management regime
<b>Transboundary</b>				
Shared			Yes or No	Provide map
Biodiversity,	Migratory species or shared stocks	Number and kind species		List species
Cross border impacts	Impacts on seagrass	Area of impact Change is species composition or abundance	m <sup>2</sup> , ha nos species nos. individuals	List species lost
	Overfishing	Declining catch	cpue	

### Schedule of Meetings, Workplan and Timetable for the Seagrass Focal Points, 2003

Table 1 Schedule of meetings for 2003

	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	
January			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				
February						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28				
						Chinese N.Y.																															
March						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
								RWG-M-3																					RWG-S-3								
								RWG-W-3																					RWG-CR-3								
April		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30						
		RWG-F-3										Thai N.Y.										RWG-LbP-3															
May				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31			
											RSTC-3																										
June							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
July		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					
August					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
																														RWG-LbP-4							
September	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30							
							RWG-F-4															RWG-S-4					RWG-CR-4										
October			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				
			Cont.				RWG-W-4							RWG-M-4															Ramadan								
November						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
						Ramadan																															
December	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31						
							Regional Sci. Mto			RSTC-4											PSC-3				Xmas												

Table 2 Revised Workplan and Timetable of Agreed National and Regional Activities in the Seagrass Sub-component: 2002-2003.

[1. National Seagrass Committee/Working Group prepare first draft for discussion with stakeholders; 2. National Seagrass Committee/Working Group prepare second draft for discussion with stakeholders; 3. Initial prioritisation will be conducted at the third RSTC meeting; 4. Final decision on the 3 demonstration sites for seagrass; 5. First draft of the SAP; 6. Final draft of the SAP; 7. 22-26 September 2003, Fourth Meeting of the RWG-SG, China, exact venue to be decided.]

Year	2002												2003											
Quarter	1 <sup>st</sup>			2 <sup>nd</sup>			3 <sup>rd</sup>			4 <sup>th</sup>			1 <sup>st</sup>			2 <sup>nd</sup>			3 <sup>rd</sup>			4 <sup>th</sup>		
Month	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
National Committee meetings	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
NTWG Meetings						x				x														
Review National Reports																								
Review of Regional Database and Respond																								
<b>NATIONAL ACTIVITIES</b>																								
1. Review of past and on-going projects															R			F						
2. Complete questionnaire on status of data and information <sup>4</sup>															R					F				
3. Complete questionnaire on metadata															R									
4. Review national criteria <sup>5</sup>																				D				
5. Review economic valuation criteria																	R							
6. Review threats at site level																				D	F			
7. Review national legislation																	R							
8. Review national level management regimes																	R							
9. Causal chain analysis list (for threats) <sup>6</sup>																				D	F			
10. Identify priority points of intervention																				D	F			
11. Evaluate barriers to action and possible solutions																				D	F			
12. Submit missing data for cluster analysis																	F							
13. Preparation/revision of the NAP																		1 <sup>7</sup>			2			
<b>REGIONAL ACTIVITIES</b>																								
14. Regional criteria development																								
15. Development of Regional Priorities																								
16. Selection of demonstration sites																	3				4			
17. Finalisation of the Regional SAP																	5		6					
18. Regional GIS database tasks:																								
Step 1																								
Step 2																								
Step 3																								
4th meetings RWG-SG																					7			

D = draft, R = draft for independent review of the reports, F = finalisation of reports on the basis of the review.

<sup>4</sup> Please refer to Annex 7 of the Report of the First Meeting of the RWG-SG for details on the parameters and corresponding requirements for data and information.

<sup>5</sup> Criteria for assigning conservation and/or management status and/or zoning and importance given to seagrass meadows in coastal zone management plans.

<sup>6</sup> For all seagrass sites that were identified and characterised.

<sup>7</sup> Please see caption for notes referring to the numbers 1 to 7.