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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 Mangrove Sub-component**

***Bali, Indonesia, 3<sup>rd</sup> – 6<sup>th</sup> March 2003***

## Table of Contents

<b>1.</b>	<b>OPENING OF THE MEETING.....</b>	<b>1</b>
1.1	WELCOME ADDRESS .....	1
1.2	INTRODUCTION OF MEMBERS .....	1
<b>2.</b>	<b>ORGANISATION OF THE MEETING .....</b>	<b>1</b>
2.1	ELECTION OF OFFICERS .....	1
2.2	DOCUMENTS AVAILABLE TO THE MEETING .....	2
2.3	ORGANISATION OF WORK .....	2
<b>3.</b>	<b>ADOPTION OF THE MEETING AGENDA .....</b>	<b>2</b>
<b>4.</b>	<b>OPENING REMARKS FROM THE FOCAL POINTS FOR MANGROVES FROM EACH PARTICIPATING COUNTRY .....</b>	<b>2</b>
<b>5.</b>	<b>REPORTS FROM THE PROJECT CO-ORDINATING UNIT (PCU) REGARDING OVERALL PROGRESS TO DATE.....</b>	<b>4</b>
5.1	STATUS OF END-YEAR PROGRESS REPORTS, EXPENDITURE REPORTS, AND BUDGETS .....	4
5.2	STATUS OF PLANNED SUBSTANTIVE OUTPUTS FROM THE NATIONAL LEVEL ACTIVITIES .....	4
<b>6.</b>	<b>REVIEW AND EVALUATION OF COUNTRY REPORTS .....</b>	<b>5</b>
6.1	PAST AND ON-GOING ACTIVITIES INCLUDING ECONOMIC VALUATION .....	5
6.2	REVIEW OF NATIONAL DATA AND INFORMATION, CREATION OF NATIONAL META-DATABASE AND NATIONAL INPUTS TO THE REGIONAL GIS DATABASE .....	6
6.3	REVIEW OF NATIONAL LEGISLATION, INSTITUTIONAL AND ADMINISTRATIVE ARRANGEMENTS .....	7
<b>7.</b>	<b>CHARACTERISATION OF NATIONAL MANGROVE SITES AND THEIR REGIONAL PRIORITISATION .....</b>	<b>7</b>
<b>8.</b>	<b>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 .....</b>	<b>13</b>
<b>9.</b>	<b>REVISION OF THE WORKPLAN AND ACTIVITIES FOR THE REGIONAL WORKING GROUP ON MANGROVES .....</b>	<b>14</b>
<b>10.</b>	<b>DATE AND PLACE OF THE FOURTH MEETING OF THE REGIONAL WORKING GROUP ON MANGROVES .....</b>	<b>15</b>
<b>11.</b>	<b>ANY OTHER BUSINESS.....</b>	<b>15</b>
<b>12.</b>	<b>ADOPTION OF THE REPORT OF THE MEETING.....</b>	<b>15</b>
<b>13.</b>	<b>CLOSURE OF THE MEETING .....</b>	<b>16</b>

## **List of Annexes**

- ANNEX 1 List of Participants**
- ANNEX 2 List of Documents**
- ANNEX 3 Agenda**
- ANNEX 4 Tabulation of Raw and Transformed Data Relating to Identified Mangrove Sites Bordering the South China Sea and used in the Preliminary Cluster Analysis**
- ANNEX 5 Dendrograms Resulting from the Preliminary Cluster Analyses Conducted During the Third Meeting of the Regional Working Group on Mangroves**
- ANNEX 6 Tabulation of Indicators and Scores to be used in the Ranking of Mangrove Sites Bordering the South China Sea**
- ANNEX 7 Results of Preliminary Ranking of Mangrove Sites Bordering the South China Sea**
- ANNEX 8 Schedule of Meetings, Workplan and Timetable for the Mangrove Focal Points, 2003**

## **Report of the Meeting**

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

#### **1.1 Welcome address**

1.1.1 The Project Director, Dr. John Pernetta, 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).

1.1.2 In his opening address, he reminded participants of the overall project timetable that necessitated the Project Steering Committee (PSC) making decisions regarding the choice of demonstration sites at the third meeting, scheduled for December 2003. To meet this timetable the Regional Working Group on Mangroves (RWG-M) needs to make a number of critical decisions regarding the nature of the analysis of existing data and information contained in the site characterisations, in order to arrive at a preliminary ranking of the regional priority of various mangrove sites. He noted that at the present time not all of the required data and information were available but noted further that, sufficient site characterisations had been prepared by the Focal Points to enable a preliminary analysis of priority using the guidelines agreed by the second meetings of the Regional Scientific and Technical Committee (RSTC) and the Project Steering Committee convened in Viet Nam in December 2002.

1.1.3 The Project Director noted that this was a critical meeting, since it was at this meeting that the RWG-M must agree on the mode of determining priority, in order to ensure that, proper guidance was provided to the Focal Points and national committees and sub-committees regarding the sites for which more detailed demonstration site proposals should be prepared between the third and fourth meetings of the Regional Working Group. He noted also the need to ensure that proposals were sufficiently well prepared to be suitable for presentation at the Regional Scientific Conference and to potential donors by the end of the third quarter of 2003. He noted that the task before the Working Group was substantial but noted further that, the group had successfully achieved a considerable amount of progress to date. On behalf of the Executive Director and Director of the Division of GEF Co-ordination, he wished the group every success in their deliberations.

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

1.2.1 Dr. Pernetta noted with regret that neither Dr. Hangqing Fan nor Professor Sanit Aksornkoae were able to be present for the opening of the meeting but noted that, they would be arriving on 4<sup>th</sup> March, he welcomed the Indonesian observers and Dr. Ian Campbell from the Mekong River Commission and then invited the members and observers to introduce themselves to the meeting. A 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 members that the Rules of Procedure adopted by the RWG-M at their first meeting state that, the Regional Working Group shall elect, from amongst the members, a Chairperson, Vice-Chairperson and Rapporteur to serve for one year. The rules state further that, officers shall be eligible for re-election no more than once. He noted that, Dr. Sonjai Havanond (Thailand), Dr. Hangqing Fan (China), and Mr. Florendo Barangan (Philippines) who had served, as Chairperson, Vice-Chairperson, and Rapporteur during 2002 were therefore eligible for re-election.

2.1.2 Members were invited to nominate members as Chairperson, Vice-Chairperson, and Rapporteur for 2003. Following extensive discussion regarding the merits of electing new members and retaining the serving officers in the interest of continuity, the meeting re-elected Dr. Sonjai Havanond, Dr. Hangqing Fan and Mr. Florendo Barangan as Chairperson, Vice-Chairperson and Rapporteur, respectively.

2.1.3 The elected Officers assumed their responsibilities for the subsequent conduct of the meeting.

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

2.2.1 The Project Director introduced the documentation that had been prepared in advance of the meeting and outlined the documents available to participants in both hard copy and on CD-ROM, which had been up-loaded to the project website in advance of the meeting. He noted that numerous documents had been provided to the Project Co-ordinating Unit (PCU) at the commencement of the meeting for consideration of members, copies of which were distributed, together with an amended list of the documents for consideration, and discussion during the meeting. The final list of documents is attached as Annex 2 to this report.

## **2.3 Organisation of work**

2.3.1 The Chairperson invited the Project Director to brief participants on the administrative arrangements for the conduct of the meeting, and the proposed organisation of work contained in document UNEP/GEF/SCS/RWG-M.3/INF.3. The Project Director noted that the meeting would be conducted in English and that formal sessions would be conducted in plenary although it was envisaged that, sessional working groups would need to be convened to complete the various reviews and analyses required in order to complete the business outlined under agenda item 7.

2.3.2 The Project Director noted that, following the request of members of the regional working groups for greater interaction between the components at the regional level a joint session between the RWG-M and the regional Working Group on Wetlands (RWG-W) would be convened on Wednesday morning.

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

3.1 The Chairperson then invited members to consider the provisional agenda prepared by the PCU as document UNEP/GEF/SCS/RWG-M.3/1, and to propose any amendments or additional items for consideration.

3.2 Dr. Hoang Tri sought clarification regarding arrangements for the field trip and Mr. Santoso advised that a visit to the JICA mangrove project site was planned for March 6<sup>th</sup>, the final day of the meeting.

3.3 There being no proposals for amendment or addition, the draft agenda was adopted and is attached as Annex 3 to this report.

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

4.1 The Chairperson invited the focal points from the Specialised Executing Agencies (SEAs) to provide a short overview of their work, and progress subsequent to the second meeting of the RWG-M and to highlight the contents of any additional documentation tabled at the meeting.

4.2 Dr. Sonjai advised that there had been some administrative delays in execution of planned activities in Thailand, due to restructuring of the Government Departments responsible for mangroves that had resulted in difficulties in accessing and spending the GEF grant funds. He noted however that, Thailand would do its utmost to meet the agreed schedule and that although some administrative problems had been encountered, progress had been substantial since the last meeting. He noted that in Thailand 9 sites are currently under consideration and that this number was likely to increase. He also stated that many mangrove areas under consideration are adjacent to seagrass and coral reef areas, and that discussions will take place with the other National Committees on selecting sites that incorporate more than one habitat type, hence promoting synergy and co-operation between a wider range of institutions and organisations in the country.

4.3 Mr. Santoso noted that, in Indonesia overall responsibility for mangroves comes under the joint responsibility of the Forestry Department, and the Department of Fisheries, which is responsible for activities in mangrove areas, such as fish and shrimp farming. He noted that as the national mangrove focal point, he had facilitated co-operation between the Institute of Mangrove Research & Development, the Forestry Department, and JICA in order to revise mangrove management within the country.

4.4 Mr. Santoso then provided background information on some of the potential demonstration sites and noted that these proposals had been developed as partnerships with private sector donors for mangrove rehabilitation; and with community based management groups concerned with mangroves in West Kalimantan. He noted that, sand mining in Riau Island and illegal cutting of mangroves are two major issues that need attention, whilst in the case of Rambut Island the important population of migratory water birds associated with mangroves, was a key focus for the proposed demonstration activities. He referred participants to the reports from Indonesia that were tabled at the meeting, and which contained more detailed information.

4.5 Dr. Sukristijono Sukardjo provided some key information regarding the distinction between the government classification of state, and non-state forest areas in Indonesia. He noted that through the National Mangrove Committee attempts were being made to resolve the conflicts that can arise between the management policies applicable in the two types of designated forest areas. He also provided information on the efforts made to raise the awareness of stakeholders regarding the benefits of mangroves to the local community.

4.6 In reply to a question from Dr. Hoang Tri, Mr. Santoso elaborated on the impacts resulting from different ownership regimes of state and non-state forest, noting that state forests were under the jurisdiction of the Department of Forestry, while non-state forests were under variable regimes of local government and Department of Fisheries control. He noted that the status of particular areas could be changed and that on occasion state forest could be converted to non-state forest.

4.7 Dr. Do Dinh Sam gave a brief summary of the activities of the Vietnamese National Mangrove Committee that had elaborated 14 site characterisations. He noted that in 2003, the Ministry of Natural resources and Environment will organise a policy workshop concerning mangrove forest management and that the World Bank Project is also working on Policy and management of mangrove forests. Problems include land use change, including clearance for shrimp farms in the Mekong River Delta, and in areas of North Viet Nam.

4.8 Mr. Ke Vongwattana gave a brief summary of progress in Cambodia where four meetings had been convened since the last RWG meeting. During these national meetings consideration had been given to the types of data required for site characterisation, and reports prepared for the SCS project had been reviewed prior to submission to the PCU. He noted that the national mangrove and wetlands sub-committee had selected 3 sites for characterisation as potential demonstration sites.

4.9 During discussion the Project Director noted that the 3 sites for Cambodia had been characterised in a single document, making it difficult to incorporate the information into a regional level analysis.

4.10 Mr. Florendo Barangan reviewed progress by the Philippines National Mangrove Committee and noted that illegal conversion of mangrove to shrimp farms continues, in spite of legislation banning such destructive practices. Illegal cutting of mangroves is a continuing problem, especially in southern Palawan, partly due to the fact that this area is difficult to police, and in spite of the fact that the whole of Palawan is designated as a biosphere reserve. Foreshore development also contributes to mangrove destruction. He noted that other than Palawan, Mindanao is the area in the Philippines with significant mangrove stands.

4.11 Mangrove reforestation, with assistance from the ADB, has been continuing throughout the 1990s and involves promoting community-based management. Mr. Barangan noted that conflicts of interest sometimes arise between national and local governments. He noted further that, the

government is also promoting planting of mangroves, even in small areas, in the hope that this will help preserve mangrove and that utilisation of mangroves for fuel wood by local communities has been minimised, due to the use of other cooking fuels, and the promotion of planting of alternative fuel woods.

## **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 the Project Director to introduce document UNEP/GEF/SCS/RWG-M.3/4, which provides a summary of the current status of budgets and reports from the Specialised Executing Agencies in the participating countries. The dates of receipt of the 6 monthly progress reports, expenditure reports, and cash advance requests from each Focal Point are detailed in Table 1 of this document and the Project Director highlighted the difficulties encountered by the PCU consequent upon the failure of the Focal Points to meet agreed timelines and submission dates. He noted that where submission of reports was delayed then their receipt overlapped with the preparation of the Regional Working Group meetings and the PCU was unable to devote sufficient time to responding and finalising the reports and authorising subsequent cash advances.

5.1.2 Dr. Pernetta noted that, the GEF Secretariat and UNEP were interested in monitoring progress in project execution and that a simple, if crude estimate of progress was to calculate a dollar cost per page of output. He noted that this figure was extremely simplistic but nevertheless provided a simple guide to the productivity of individual SEAs. He noted further that all participants should be concerned, not merely about the quantity but also about the quality of the outputs and that consequently the Project Steering Committee had agreed that the PCU should initiate a process of independent evaluation of the outputs. He drew the attention of the members to the procedures agreed by the Project Steering Committee and contained in the document, UNEP/GEF/SCS/RWG-M.3/4.

5.1.3 Following some discussion of the contents of this report it was agreed that any difficulties concerning the outstanding 6 month reports should be discussed and resolved during the course of the meeting, using time available outside the formal sessions. It was agreed that finalisation of the outstanding matters must be resolved such that, all individuals were clear regarding their responsibilities prior to the closure of the meeting.

5.1.4 In reply to a question from Dr. Sukardjo, Dr. Pernetta explained the difference between the substantive and administrative progress reports, noting that the primary business of the meeting was to discuss and agree on substantive matters. He explained that the administrative reports should be discussed and any difficulties resolved through bilateral discussions rather than in the plenary sessions since these were obligations of the Specialised Executing Agencies (SEAs) consequent upon the signature of the individual memoranda of understanding, which had been signed between UNEP and the individual SEAs.

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

5.2.1 It was noted that Annex 8 of the first meeting report (UNEP/GEF/SCS/RWG-M.1/3) and Annex 8 of the second meeting report (UNEP/GEF/SCS/RWG-M.2/3) provided specific dates by which outputs were to have been produced by the individual Focal Points in advance of the second and third meetings: These dates were as follows:

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|----|--|--|
| 1. | Review of past & ongoing activities:         | 1 <sup>st</sup> draft June; final draft September 2002 |
| 2. | Review of national data and information:     | Final draft September 2002                             |
| 3. | Identification & characterisation of "sites" | 1 <sup>st</sup> draft September, Final December        |
- The second meeting agreed that first drafts would be produced by November and the second set by end of January 2003*

4. Review National legislation 1<sup>st</sup> draft September, Final December 2002  
*The second meeting agreed to defer the first draft to November, the second to January, and the final document for publication by end March, 2003*

5.2.2 The Project Director noted that, documentation received by the PCU from the Focal Points by the time of this meeting and detailed in the appendix to document UNEP/GEF/SCS/RWG-M.3/INF.2 did not fully cover these anticipated outputs, and that the delivery of substantial documents on the first day of the meeting did not permit adequate evaluation and consideration of their contents during the meeting. He noted further that, the United Nations internal auditors and the monitoring and evaluation units of both UNEP and the GEF Secretariat might raise serious questions concerning the execution of the project if further additional postponements of outputs were proposed by this meeting of the Regional Working Group.

5.2.3 The Project Director noted that, this issue had been considered by the Project Steering Committee which had decided that: the SEAs should submit their mandatory 6 month progress reports within ten working days of the due date and that the PCU would respond substantively within ten working days of receipt; that a process of independent peer review of substantive reports should be initiated by the PCU immediately. It was noted that the Project Steering Committee had agreed to the establishment of two Regional Task Forces, one for legal matters and one covering issues relating to economic evaluation of coastal resources and that the specific terms of reference for the legal task force had been approved by the PSC and were contained in Annex 4 of the report of the second meeting. He noted further that the specific outputs relating to economic evaluation and legal matters would be referred to these two groups who would provide assistance to the Focal Points in each country.

## **6. REVIEW AND EVALUATION OF COUNTRY REPORTS**

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

6.1.1 The Chairperson invited the focal points from the SEAs to provide a short overview of the status of their reports following which discussion and comments from the floor would be considered prior to deciding on the next steps required to finalise the reports. Appendix 1 of Annex 2 lists the reports available to the meeting, and individual members elaborated on the status of these reports during their brief presentations.

6.1.2 Mr. Santoso, outlined the status of the Indonesian reports indicating that although not comprehensive, the report on past and on-going activities was fairly comprehensive and makes specific reference to the economic valuation studies some of which were ongoing. Dr. Hoang Tri referred to a report by J. Ruitenbeek (1992)<sup>1</sup> on economic evaluation of mangroves in Indonesia and queried why this was not referred to in the report. In reply Mr. Santoso noted that this work encompassed areas of Indonesia that are not adjacent to the South China Sea, although these could still be a useful reference for the work of the national committee.

6.1.3 Dr. Sam noted that in Viet Nam there was insufficient data to conduct a fully comprehensive economic evaluation for all 14 potential demonstration sites, and that a major difficulty lay in determining Total Environmental Value. Despite this, comprehensive information on economic values had been assembled for ten sites and the review of past and ongoing activities was as comprehensive as could reasonably be expected at this time. Several participants noted similar problems in preparing their reviews of past and ongoing activities and economic evaluations.

6.1.4 Following individual presentations by the focal points from each country, the Project Director noted that very few of the reviews of past and ongoing activities had been prepared in the agreed format contained in Annex 5 of the report of the second meeting of the RWG-M. He also noted that, this had been envisaged as a preparatory activity to be completed in draft by June 2002 and that the

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<sup>1</sup> Ruitenbeek, J. 1992. *Mangrove Management: An Economic Analysis of Management Options with a focus on Bintuni Bay, Irian Jaya. Environmental Management Development in Indonesia Project (EMDI).*



second RWG-M meeting had agreed to postpone submission but that even the second set of agreed deadlines had now already passed. He noted that the RSTC and PSC during their meetings in December had agreed that these preparatory reports should be finalised in the first quarter of 2003.

6.1.5 The Chairman invited the Regional Working Group to consider, discuss and decide on the finalisation and future use of these reports. During discussion it was noted that a considerable amount of information had been assembled but that, what was needed was a consolidated effort on the part of the SEAs to finalise these reports, using perhaps the services of research assistants and that individual focal points should seriously consider revising their budget allocations accordingly.

6.1.6 In response to a suggestion from Dr. Tri that regional expertise be utilised to assist in the finalisation of these and other reviews Dr. Pernetta informed the meeting that, the PSC had agreed to such an approach in the case of the economic valuation and legal reviews but that the remaining tasks most properly fell within the purview of the SEAs. Dr. Pernetta noted further that, part of the purpose of these preparatory activities was to build a regional knowledge base that could be presented in the form of a decision making tool to the Project Steering Committee, and that this objective had not changed.

6.1.7 In response to a comment from Dr. Sam on the scope of activities under the budget allocation for the first two years of the project, Dr. Pernetta agreed that it was the original intention that the main national activities during this initial phase consisted of collecting existing information, and for convening of meetings. The money was not intended for fieldwork or new surveys however, it was agreed that where absolutely necessary, some primary data could be collected using some of the funds.

6.1.8 Dr. Gong, referring to the limited time, asked whether it would be acceptable to compromise to some extent on the comprehensiveness of the coverage of data for past and ongoing activities, and allow countries to complete their reports with the data collected to date on the understanding that more data could be added subsequently. It was agreed that the purpose of the review was not to be one hundred percent comprehensive and that individual SEAs were to use their best judgement in deciding on the cut-off, in terms of the returns, consequent upon further additional investment of time and resources.

6.1.9 In response to a question from Dr. Sonjai on how demonstration sites were ranked in Viet Nam, Dr. Sam gave some background on the process used by the national committee and Mr. Santoso then elaborated on the process used in Indonesia. Dr. Pernetta said that countries could rank sites using any criteria they wished since national ranking and priority became only one criterion of many in determining the regional priority.

6.1.10 The meeting concluded that the end of March was the absolute deadline for finalisation of the review of past and ongoing activities and that the PCU would then send the draft documents received to date for independent review. The review would be completed by the end of March and despatched to the focal points, so that comments could be considered by the SEAs in preparing their final reports by the end of August. In finalising these reviews Focal Points were urged to pay particular attention to the review of on-going projects, since this information would be critical in identifying potential sources of co-financing for the SCS demonstration activities. He further stated that information collected should be for the country in general, and not restricted to the potential demonstration sites.

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

6.2.1 The focal points were invited by the Chairperson to provide short overviews of their reports and the status of the national meta-databases. It was noted that following the identification of inaccuracies in the GIS questionnaire during the second meeting of the RWG-M Dr. Anond of SEA START RC had reviewed the questionnaires and identified only a single discrepancy between the questionnaire and the tabulation of data and information requirements made by the first RWG-M meeting. It was further noted that Dr. Fan had already completed the questionnaire for five sites in China, and that there was no reason why other countries could not do the same.

6.2.2 There followed a general discussion on the availability of maps of mangrove distribution and the need for a regional map of mangrove habitat distribution. It was agreed that any, and all, available maps of mangrove habitat distribution were acceptable, and that individual species distribution maps could be prepared on the basis of specific site characterisations if they were completed in the agreed format.

6.2.3 Mr. Yihang Jiang informed the meeting that a CD ROM distributed at the GIS workshop last year included a map of mangrove distribution for the region and that at the very least focal points could review the reliability and accuracy of the information contained in these maps.

6.2.4 It was agreed that the original deadline for receipt of the maps from all Focal Points was well past, and that such maps would be submitted as soon as possible.

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

6.3.1 It was noted that reviews of national legislation had been prepared by most focal points and that these reviews would be finalised as inputs to the first meeting of the Regional Task Force on legal matters which was to be convened in May 2003.

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

7.1 The Project Director was invited by the Chairperson to introduce documents UNEP/GEF/SCS/RSTC.2/10/Amend.1 & UNEP/GEF/SCS/RSTC.2/8, which had been presented to, discussed and agreed by, the second meetings of the Regional Scientific and Technical Committee and the Project Steering Committee in December 2002. He introduced the principles and procedures agreed and approved by the RSTC and PSC concerning the nature of proposed demonstration sites, and the procedures to be used in clustering and ranking potential demonstration sites.

7.2 During these presentations it was noted 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. It was therefore critical that this meeting conduct a preliminary cluster analysis and ranking of sites in order to provide guidance to the individual focal points concerning regional priorities for demonstration sites, which should be subject to the preparation of specific proposals,

7.3 In reply to a question from Dr. Sam, the Project Director stated that in his view it would be best to have demonstration activities that addressed the basic causes of biodiversity loss, rather than focussing on "preservation" or conservation of biodiversity *per se*. He noted however, that there existed no prior decision regarding the nature of the demonstration sites to be funded and that the RWG-M would be responsible for developing the criteria and ranking procedures for mangrove demonstration sites. He drew the attention of members to the guidance on the nature of potential demonstration sites contained in document UNEP/GEF/SCS/PSC.2/10 Amend.1 that had been presented to, and approved by, the Project Steering Committee.

7.4 There followed a general discussion regarding the various advantages of the protected area approach to maintaining biodiversity compared with an approach that focussed on sustainable use. It was suggested that whilst protected areas could be important as *refugia* for biodiversity and as the core of any system of sustainable use, management activities focussed purely on such an approach were unlikely to achieve the overall objectives of the project in this region given the existing use levels and pressures on coastal and marine resources.

7.5 Following a presentation on the proposed cluster analysis approach and the actions required to attempt a preliminary analysis of similarity it was agreed that the members would tabulate the data and information regarding each site for input to an analysis during the following mornings session. It was noted that various decisions would need to be made regarding the nature of the data to be included in the analyses and the implied weightings that would be accepted by the group.

7.6 Following resumption of the session, the tabulated data prepared overnight were consolidated into a single table for further review and analysis. Included in this initial consideration were data for 7 sites from Thailand; 14 sites from Viet Nam; five sites from China, three sites from Cambodia; four sites from the Philippines and data from 13 Indonesian Provinces bordering the South China Sea. These raw data are presented in Table 1 of Annex 4.

7.7 An initial review of the data revealed that no data were provided for the change in area of mangrove at any site. During the ensuing discussion it became apparent that such data were not easily obtained at the site level but statistics on mangrove forest area were available at larger geographic scales such as the Province in Indonesia, Thailand and Viet Nam. It was agreed that where such data were available then these figures would be included in the site descriptions, together with an explanatory note regarding the scale at which the data had been collected. It was further agreed that such data should reflect single trends rather than being an average of opposite trends such as a period of reduction in area followed by extension of mangrove cover as a consequence of replanting or natural regeneration of abandoned shrimp farm areas. Rates were to be expressed in terms of average annual loss (or gain) in area over a specified period of time.

7.8 A consideration of the figures for area resulted in an initial discussion of exactly what the data encompassed, and it was noted that in the case of Thailand, Indonesia and Viet Nam figures represented vegetation cover only and not areas of shrimp ponds or natural open waters since they had been derived from interpretation of satellite images. It was agreed that where possible the figures for area used in the analysis would reflect actual areas of mangrove vegetation rather than the total areas inclusive of open water and cleared vegetation.

7.9 During discussion of the areas of mangrove, certain anomalies were noted in the data with figures being unrealistically high in some instances. It was noted that such data needed to be checked for accuracy and that it could not be included in the analysis at the present time since it would introduce an unrealistic bias into the cluster analysis. It was further noted that the Indonesian data had been aggregated by Province, rather than being assembled by site, and consequently it was agreed to conduct an independent cluster analysis of these data noting that the Indonesian site data would need to be assembled and included in the analysis at a subsequent date.

7.10 In examining the data concerning the numbers of zones present at each site it was noted that such data had not been assembled for a large number of sites. During discussion it became apparent that zones were not easily identified in some of the more extensive areas of mangrove in Indonesia for example, where associations or communities of species were more easily recognised and these did not follow a recognisable transition from the seaward to landward side of the land-ocean transition. It was agreed that the definition of this indicator should be extended to include the number of different recognisable plant communities or associations identified at a particular site.

7.11 A question was raised regarding the high number of zones apparently recognised in the Vietnamese sites and during discussion it became apparent that these data were not comparable to the others since they reflected the biogeographic zones defined in Viet Nam rather than the within site zonation characteristic of the transition within mangrove stands from seaward to landward margin.

7.12 Comparison of the numbers of tree species recorded at different sites revealed that the figures for Cambodia were unreasonably high being greater than 50 mangrove tree species. Clarification was provided that these figures included both true and associate mangrove species and it was agreed that the figures, which should be reported should be the number of true mangrove species only, as listed in Annex 6 of the report of the second meeting of the RWG-M.

7.13 In discussion of the figures for tree density it became apparent that the definition of "tree" differed in the different data sets. In the case of Thailand, "trees" were defined in terms of anything greater than 1.5 metres in height whereas in the case of Indonesia, seedlings, saplings and trees were distinguished on the basis of girth, with seedlings being less than 5cm, saplings being between 5 and 10 cms and trees being greater than 10 cms in girth. An extensive discussion of what criterion should be used to define "trees" resulted in a general consensus that height should be the determining factor with 1.5 m being the cut-off for defining "trees" for the purpose of this indicator.

7.14 The data regarding animal species and genera were then reviewed and it was agreed that since the numbers of species rather than genera had been recorded for most sites, and given that within a single taxon such as crustacea or bivalve molluscs, genera and species numbers would be closely correlated, only the numbers of species would be used in the cluster analysis.

7.15 Following a review of the revised table of data, the Regional Working Group made some estimations for missing data values in order to extend the sites and parameters used in the initial analysis. The final, set of data used in the initial cluster analysis, are presented in Table 2 of Annex 4. There followed preparation of a series of clusters with the group discussing the outcomes of each analysis in turn. These analyses involved consideration of a number of technical matters and alternative forms of analysis including:

- (i) Log transformation of some parameters where the arithmetic values were orders of magnitude greater than others (area of mangroves and tree density, for example);
- (ii) Log transformation of all parameters;
- (iii) 1/100 transformation of the present area;
- (iv) 1/1000 transformation of present area; and
- (v) removal of the parameter of "abundance of migratory birds"

7.16 The results of these analyses were presented to the meeting and examined by the members; they are included in Annex 5. Following extensive discussion it was agreed that the cluster analysis resulting from log transformation of the mangrove area and tree density, resulted in the most appropriate dendrogram based on the expert opinion of the group concerning their views of similarity and difference between the sites under consideration. The resulting dendrogram is attached as Figure 3 in Annex 5.

7.17 As noted during the initial consideration of the raw data, the data from Indonesia had been aggregated on the basis of Province making it difficult to include them in a cluster analysis involving sites from the other participating countries. In order to provide some preliminary guidance to the Indonesian National Committee regarding site characterisation and ranking, a cluster analysis of the 13 Indonesian Provinces was conducted independently and the resulting dendrogram is presented in Figure 4 of Annex 5.

7.18 Following this extensive and detailed review the meeting agreed that the method and procedure, approved by the Regional Scientific and Technical Committee, were scientifically sound and useful as the initial step in the process of site prioritisation and ranking. After careful consideration of the results of these analyses, the Regional Working Group agreed to continue the analysis with improved data and information. It was also agreed that, the presence or absence of mangrove tree genera should be included in the data set to be used for the final cluster analysis, since this would provide a stronger reflection of similarities based on the biological diversity of the mangrove habitats within the region. It was suggested that the PCU should purchase the computer software package, needed to enable inclusion of non-metric data in the matrix, based on Gower's Index of Similarity rather than continuing to use the SPSS software, which allowed only the entry of metric data and did not provide a mechanism for computing missing data.

7.19 The meeting then initiated discussion of the indicators and weighting that should be used for ranking individual mangrove sites within the same cluster. The Chairperson invited Dr. Sam, Focal Point for Mangroves from Viet Nam to give a presentation on the criteria and weighting used in the prioritisation of mangrove sites in Viet Nam, as a starting point for discussion of the regional criteria.

7.20 Dr. Sam presented the national criteria, including the indicators and associated scoring system that had been developed and used at the national level in Viet Nam. The meeting expressed its appreciation to Dr. Sam for his contribution, and proceeded to discuss the criteria and indicators in detail. Initial discussion focused on the indicators and criteria, identified and agreed by the Regional Working Group at its first meeting on which the data and information needs for site characterisation had been agreed and the GIS questionnaire prepared.

### **Special Joint Session of the Regional Working Groups on Mangroves and Wetlands**

7.21 On the morning of 5<sup>th</sup> March a joint session between the Regional Working Groups for wetlands and mangroves was convened. The Project Director opened the special joint session, and said that this session had been convened at the request of several members of the regional working groups who felt there was a need for greater communication between the working groups at the regional level. 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.

7.22 Dr. Pernetta noted that as this was a joint session, and some members of each of the working groups might not be known to each other. He therefore invited the participants to introduce themselves, and there followed a "*tour de table*" in which all participants briefly outlined their experience and involvement in the project.

7.23 Following this, Dr. Pernetta invited the Chairs of the two regional working groups to co-chair the session and opened the floor for any suggestions or proposals that members felt required joint discussion, noting that he felt it would be useful for the group to hear an overview of the experiences of the mangrove working group with the application of the cluster analysis. It was agreed that any issues would be dealt with, if and when, they arose.

7.24 Dr. Pernetta then invited, Dr. Gong to present an overview of the results of the exercise conducted by the mangrove group in undertaking the cluster analysis and developing the criteria that could be used for the ranking of sites within clusters. The limitation of parameters that, could be used, was set by, those sites with the least available sets of data and ultimately seven parameters were identified and used in the initial set of cluster analyses. It was noted by the group however that seven was not sufficient for the purpose or developing final clusters, and attempts should be made to expand the number of parameters used including presence or absence data for genera of true mangrove trees.

7.25 The mangrove group felt that it was important to give more weight to the trees, by including the genera (presence or absence) in the final table although this had not been done at this time. Mr. Jiang noted that the cluster analysis had also used only data from only 5 countries, as Indonesia had collated their data by Province rather than by site. Dr. Pernetta noted that the purpose of conducting the initial cluster analysis was to assist in the process of selection of sites by grouping similar sites that would be ranked within the finally identified clusters.

7.26 Dr. Tri highlighted the importance of being careful in collecting and entering data in order to ensure that anomalous results did not result from inaccurate data collection or entry.

7.27 During discussion, the issue of whether the assumption that large size would automatically mean higher biodiversity, was a reflection of reality. It was noted that this is not always the case, as some extensive mangrove areas could be close to monoculture systems for example. It was also noted that, high biodiversity was not necessarily the sole reason for selecting demonstration sites, but sites could also be selected to demonstrate effective management regimes in low diversity areas. It was also noted that the cluster analysis was merely the first of three steps in making recommendations for the choice of demonstration sites.

7.28 Dr. Gong then presented the results of the work of the RWG-M in addressing the second step, of the process in which the indicators, criteria and weights were to be discussed and decided. She noted that the starting point for the work of the group had been the Vietnamese national criteria presented by Dr. Do Dinh Sam.

7.29 A question was raised regarding how the missing data sets were to be addressed in determining an overall rank for a particular site since there are likely to be a high number of these. Dr. Gong indicated that this issue had not yet been discussed but would need to be considered by the group as the tabulation was developed.

7.30 Dr. Sonjai commented that certain key characters of international importance were not covered by the parameters used for site characterisation and ranking, and cited the example of the work done with Japanese and Thai scientists, which indicates that mangroves are better for carbon sequestration than terrestrial forests. Dr. Pernetta alerted the meeting to the fact that there are a number of venture capital companies investing in reforestation, on the basis of agreements with the governments, which gave the companies vested rights in the carbon credits. He noted that such considerations might be added to the criteria and that private capital might be a possible source of future co-financing restoration activities.

7.31 Mr. Santoso raised an important question regarding the boundaries of areas designated as demonstration sites, using as an example Rambut Island, which is a very extensive breeding site for many bird species which feed in areas quite a long distance from the Island. It was noted that in this example merely protecting the breeding ground, would be completely ineffective if the feeding grounds were destroyed, hence management interventions on the island alone would be ineffective. It was vital therefore that the objectives need to be considered carefully in establishing each demonstration site. In this example, one would need to manage both the breeding and roosting site (Rambut Island), and the feeding grounds. This should be addressed in the proposals for demonstration sites, which should be integrated where required.

7.32 Dr. Fan stated that, there must be a consideration of the types of species present, and not just the number of species. For example, there are sub-tropical mangroves that do not exist in tropical areas and these were characterised by different communities of species.

7.33 Dr. Pernetta asked whether the members of the wetlands group had any comments or observations, which they wished to make on the work of the mangrove group and the value of the cluster analysis. He noted that perhaps the combined session might wish to discuss how one might rank sites, which encompassed more than one habitat type in a single demonstration proposal. There followed a discussion of the relationships between the mangrove and wetland ecosystems, as defined under the project.

7.34 During the discussion Dr. Sonjai noted that it was very difficult to separate a mangrove demonstration site from the adjacent mudflats, estuaries and swamp forests and it was generally agreed that the demonstration sites should encompass all "habitat" types within the defined area of the demonstration site. This problem was further elaborated in diagrammatic form and it was suggested that each group might wish to include a criterion reflecting the number of habitat types in each demonstration site with higher scores going to multiple habitat sites. Dr. Pernetta noted that, where the same physical location had been considered by the national focal points then, these data should be ranked independently by the regional working groups but that, at a national level some co-ordination would be necessary particularly if such a location was identified as a priority for the development of a demonstration site proposal. It was also agreed that not all sites chosen should be multiple habitat sites but that this should be used as one criterion to be added to the overall ranking.

7.35 Dr. Gong reminded participants that different demonstrations would have different purposes but that the overall goal was to select demonstration sites at which it was possible to demonstrate reversal of environmental degradation trends. In this connection Dr. Pernetta noted that it was important to not consider demonstration sites as individual sites, but as components of an integrated framework of demonstration activities that would serve to raise awareness of the problems and potential solutions at all levels and amongst all stakeholders having interests in the South China Sea.

7.36 Dr. Fan emphasised the importance of the demonstration sites in successful outreach, coordination and dissemination of lessons that, can be transferred to the rest of the country and to the region as a whole.

7.37 Dr. Ian Campbell noted that the discussion had shown the importance of the review of past and ongoing projects, as this review will be extremely useful for information transfer, identifying potential lessons learned, and hence in deciding on the types of existing demonstration sites that could be included in the regional framework.

7.38 Dr. Sanit suggested that one might decide to allocate demonstration sites on the basis of for example; one integrated site, one isolated mangrove ecosystem, and one other type to make up the three selected.

7.39 Dr. Mai asked about the mechanism for national coordination in demonstration site selection between the components. Dr. Pernetta indicated that initially this is the responsibility of the NTWG in each country and that it was at that level that the consideration of relative importance of demonstration activities in each component should be decided.

7.40 Ms. Mendoza, Co-Chair, concluded the session with a request for closer collaboration with the mangrove group in the selection of demonstration sites during the course of this year.

### **Resumption of the Third Meeting of the Regional Working Group on Mangroves**

7.41 The resumed session opened in the afternoon with a consideration of the initial draft tables prepared during the preceding day and based on the work of the Vietnamese national mangrove committee. Initial discussion identified the fact that the categories and classes of criteria were in fact too detailed and too prescriptive to be easily completed, hence their value as a tool in ranking the priority of sites within clusters was open to question. It was agreed that simplicity was required both to ensure completeness of the data and that sufficient sites were clustered and ranked.

7.42 It was agreed that initially the four major clusters of indicators concerned with biological diversity would be considered, discussed and agreed upon, prior to turning to a consideration of some of the more subjective parameters such as extent of co-financing or stakeholder involvement in plan preparation. The four initial groups or classes of criteria were area, biological diversity, transboundary significance and regional/global significance. The group considered the elements originally tabulated during the first meeting of the RWG-M, the tabulation produced by Viet Nam and agreed that these four elements were adequate but that they contained too much detail.

7.43 An extensive discussion ensued during which the relative importance of these four classes of criteria were examined and debated. It was agreed that biological diversity should be considered the most important class followed by area and transboundary significance with regional and global significance being the least important class. Part of the basis for this decision was the weight which the experts considered should be given to these classes and part, to the availability and reliability of data used as indicators in each class.

7.44 Following assignment of overall values of: Area, 35; Biological Diversity 50; Transboundary significance, 10; and regional/global significance 5, the relative weights that should be assigned to the sub-components in each class followed, thus it was agreed for example that greater weight should be assigned to species diversity than to community level diversity and that no indicator of genetic diversity should be included since the data available were sparse and patchy. On the basis of discussion 30 points were assigned to species diversity and 20 to community diversity. Similar discussion and weighting of the "quantifiable" indicators resulted in the assignments presented in Annex 6.

7.45 During the discussion of the second major grouping of characters which, include various subjective and anthropocentric indicators such as "stakeholder involvement" and national significance it was recognised that, not all of these parameters could be objectively quantified hence simple classes to indicate low, medium or high were included for a number of these indicators. Weights were again assigned on the basis of a total potential score for these indicators of 100.

7.46 Following agreement on the ranking procedures and weight each focal point was requested to score their sites overnight for review and discussion during the following session, the results of this work are presented in Annex 7.

7.47 Analysis of the results presented in Annex 7 highlighted a number of key issues, the first of which is the difficulty of assigning "priority" which distinguished between the individual sites from each country. Similar difficulties were encountered with a number of the indicators included in the more

subjective, anthropocentric class. The consequence of this is that the biological indicators clearly rank sites, whereas the more subjective class does not. Examination of actual values revealed that, not unexpectedly, within each national set, the ranking of each site was not the same in the two classes of indicator and that simple addition of the outcome of the two classes was not an appropriate way in which to determine overall rank. It was agreed that the initial set of indicators was more appropriate for determining rank in the first instance whilst the second set could be used to distinguish between the top ranked sites.

7.48 It was noted that in cases where the data were not available to determine a numerical score then the overall rank of a site was correspondingly lower. During discussion it was agreed that all sites could be scored and that it was merely a case that these data were not to hand during the meeting. It was agreed that all site scores would be submitted to the Project Co-ordinating Unit, no later than 7<sup>th</sup> April and that they would be submitted sequentially as they were completed.

7.49 Professor Sanit raised an issue regarding the "purpose" of the demonstration sites noting that a number of the Thai sites represented ongoing funded activities which could be added to the regional demonstration site framework at little or not cost to the Project, beyond the costs of bringing people to the site. In such cases regional approval or agreement for their inclusion would result in substantial benefits to the project, three Thai sites were of this kind whereas one, also of high priority from the national perspective, currently had little or no investment in activities hence it would require inputs from the Project. Again it was noted that if these were agreed and accepted at the regional level this would result in substantial government investment in the planned activities.

7.50 The list of Thai sites was annotated to indicate the distinction between these two types of site and it was agreed that the second class of indicator should theoretically enable a reader to distinguish between the two sites since the analysis of costs was an integral part of this section of the ranking procedures. During discussion the participants noted that the Project Steering Committee had agreed to adopt a portfolio of twenty-four sites in December 2003 although GEF grant funds were available only to support nine sites. Existing sites such as the King's Projects in Thailand would contribute substantially to achieving this goal.

7.51 During the final discussion, participants agreed that overall, the approach to selecting demonstration sites was objective and easy to understand and that furthermore the outcome of the ranking fitted the expert perceptions of the participants. It was noted with regret that it had not been possible to provide guidance to the Focal Points regarding the regional priority of the sites identified due to the incomplete nature of the data and in some instances its non-comparability. The importance of completing the ranking exercise and site characterisations, and submitting the data to the PCU on time (April 7<sup>th</sup>), was noted by the participants.

## **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 Project Director introduced document UNEP/GEF/SCS/RWG-M.3/4 containing a proposed format for the completion of the demonstration site proposals. In introducing this document Dr. Pernetta indicated that it was extremely important for proposals to conform to a minimum format if they were to be considered equally and that production of a portfolio of proposals was necessary if potential donors were to become involved in the activities. He noted further that the intention was to convene a partnership workshop in connection with the Regional Science Conference and that all proposals should be available for distribution to potential donors not later than 1<sup>st</sup> October 2003.

8.2 The format was reviewed section by section with clarification of the intended content and the explanatory notes. The Regional Working Group accepted the proposed format recognising that, it would require at least two iterations and that drafts would need to be reviewed by the project Co-ordinating Unit who would provide advice and assistance regarding any required amendments or additions prior to finalisation and submission to the Regional Science Conference.



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

9.1 The status of the outputs from 2002 including the required reports and data were then reviewed and it was noted that the Project Steering Committee had agreed during the second meeting to an independent review process for all outputs. Under these procedures reports produced from the national level will be sent to an independent expert reviewer in the region for a critical evaluation that is intended to provide guidance to the authors on necessary amendments and revisions in order to ensure that the documents reach internationally acceptable standards. The reviewers will be asked to complete the reviews, which will be forwarded to the authors, by the PCU. The reviewer's names will not be revealed to the authors at the time the reports were returned.

9.2 Members discussed the various reports and outputs and agreed that copies of the reports concerning the review of past and ongoing projects and data and information would be sent by the PCU for review by the end of March. Reviewers would be requested to provide their reviews and advice no later than the end of April, at which time the authors would be asked to amend and revise their reports. Final drafts of these two reports should be provided to the PCU no later than 1<sup>st</sup> September where-upon they would be formatted for final review by the fourth meeting of the Regional Working Group, which would consider and decide on the final form of publication.

9.3 In the case of the reviews of national legislation, institutional and administrative arrangements and the review of economic evaluation, the country reports will be used as initial inputs to the two regional task forces which will review their contents and advise the focal points on any required modifications. The task forces will also consider how these national contributions may be used to contribute to a regional level overview. The national reviews will be dispatched to the members of the regional task forces once these groups have been established. In this regard it was noted that to date members have been nominated from three countries.

9.4 In relation to the site characterisations, preparation of the national meta-database and the inputs to the regional GIS database it was noted that the contributions to the Regional GIS database were somewhat limited, and that the finalisation of the site characterisations could have been done via the GIS site questionnaires thereby providing immediate inputs to the Regional GIS database. Members recognised that they also needed to review the information currently contained in the system and provide immediate feedback to Dr. Anond in SEA START RC regarding the accuracy of the existing data sets. It was agreed that all members would provide the required site characterisation data both in the GIS questionnaire and in a more extensive written form along the lines of the submissions made to date.

9.5 Concerning the production of the site specific proposals for demonstration sites that need to be prepared during the course of the year members agreed on the following schedule of events:

- April 7<sup>th</sup> all site specific data and information for site characterisation to be received by the Project Co-ordinating Unit.
- April 21<sup>st</sup> PCU completes and dispatched the cluster analysis and ranking results to all members of the Regional Working Group, together with advice regarding the priority demonstration sites for which focal points should commence preparation of proposals.
- May - August Focal points prepare site proposals in the agreed format, submitting these sequentially as they are finalised for comment and review by the PCU.
- 1<sup>st</sup> September Focal Points submit final drafts of demonstration site proposals for formatting and review by the PCU and independent reviewers if necessary.
- 1<sup>st</sup> October demonstration site proposals camera-ready format for printing and distribution to potential donors, stakeholders and partners.
- October - November negotiation and follow-up with potential stakeholders and partners regarding support for demonstration activities

- December Regional Scientific Conference at which the demonstration sites and other outputs are presented to the wider scientific community.
- December 19-23<sup>d</sup> Project Steering Committee agrees upon the recommendations of the Regional Scientific and Technical Committee concerning the choice of demonstration sites and operation of the regional programme.

9.6 In discussion of the timing of production of various outputs and recognising that the agenda for the fourth meeting of the RWG-M would be quite heavy the members agreed to extend the meeting to five days inclusive of the field trip to accommodate the volume of work anticipated to be required during that critical meeting. A workplan and schedule indicating the dates of production of various outputs is appended as Annex 8 to this report.

9.7 During the final discussion under this agenda item it was noted that the deadlines with respect to outputs relating to the preparation of site proposals were absolute and that proposals, which missed the deadlines for 2003 would have to be held over for a possible second tranche during 2004.

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

10.1 Members were invited to consider and agree upon the proposed time and place for the fourth meeting of the RWG-M, noting that the overall schedule of meetings for the Project currently has the fourth meeting scheduled for October 14<sup>th</sup> to 17<sup>th</sup>. It was agreed that the meeting would be extended by one day and would commence on Monday 13<sup>th</sup> October, running to the evening of Friday 17<sup>th</sup> October. Participants would therefore travel to the meeting on Sunday 12<sup>th</sup> and leave on Saturday 18<sup>th</sup> October. All members agreed on the suitability of these dates that, they had no conflicts at the present time, and that they would all endeavour to participate in the entire meeting. The revised schedule of meetings is appended as Annex 8 to this report.

10.2 In discussing possible locations for the next meeting the Project Director drew to the attention of members the table of comparative costings for meetings convened during 2002 and in particular that the preliminary estimates suggested that the meeting in Bali would be amongst the most expensive convened to date. Dr. Fan expressed his willingness to host the next meeting in China and this possibility, was considered by the group. Following examination of the UN rates for DSA in various locations it was agreed that Beihai would be an excellent choice providing an opportunity to visit the potential mangrove site on the Viet Nam/Chinese border. The meeting requested that, the Project Director liaise with Dr. Fan to arrange for the meeting to be convened in Beihai, October 13<sup>th</sup> to 17<sup>th</sup> inclusive.

10.3 Members noted 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 Science Conference and fourth meeting of the Regional Scientific and Technical Committee. Members were invited to indicate whether this posed a potential conflict and whether any member planned to attend the PEMSEA Congress. Only one member saw this as a potential conflict but agreed that moving the RSTC and Science Congress was impractical.

## **11. ANY OTHER BUSINESS**

11.1 The chairperson invited members to propose any additional items of business, which they wished to be considered by the meeting. No additional items were raised.

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

12.1 The meeting noted that it had before it, the complete text of the meeting report up to agenda item 7, paragraph 7.42 and that if the remainder of the report were to be drafted, presented, considered and adopted this would necessitate either a night session or delaying closure of the meeting. Participants accepted the draft report as presented on the understanding that: minor suggestions for

change to the existing text would be submitted in writing to the Project Director prior to members departure; the Project Director would be responsible for English editing.

12.2 It was agreed that given the lateness of the hour the Project Director be authorised to complete the report on behalf of the Regional Working Group, and that, prior to its public release the final report as drafted by the Project Director, would be cleared by the Chairperson, Vice-Chairperson and Rapporteur of the group.

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

13.1 The Chairperson thanked all members, focal points, experts and the Secretariat for their hard and constructive work and the Project Director for once again providing good preparation in advance of the meeting, which had facilitated the meeting reaching agreement on all matters before the group. He urged all members to try and work to meet the deadlines and timetable established during the meeting and in particular the immediate deadlines with respect to the submission of the site characterisations for proposed demonstration sites. He invited Mr. Santoso and Dr. Pernetta to say a few words.

13.2 Mr. Santoso expressed his pleasure, on behalf of the Government of Indonesia at being given the opportunity to host this important meeting in Bali, he noted with regret that the Deputy Minister had unfortunately been prevented from attending the joint session due to pressure of work, and apologised for any problems which participants had encountered before or during the meeting.

13.3 The Project Director expressed his pleasure, both personal and on behalf of UNEP, for the privilege of working with the mangrove group and expressed his satisfaction that, once again the group had managed to accomplish a considerable amount of work in a short period of time whilst at the same time retaining a harmonious and friendly working atmosphere. He thanked the Officers of the Committee for their continued leadership, the experts for their wisdom, and the focal points for their hard work before and during the meeting.

13.4 There being no further business the chairperson closed the meeting at 1915 on the evening of Thursday 6<sup>th</sup> March 2003.

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<sup>2</sup> *Mr Passfield acted as Secretary during the first two days of the meeting, subsequent to which he participated in and acted as Secretary for the Regional Working Group for Wetlands.*

## ANNEX 2

### List of Documents

#### Discussion documents

UNEP/GEF/SCS/RWG-M.3/1	Provisional agenda
UNEP/GEF/SCS/RWG-M.3/2	Provisional annotated agenda
UNEP/GEF/SCS/RWG-M.3/3	Report of the meeting
UNEP/GEF/SCS/RWG-M.3/4	Current status of budgets and reports from the Specialised Executing Agencies in the participating countries.
UNEP/GEF/SCS/RWG-M.3/5	Preliminary Mangrove site characterisations for consideration during the 3 <sup>rd</sup> meeting of the Regional Working Group for Mangroves.
UNEP/GEF/SCS/RWG-M.3/6	Guidelines for the preparation of demonstration site proposals and format for use in their presentation.
UNEP/GEF/SCS/RWG-M.3/7	Schedule of meetings and current workplan for the Regional Working Group on Mangroves.
CD-ROM	National reports and site characterisations for mangroves and wetlands (see the Appendix 1 for the list of mangrove related reports).
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.

#### Information documents

UNEP/GEF/SCS/RWG-M.3/INF.1	Provisional list of participants
UNEP/GEF/SCS/RWG-M.3/INF.2	Provisional list of documents (this document)
UNEP/GEF/SCS/RWG-M.3/INF.3	Draft programme

#### ***The following documents are supplied on CD-ROM and in hard copies.***

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-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-LbP.2/3

Second Meeting of the Regional Working Group on the Land-based Pollution Component for the UNEP/GEF Project *“Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand”*. 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 *“Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand”*. 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 *“Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand”*. 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 *“Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand”*. 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 *“Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand”*. 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 *“Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand”*. Report of the meeting. UNEP/GEF/SCS/PSC.2/3 Hanoi, Viet Nam, 16 - 18 December 2002.

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**Appendix 1****List of Substantive Reports Relating to the Mangrove 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 Mangroves,  
as pdf files on cd-rom**

**Cambodia****Reports**

1. Ke Vongwattana, October. Review and Develop National Data and Information for Mangrove. 5 pages.
2. Ke Vongwattana, October. Review of past and ongoing mangrove activities in Cambodia. 10 pages.
3. Ke Vongwattana, October Cambodia Meta-database for Mangroves.
4. Ke Vongwattana, Image of map of Mangrove distribution in Cambodia, 1 page.
5. Ke Vongwattana, Image of map of potential mangrove demonstration sites, 1 page.

**Site Characterisations**

Mangrove demonstration sites in Cambodia, 15 pages.

**Reports tabled during the meeting**

1. Report of Review of National Legislation and Management Regime for Mangrove, February 2003, 29 pages.
2. Report of Review of Identification and Characterization of the Site, January 2003.
3. Report of Review of National Data and Information for Mangrove, February 2003, 18 pages.
4. Report of Review of Past and Ongoing Mangrove Activities, February 2003, 17 pages.
5. Report of Review of National Criteria and Priority, February 2003.
6. Report of Review of Economic Valuation, February 2003, 26 pages.
7. Draft Paper: Report for the UNEP/GEF Project Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand: a Focus on Causal Chain Analysis of Peam-Krasoap, Dongpeng-Botum Sakor and Ream-Veal Rihn, February 2003, 17 pages.

**China****Reports**

1. Guangxi Mangrove Research Center. October, draft report - Review of past and ongoing mangrove activities in China 14 pages.
2. Guangxi Mangrove Research Center. October, draft report - Review of National Data and Information. 100 pages.

**Site characterisations:**

Mangroves of Fangchenggang City. 4 pages.  
Hainan Qinglangang National Mangrove Natural Reserve. 4 pages.  
Hainan Dongzhaigang National Mangrove Natural Reserve. 4 pages.  
Shankou National Mangrove Natural Reserve. 4 pages.  
Shenzhen Futian National Mangrove And Birds Natural Reserve. 4 pages.

**Indonesia****Reports**

1. Institute of mangrove research & development. June, Review of National Data Report of Indonesia. 21 pages.
2. Institute of mangrove research & development. June, Review of Data and Information of Mangrove ecosystem condition in the South China Sea, Indonesia 18 pages.
3. Institute of mangrove research & development. June, Review of National Legislation of Mangrove ecosystem 19 pages.
4. Institute of mangrove research & development. June, Review of National level Management Regime of mangroves 12 pages.

5. Institute of mangrove research & development. June, Action Plan for Mangrove Management in Indonesia. 23 pages.

*All the above are contained in the single volume: Progress Report Reversing Environmental Degradation trends in the South China Sea and Gulf of Thailand.*

**Reports tabled during the meeting**

1. Guidelines and Criteria Assessment of Mangrove Demonstration Site (Indonesia), December, 2002, 30 pages.
2. List Species Flora and Fauna in Indonesia Mangrove Ecosystem in the South China Sea, December 2002.

**Malaysia**

No Focal Point yet designated.

**Philippines**

**Reports**

GIS files with partial completion of data relating to selected mangrove sites.

**Reports tabled during the meeting**

1. Overview of Mangrove RD in Selected Regions of the Philippines: Status Report, 2003.
2. Initial Analysis on Mangrove and Mangrove-related Policy Issuances (Philippines), 2003, 11 pages.
3. Six Monthly Progress Report.

**Thailand**

**Reports**

1. Royal Forestry Department July. Draft Report of Thailand 44 pages.
2. Royal Forestry Department, October. Reversing Environmental Degradation in the South China Sea and Gulf of Thailand. Mangrove component Country Report for Thailand 35 pages.
3. Royal Forestry Department October. Tabulation of past and ongoing activities 2 pages.

**Site characterisations:**

- Ban Don Bay, 2 pages.
- Don Hoi Lot, 2 pages.
- Khoa Sam Roi Yot, 3 pages.
- Khung Kraben Bay, 2 pages.
- Mu Koh Chang, national park 2 pages.
- Pak Panang Bay, 2 pages.
- Pattani Bay, 2 pages.
- Thang Kha, 2 pages.
- Welu Rvier estuary, 2 pages.

**Viet Nam**

**Reports**

1. Forest Research Institute of Viet Nam. October. Review of National Data and Information On Mangrove Forest of Viet Nam. 62 pages + 122 pp annexes.
2. Forest Research Institute of Viet Nam. Review of past and on-going activities including economic valuation. 17 pages.
3. Forest Research Institute of Viet Nam. December. Review of National Legislation on Forest Protection and development in Viet Nam. 20 pages.

**Reports tabled during the meeting**

1. Viet Nam Report on National Criteria for Identification of Mangrove Sites and Demonstration Sites, February 2003, 16 pages.
2. Report on Economic Valuation of Mangrove Sites, November 2002, 11 pages.

**Site characterisations:**

An Thanh, 21 pages  
Con Dau Island, 5 pages  
CanGio, 17 pages  
Cat Ba, 5 pages  
Hui Ninh Tien Yen Yen Hu, 27 pages  
Kien Giang, 10 pages  
Camau, 7 pages.  
Red River, 7 pages  
Sao Luoi, 9 pages  
Thanh Phu Ben Tre, 12 pages  
Van Uc, 6 pages

## **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 MANGROVES 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 COUNTRY REPORTS**
  - 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 MANGROVE 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 MANGROVES**
- 10. DATE AND PLACE OF THE FOURTH MEETING OF THE REGIONAL WORKING GROUP ON MANGROVES**
- 11. ANY OTHER BUSINESS**
- 12. ADOPTION OF THE REPORT OF THE MEETING**
- 13. CLOSURE OF THE MEETING**

## ANNEX 4

### Tabulation of Raw and Transformed Data Relating to Identified Mangrove Sites Bordering the South China Sea and Used in the Preliminary Cluster Analysis

#### Background

Focal Points in the Specialised Executing Agencies were requested to assemble data and information relating to mangrove 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. For only one site were data available relating to the rates of vegetation cover change for example, and data relating to migratory bird species abundance were also not readily available for all sites. These parameters were not used in the subsequent analyses and are shaded in light grey in Table 1. It was agreed that data relating to rates of mangrove loss on wider than site scales were available and that these would be compiled for subsequent use.

In some instances parameters were included that were not originally contained in either the list of parameters for site characterisation, or in the GIS questionnaires such as, for example, resident reptiles, and resident mammals. In one instance data had been collected regarding the number of mollusc species, rather than separating bivalves and gastropods, hence the data could not be used and such information are shaded dark grey in Table 1.

Also indicated by footnotes, are anomalous data points reflecting either errors in transcription or calculation, or data which are not directly comparable such as the areas of mangroves presented by Indonesia where the data have been collected at the provincial rather than the site level. To avoid similar problems in the future it was agreed that all site characterisations would include a scale map of the site and lists of all species to be used in the cluster analysis as indicators of biological diversity.

The data in the shaded columns were not considered further since the cluster analysis programme in SPSS, used in the preliminary analysis requires that no data points in the matrix are missing.

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 and genera of, bivalves, gastropods, crustaceans and fish. 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 mangrove food-web, however inclusion of both genera and species numbers was not justified. The RWG-M agreed that in these instances only the data on species numbers would be used in the initial cluster analysis. The columns not considered further are shaded in dark grey. It was further agreed that in the final analysis the presence or absence of mangrove tree genera would be included and Gower's Index of similarity would be applied to the data sets.

Table 1 Raw data compiled from site characterisations and GIS questionnaires for mangrove sites bordering the South China Sea

Site	Present Area Ha	Change in Area per annum over 10 years	Zones - Spp Associations - community	Trees			Crustacea			Bivalves		Gastropods		Fish		Birds		
				No. true Mangrove Spp.	Density >1.5m high /Ha	Present Cover	No. Genera	Spp.	No mollusc Spp	No. Bivalve Gen	No. Bivalve Spp.	No. Gastropod Gen	No. Gastropod Spp.	No. resident genera	No. resident species	Resident Bird Spp.	Migratory species Birds	Abundance Migratory Spp.
<b>THAILAND</b>																		
Trad Province	9,240			35	2,600	90										61	13	
Thung Kha Bay - Savi Bay	2,080		3	18	4,500	90								50	53	46		
Pak Phanang Bay	6,987		3	15	4,400	95								50	30			
Kung Kraben Bay	640		2	10	6,100	80									35			
Pattani Bay	3,700		3	25	2,800	95								32	3	25		
Ban Don Bay	3,700	210	3	19	655	90								75	57	18		
Welu River Estuary	25,000		2	32	4,200	60								59	22			
<b>VIET NAM</b>																		
Hai Ninh	2,104		1	10	15,000	70	23	65		25	113	36	106		194	7		
Tien Yen	4,228		1	14	15,000	80	23	65		25	113	36	106		194	7		
Yen Hung	8,824		1	8	4,000	80	11											
Cat Ba	396		1	5	15,000	90		105	120							69		
Van Uc	1,342		1	7	25,000	90		124	172						143	5		
Xuan Thuy	1,855		1		20,000	62		61	55						64	181 <sup>3</sup>		
Can Gio	30,304		5	35	10,000	90		49	21						127			
Thanh Phu	2,513		7	25		80		135						61	169			
Soc Trang	1,441		7	24	7,000	80								21	33	119 <sup>4</sup>		
Ca Mau	8,899		7	17	6,000	90									69	32	52	
Sao Luoi	3,123		7	18	15,000	90							7					
FE184	3,414		7	33	15,000	90		7					15					
Kien Giang	5,736		7		20,000	70		7						15				
Con Dao	52		6	23	15,000	90		5			2				100	65		

<sup>3</sup> These numbers include resident, transitory and migratory species

<sup>4</sup> These numbers include resident, transitory and migratory species

Table 1 *continued*. Raw data compiled from site characterisations and GIS questionnaires for mangrove sites bordering the South China Sea<sup>5</sup> (*Light shading indicates parameters eliminated from further consideration due to difficulties of data collection. Dark shading indicates parameters eliminated from further consideration due to strong correlations with other parameters in the matrix.*)

Site	Present Area Ha	Change in Area per annum over 10 years	Zones - Spp Associations - community	Trees			Crustacea		No mollusc Spp	Bivalves		Gastropods		Fish		Birds		
				No. true Mangrove Spp.	Tree Density >1.5m high /Ha	Percent Cover	No. Genera	No. Spp.		No. Bivalve Gen	No. Bivalve Spp.	No. Gastropod Genera	No. Gastropod Spp.	No. resident fish genera	No. resident fish species	Resident Spp	Migratory Spp.	Abundance Migratory Spp
<b>CHINA</b>																		
Shangkou	776	+	2	15	11,980	90	40	68		32	40	17	33	20	24	28	76	30,000
Quinglangang	2,722			24	10,183	80		60							13			
DongXhaiGang	1,760			24	8,433	80		32			51					43	35	
Futien	111			10	10,233		19	29		14	16	13	21	20	24	28	76	30,000
Fangchenggang	1,337		3	15	67,448 <sup>6</sup>	95	38	64		48	59	21	38	19	20	42	145	50,000
<b>CAMBODIA</b>																		
Peam Krasop	33,445	-	4	> 50 <sup>8</sup>		80					21	30	62			3,787 <sup>9</sup>		
Dong Peng-Botum Sakor	53,320	-	3	> 50		70									29			
Ream-Veal Rinh	34,090	-	3	74		60		30										
<b>INDONESIA</b>																		
Province																		
East Java	97,712			18			13	18		13	23	2	3					
Central Java	95,338			18			15	17										
West Java	128,290			24			25	33		11	15	24	39					
Banten				16			10	10		42	46	90	101					
DKI Jakarta	260			17			14	14		18	23	48	78					
Lampung	18,370			12			15	21		5	7	4	7					
South Sumatera	1,046,896			15			9	12		25	29	1	1					
Babel				11			3	5		20	25	27	46					
Jambi	263,349			15			3	10										
Riau	1,155,085			23			32	31		10	11	8	9					
West Kalimantan	472,365			22			2	3		6	6	15	17					
Central Kalimantan	2,228,587			9														
South Kalimantan	208,620			7			2	2										

<sup>5</sup> Light shading indicates parameters eliminated from further consideration due to difficulties of data collection. Dark shading indicates parameters eliminated from further consideration due to strong correlations with other parameters in the matrix.

<sup>6</sup> This figure includes seedlings

<sup>7</sup> The figures for Area in Cambodia relate to coastal Provinces rather than specific sites.

<sup>8</sup> These figures include both true and associate mangrove species

<sup>9</sup> This figure represents numbers of individuals of resident and migratory birds rather than number of resident bird species

Table 1 *continued.* Raw data compiled from site characterisations and GIS questionnaires for mangrove sites bordering the South China Sea

Site	Present Area Ha	Change in Area per annum over 10 years	Zones - Spp Associations - community	Trees			Crustacea		No mollusc Spp	Bivalves		Gastropods		Fish		Birds		
				Species - True mangroves	Tree Density >1.5m high /Ha	Percent Cover	No. Genera	No. Spp.		No. Gen	No. Spp.	No. Gastropod Gen	No. Gastropod Spp.	No. resident genera	No. resident species	Resident Spp	Migratory Spp.	Abundance Migratory Spp
<b>PHILIPPINES</b>																		
Pasuquin	118			19										109				
Busuanga	1,299		3	19										53	3			
Ulugan				5										30	6			
Dumaran	1,421		3	19										114				
<b>Parameters recorded for Philippines sites but not included in the agreed list for site characterisation</b>				<b>Tree density</b>	<b>Ave. Height</b>	<b>Ave. ht dom. sp</b>	<b>Av. girth</b>	<b>Ave. girth Dom spp.</b>	<b>Den. Dom spp.</b>	<b>Res. reptile</b>	<b>Res. Mammals</b>							
Pasuquin				290	5.88	6.06	63.02	65.83										
Busuanga				1,000	8	12.14	21.09	70.98	654	2	3							
Ulugan				2,000	10.6		69.34		1,610	2								
Dumaran				63.02	8.5	12.63	21.21	71.37		2								



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

Table 2 presents the data for those parameters that should be included in the 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 numbers of crustacean, bivalve, gastropod and migratory bird species and rates of loss, were eliminated from further consideration. These columns are shaded in dark grey.

Shaded in light grey in Table 2 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. Indicated by footnotes are anomalous values retained in the analysis but which need to be checked and validated prior to finalisation of the cluster analysis.

The final set of data used in the analysis involved 7 parameters for 33 sites: 3, Cambodia; 5, China; 4, Philippines; 7, Thailand; 14, Viet Nam. An independent cluster analysis of the Indonesian data was performed using five parameters as indicated in the last section of Table 2.

Initially data were used without transformations and subsequently the data for tree density and area were log transformed. The transformed data are presented in Table 1 of Annex 5.

Table 2 Selected data sets for cluster analysis including estimates for missing data (light shading) and columns, which were not included since less than 50% of the cells contained data (dark shading). Anomalous data points are annotated with footnotes.

Site	Present Area	Zones - Spp Associations	True mangrove Spp.	Trees		No. Crustacean. Spp.	No. Bivalve Spp.	No. Gastropod Spp.	No Resident Fish Spp.	No. Resident Bird Spp.	No. Migratory Bird Spp.
				Density >1.5m high /Ha	Present Cover						
Trad Province	9,240	3	35	2,600	90				50	61	13
Thung Kha Bay - Savi Bay	2,080	3	18	4,500	90				50	53	46
Pak Phanang Bay	6,987	3	15	4,400	95				50	30	
Kung Kraben Bay	640	2	10	6,100	80				50	35	
Pattani Bay	3,700	3	25	2,800	95				32	3	25
Ban Don Bay	3,700	3	19	655	90				75	57	18
Welu River Estuary	25,000	2	32	4,200	60				59	22	
Hai Ninh	2,104	1	10	15,000	70	65	113	106	194	7	
Tien Yen	4,228	1	14	15,000	80	65	113	106	194	7	
Yen Hung	8,824	1	8	4,000	80				50	20	
Cat Ba	396	1	5	15,000	90	105			50	69	
Van Uc	1,342	1	7	25,000	90	124			143	5	
Xuan Thuy	1,855	1	5	20,000	62	61			64	181 <sup>10</sup>	
Can Gio	30,304	5	35	10,000	90	49			127	30	
Thanh Phu	2,513	7	25	1,000	80	135			169	30	
Soc Trang	1,441	7	24	7,000	80				33	119 <sup>10</sup>	
Ca Mau	8,899	7	17	6,000	90				69	32	52
Sao Luoi	3,123	7	18	15,000	90			7	50	35	
FE184	3,414	7	33	15,000	90	7		15	50	35	
Kien Giang	5,736	7	20	20,000	70	7			50	35	
Con Dao	52	6	23	15,000	90	5	2		100	65	

<sup>10</sup> Numbers require confirmation considered too high

Table 2 *continued*. Selected data sets for cluster analysis including estimates for missing data (light shading) and columns, which were not included since less than 50% of the cells contained data (dark shading). Anomalous data points are annotated with footnotes.

Site	Present Area	Zones - Spp Associations	Mangrove true Spp.	Trees		No. Crustacean. Spp.	No. Bivalve Spp.	No. Gastropod Spp.	No Resident Fish Spp.	No. Resident Bird Spp.	No. Migratory Bird Spp.
				Density >1.5m high /Ha	Present Cover						
Shangkou	776	2	15	11,980	90	68	40	33	24	28	76
Quinglangang	2,722	3	24	10,183	80	60			13	30	
DongXhaiGang	1,760	3	24	8,433	80	32	51		15	43	35
Futien	111	3	10	10,233	80	29	16	21	24	28	76
Fangchenggang	1,337	3	15	67,448	95	64	59	38	20	42	145
Peam Krasop	33,445	4	50	1,000	80		21	62	20	34	
Dong Peng-Botum Sakor	53,320	3	50	1,000	70				29	30	
Ream -Veal Rinh	34,090	3	74	1,000	60	30			20	30	
Pasuquin	118	3	19	1,000	80				109	4	
Busuanga	1,299	3	19	1,000	80				53	3	
Ulugan	1	3	5	1,000	80				30	6	
Dumaran	1,421	3	19	1,000	80				114	5	
<b>INDONESIA</b>											
East Java	97,712		18			18	23	3			
Central Java	95,338		18			17		5			
West Java	128,290		24			33	15	39			
Banten			16			10	46	101			
DKI Jakarta	260		17			14	23	78			
Lampung	18,370		12			21	7	7			
South Sumatera	1,046,896		15			12	29	1			
Babel			11			5	25	46			
Jambi	263,349		15			10	15	25			
Riau	1,155,085		23			31	11	9			
West Kalimantan	472,365		22			3	6	17			
Central Kalimantan	2,228,587		9			25	22	15			
South Kalimantan	208,620		7			2	22	15			

## ANNEX 5

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

#### Introduction

The purpose of the cluster analysis is to group sites on the basis of their similarity, thus enabling selection of demonstration sites from different groups and hence encompassing as wide a range of conditions as possible within the final selection of demonstration sites, subject to limitations of available opportunities and financial resources.

#### Results

Tables 1 and 2 present the data finally selected for inclusion in the analyses with Table 1 presenting the data for 33 sites from 5 countries and Table 2 the data for thirteen coastal Provinces in Indonesia bordering the South China Sea. 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 the data contained in Table 1.

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 density of trees. This results in the vast majority of sites (27) falling into a single cluster. 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 in hectares and the density of trees per hectare into logarithms.

The transformed data are presented in Tables 3 and 4 and the resultant dendrograms in Figures 2 and 4. It can be seen from Figure 2 that two Vietnamese sites (numbers 13 and 16) form a single outlier group, which may reflect the unusually high numbers of resident bird species. Given the differences in interpretation of the term "resident" with respect to bird species by the different focal points and the need to verify these data it was decided to run a further analysis without the inclusion of this data set. Removing these data from the analysis results in the cluster pattern displayed in Figure 3 where sites 13 and 16 no longer form a single outlier group.

#### Conclusions

It was 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. Given the uncertainties and inaccuracies inherent in some of the data sets it was agreed to use Gower's Index of Similarity and to include the presence or absence of genera of mangrove trees in the final analysis.

If this were the final analysis then three demonstration sites would be selected, one from each of the clusters 1, 2 and 3 indicated in Figure 3.

Table 1 Untransformed data set, for mangrove sites from 5 countries, selected for cluster analysis, including estimates for missing data

Site	Present Area	Zones - Spp Associations	Trees			No Resident Fish Spp.	No. Resident Bird Spp.
			True mangrove Spp.	Density >1.5m high /Ha	Present Cover		
Trad Province	9,240	3	35	2,600	90	50	61
Thung Kha Bay - Savi Bay	2,080	3	18	4,500	90	50	53
Pak Phanang Bay	6,987	3	15	4,400	95	50	30
Kung Kraben Bay	640	2	10	6,100	80	50	35
Pattani Bay	3,700	3	25	2,800	95	32	3
Ban Don Bay	3,700	3	19	655	90	75	57
Welu River Estuary	25,000	2	32	4,200	60	59	22
Hai Ninh	2,104	1	10	15,000	70	194	7
Tien Yen	4,228	1	14	15,000	80	194	7
Yen Hung	8,824	1	8	4,000	80	50	20
Cat Ba	396	1	5	15,000	90	50	69
Van Uc	1,342	1	7	25,000	90	143	5
Xuan Thuy	1,855	1	5	20,000	62	64	181
Can Gio	30,304	5	35	10,000	90	127	30
Thanh Phu	2,513	7	25	1,000	80	169	30
Soc Trang	1,441	7	24	7,000	80	33	119
Ca Mau	8,899	7	17	6,000	90	69	32
Sao Luoi	3,123	7	18	15,000	90	50	35
FE184	3,414	7	33	15,000	90	50	35
Kien Giang	5,736	7	20	20,000	70	50	35
Con Dao	52	6	23	15,000	90	100	65
Shangkou	776	2	15	11,980	90	24	28
Quinglangang	2,722	3	24	10,183	80	13	30
DongXhaiGang	1,760	3	24	8,433	80	15	43
Futien	111	3	10	10,233	80	24	28
Fangchenggang	1,337	3	15	67,448	95	20	42
Peam Krasop	33,445	4	50	1,000	80	20	34
Dong Peng-Botum Sakor	53,320	3	50	1,000	70	29	30
Ream -Veal Rinh	34,090	3	74	1,000	60	20	30
Pasuquin	118	3	19	1,000	80	109	4
Busuanga	1,299	3	19	1,000	80	53	3
Ulugan	1	3	5	1,000	80	30	6
Dumaran	1,421	3	19	1,000	80	114	5

Figure 1 Dendrogram using average linkage between groups based on the untransformed data presented in Table 1.

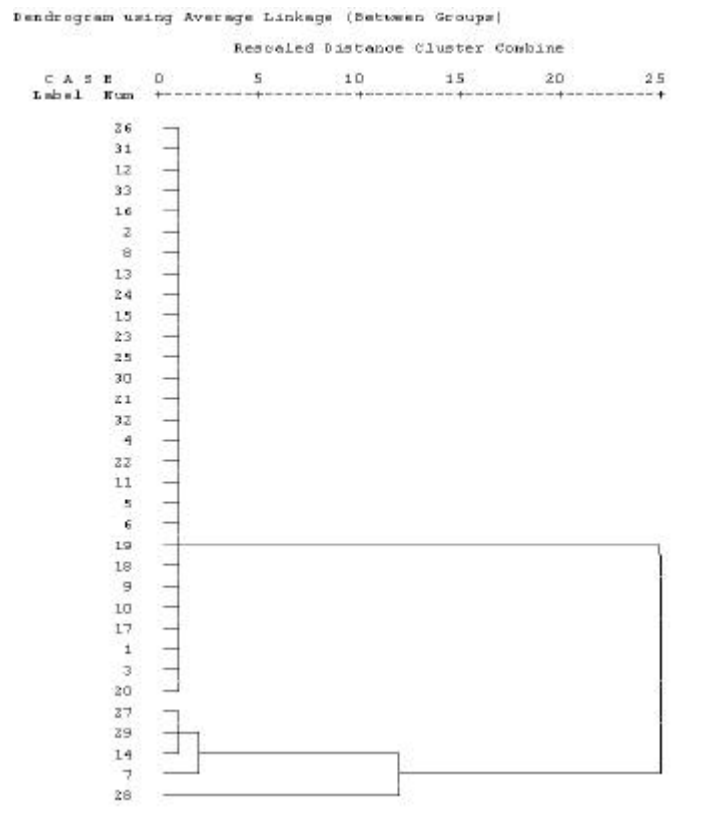


Table 2 Untransformed data sets, for mangrove forest areas in 13 coastal Provinces of Indonesia bordering the South China Sea.

Site	Present Area	No. True Mangrove Spp.	No. Crustacean. Spp.	No. Bivalve Spp.	No. Gastropod Spp
East Java	97,712	18	18	23	3
Central Java	95,338	18	17	20	5
West Java	128,290	24	33	15	39
Banten	15,000	16	10	46	101
DKI Jakarta	260	17	14	23	78
Lampung	18,370	12	21	7	7
South Sumatera	1,046,896	15	12	29	1
Babel	250,000	11	5	25	46
Jambi	263,349	15	10	15	25
Riau	1,155,085	23	31	11	9
West Kalimantan	472,365	22	3	6	17
Central Kalimantan	2,228,587	9	25	22	15
South Kalimantan	208,620	7	2	22	15

Table 3 Data set, for mangrove sites from 5 countries, selected for cluster analysis, including estimates for missing data. Area of the site and density of trees have been transformed using a logarithmic transformation.

Site	Present Area	Zones - Spp Associations	Trees			No Resident Fish Spp.	No. Resident Bird Spp.
			True mangrove Spp.	Density >1.5m high /Ha	Present Cover		
Trad Province	3.97	3	35	3.41	90	50	61
Thung Kha Bay - Savi Bay	3.32	3	18	3.65	90	50	53
Pak Phanang Bay	3.84	3	15	3.64	95	50	30
Kung Kraben Bay	2.81	2	10	3.79	80	50	35
Pattani Bay	3.57	3	25	3.45	95	32	3
Ban Don Bay	3.57	3	19	2.82	90	75	57
Welu River Estuary	4.4	2	32	3.62	60	59	22
Hai Ninh	3.32	1	10	4.18	70	194	7
Tien Yen	3.63	1	14	4.18	80	194	7
Yen Hung	3.95	1	8	3.6	80	50	20
Cat Ba	2.6	1	5	4.18	90	50	69
Van Uc	3.13	1	7	4.4	90	143	5
Xuan Thuy	3.27	1	5	4.3	62	64	181
Can Gio	4.48	5	35	4	90	127	30
Thanh Phu	3.4	7	25	4	80	169	30
Soc Trang	3.16	7	24	3.85	80	33	119
Ca Mau	3.95	7	17	3.78	90	69	32
Sao Luoi	3.49	7	18	4.18	90	50	35
FE184	3.53	7	33	4.18	90	50	35
Kien Giang	3.76	7	20	4.3	70	50	35
Con Dao	1.72	6	23	4.18	90	100	65
Shangkou	2.89	2	15	4.08	90	24	28
Quinglangang	3.43	3	24	4.01	80	13	30
DongXhaiGang	3.25	3	24	3.93	80	15	43
Futien	2.05	3	10	4.01	80	24	28
Fangchenggang	3.13	3	15	4.83	95	20	42
Peam Krasop	4.52	4	50	3	80	20	34
Dong Peng-Botum Sakor	4.73	3	50	3	70	29	30
Ream -Veal Rinh	4.53	3	74	3	60	20	30
Pasuquin	2.07	3	19	3	80	109	4
Busuanga	3.11	3	19	3	80	53	3
Ulugan	0	3	5	3	80	30	6
Dumaran	3.15	3	19	3	80	114	5

Figure 2 Dendrogram using average linkage between groups based on the transformed data presented in Table 3

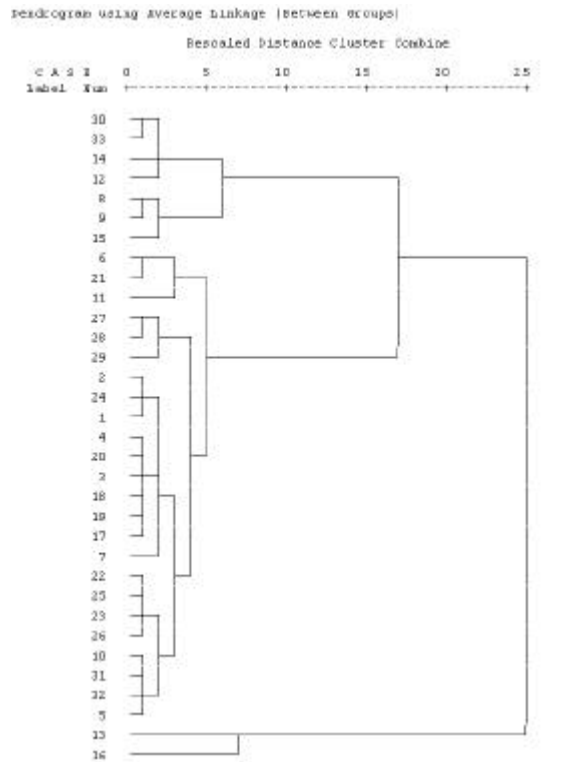


Figure 3 Dendrogram using average linkage between groups based on the transformed data presented in Table 3 with sites 13 and 16 removed.

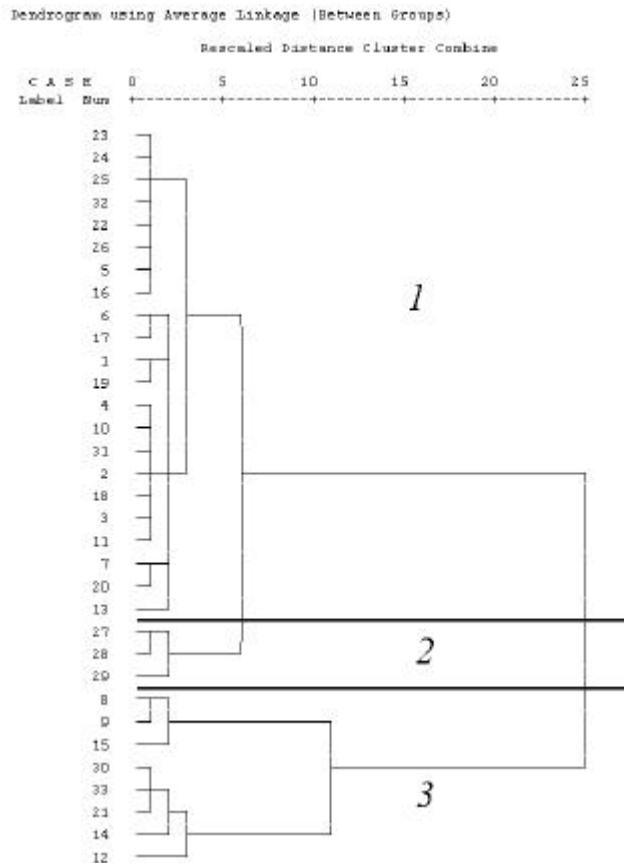
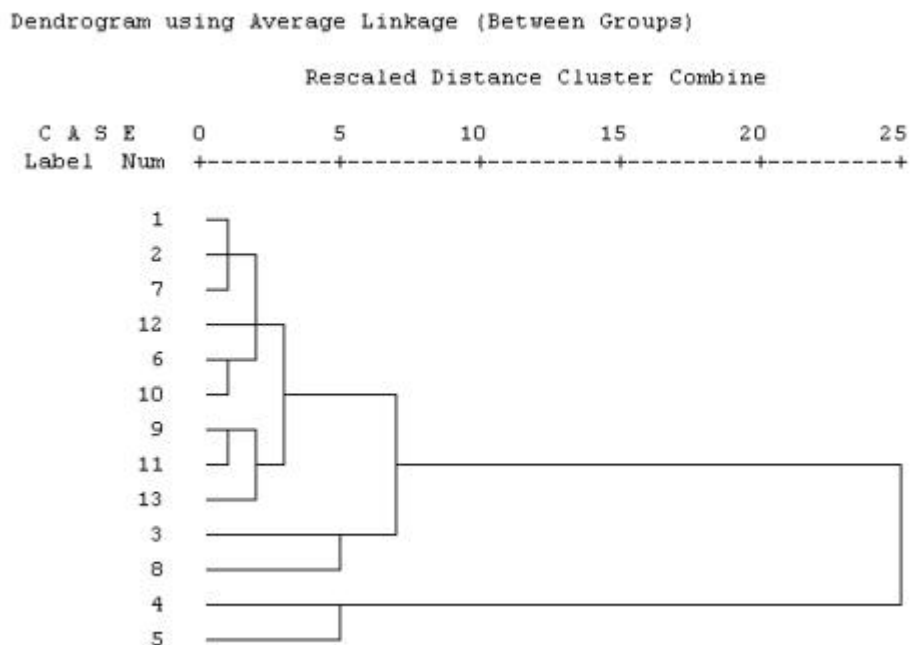




Table 4 Data set, for mangrove forest areas in 13 coastal Provinces of Indonesia bordering the South China Sea, area of site transformed and presented as logarithms. Shaded cells contain estimated values.

Site	Present Area	No. True Mangrove Spp.	No. Crustacean. Spp.	No. Bivalve Spp.	No. Gastropod Spp
East Java	5	18	18	23	3
Central Java	5	18	17	20	5
West Java	5	24	33	15	39
Banten	4	16	10	46	101
DKI Jakarta	2	17	14	23	78
Lampung	4	12	21	7	7
South Sumatera	6	15	12	29	1
Babel	5	11	5	25	46
Jambi	5	15	10	15	25
Riau	6	23	31	11	9
West Kalimantan	6	22	3	6	17
Central Kalimantan	6	9	25	22	15
South Kalimantan	6	7	2	22	15

Figure 4 Dendrogram using average linkage between groups based on the transformed data presented in Table 4.



## ANNEX 6

### Ranking Indicators and Weights for Determination of Priority within Clusters of Potential Demonstration Sites

#### Background

The Focal Points in each Specialised Executing Agency assembled, in advance of the third Regional Working Group meeting data and information required to characterise mangrove 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 6 of the meeting report. 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 mangrove 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 37 mangrove sites and made available to the third meeting of the Regional Working Group on Mangroves. The sites included: 7 from Thailand, 13 from Viet Nam, 3 each from Cambodia and the Philippines 5, from China, and thirteen Provinces from Indonesia bordering the South China Sea.

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. Hence rates of change in vegetation cover are available not at the site level but for entire Provinces and districts and it was agreed that these data should be included in the site characterisation information even though they refer more specifically to a wider region.

Table 1 lists the indicators selected by the Regional Working Group as being indicative of biological diversity, transboundary, regional and global significance. An extensive discussion of the merits of including area in this category resulted in agreement that area did reflect to some extent the biodiversity present, although it was recognised that some very extensive mangrove stands in fact had lower diversity than smaller transitional stands since they consisted in large part of extensive areas of "mono-specific" stands.

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 greater weight than either transboundary, regional or global significance. It should be recognised that in reality the indicators of transboundary, regional and global significance are in fact indicators of biological diversity, hence this set of indicators is strongly weighted towards the biological characteristics of the sites concerned.

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

Class of Indicator	Indicator scale				
	Score				
<b>1. Area maximum 35 points</b>					
1.1 Total existing natural mangrove area (ha)	< 500	500-1,000	1,001-5,000	5,001-15,000	>15,000
Score	7	14	21	28	35
<b>2. Biological diversity 50 points</b>					
<b>2.1 Species diversity Score maximum 30 points</b>					
2.1.1 True mangrove species	< 10	10-20	21-30	30-40	>40
Score Maximum 14 points	1	3	6	10	14
2.1.2 Associate mangrove species	<10	11-20	>20		
Score Maximum 4 points	1	2	4		
2.1.3 Total fish species <sup>4</sup>	<50	51-150	>150		
Score Maximum 4 points	1	2	4		
2.1.4 Crustacean	40	41-90	>90		
Score Maximum 4 points	1	2	4		
2.1.5 Resident bird species	< 15	16-50	>50		
Score Maximum 4 points	1	2	4		
<b>2.2 Community diversity 20 points</b>					
2.2.1 Number of zones or associations	1-2	3-4	5 – 5/		
Score Maximum 11 points	3	6	11		
2.2.2 Number of trophic levels below the top carnivore in the terrestrial food chain 9 points	1-2	3-4	5, 5+		
Score Maximum 9 points	3	6	11		
<b>3. Transboundary significance 10 points</b>					
3.2 Number of migratory bird species incl.s/d seasonal migratory spp and long distance migrators	<30	30-59	60-89	90-120	>120
Score Maximum 10 points	2	4	6	8	10
<b>4. Regional/Global significance 5 points</b>					
4.1 Number of associate and true mangrove species found only in the South China Sea	0.5 points for each endemic to a maximum of 2.5				
Score Maximum 2.5 points					
4.2 Number of endangered & threatened species	0.5 points for each endangered species to a maximum of 2.5				
Score Maximum 2.5 points					

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. Hence for example the number of migratory bird species recorded from each site ranged from 13 at Trad Province in Thailand to 145 species at Fangchenggang in China. It was decided to distinguish five categories based on an increment of 30 species and weights were assigned accordingly.

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 with, for example the Thai sites being given equal weight in the column reflecting national priority. It was noted that such an equal (and high) weighting not only influences the total score and hence rank, when calculated regionally but also fails to distinguish between the comparative importance of sites ranked equally.

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

Class of Indicator	Indicator scale			
	Score			
<b>1. Threats</b>				
1. Change of area (% Lost over ten years)	<5	6-10	11-25	>25
Score – max 20	20	15	10	5
2. Human population stress (population density, people/Km <sup>2</sup> ) in the site 10	<40	40-199	200-400	>400
Score – max 20	10	6	4	2
<b>2. National significance/priority-Government support</b>				
1. National priority	Low	medium	high	
Score – max 20	2	10	20	
<b>3. Financial considerations /co-financing</b>				
1. Project cost (\$US) 10	<150,000	150,000	>150,000	
Score – max 20	10	5	0	
2. Co-financing commitment 10	<1/1	1/1	>1/1	
Score – max 20	0	5	10	
<b>4. Stakeholders involvement 30</b>				
Local government (in cash/in-kind)	Low	medium	high	
Score – max 8	2	5	8	
Central government (in cash/in-kind)	Low	medium	high	
Score – max 8	1	3	6	
NGOs/Civil Society (in cash/in-kind)	Low	medium	high	
Score – max 8	2	5	8	
Private Sector (in cash/in-kind)	Low	medium	high	
Score – max 6	1	3	6	

## Conclusion

Having applied the weighting and indicators to the initial data set the regional Working Group agreed on the use of this selection 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 are being made.

Appendix 1 Details of Parameters, Data and Information requirements for Mangrove Site characterisation. Extract from Annex 6 of the report of the first meeting of the Regional Working Group on Mangroves (UNEP/GEF/SCS/RWG-M.1/3)

	Parameter	Data & Information needed	
<b>Geographic information</b>	Co-ordinates	Lat. Long. central position of areas <50 Ha; GPS Boundary or number (min 4) of paired co-ordinates for larger areas; end points for linear strips.	
	Area	(Units Km <sup>2</sup> or Ha)	
<b>Physical Environment</b>	Substrate (soil)	Proportion of sand, silt, clay	
		Bulk Density	
	<b>Freshwater regime</b>	Mean monthly rainfall (mm)	
		Mean monthly River discharge (m <sup>3</sup> sec <sup>-1</sup> )	
	<b>Tidal regime</b>	Range (m)	
		Diurnal, semi-diurnal, mixed	
	Slope	Degrees (tangent)	
	Temperature	Mean, max, min, monthly (°C)	
	Soil Salinity	Range (psu)	
	Water quality	Total suspended solids	
	Contaminant concentration/flux		
	Other parameters as available		
	Geomorphic class	Description, lagoon, tidal flats, estuaries, islands etc.	
<b>Environmental state</b>	Present status	Vegetation Canopy Cover (% area)	
	Pressure (threats) – present	% loss of species or area or canopy cover in last five years	
	Pressure (threats) – future	Estimated future losses from known development plans	
<b>Social &amp; use information</b>	Ownership	Description: Federal, State, Community, private	
	Management regime	Description: Land-use planning, Institutional framework, stakeholder co-ordination, forestry practices, restoration replanting, stakeholder investment, fishery practices.	
	Current use	Description: Commercial, subsistence	
	Potential use	Alternative livelihoods	
	Significance/national importance	Use designation in national/state master plans	
<b>Biological data</b>	Natural/Managed	Proportions of total area natural and replanted	
	Species diversity	(True) Mangrove <sup>11</sup> tree species Density (no ha <sup>-1</sup> )	
		Crustacea – Crab genera, density	
		Molluscs – Bivalve genera, density	
		Molluscs – gastropods genera, density	
		Fish – Residents, species abundance	
		Fish – Transient for breeding, species abundance	
		Mammals, resident	
		Birds, resident species	
		Birds, migratory species	
		Reptiles, resident species	
		List others as available (eg mud lobster)	
		Genetic diversity	
		Heterogeneity	Formations – number of canopy layers (strata)
			Average and range Height m, by species
			Average and range Girth, cm by species
			Zonation – number of zones by dominant species
		Ecotones – average width m, major species	
	SCS Endemic species	List species and abundance	
	Endangered or threatened species (IUCN criteria)	List species and abundance if data available	
<b>Stress-pressure Information</b>	Intrinsic/internal sources of change	resident human population	
		Natural e.g. frequency of typhoon throw, change in allochthonous sediment inputs, marine based flooding	
	Extrinsic/external sources of change	Changes in catchment basin e.g. dam construction water diversion etc.	
	Rates of change, historical review	Rates of loss of cover and/or species over the period 1990-2000	
	Social and economic drivers of change in environmental state	Description, quantitative if possible e.g. pop'n growth, immigration, income/livelihood, demand/ consumption, management regime)	
<b>Economic valuation</b> <sup>12</sup>	Values of direct use	Timber, charcoal, living marine resource extraction Yr 2000 local currency total	
	Values of indirect use	Carbon sequestration, ecotourism, nursery areas for shrimps Yr 2000 local currency total	
	Values from environmental services	Coastal protection, sediment stabilisation, water quality enhancement, contaminant sink, reduction of wave energy & erosion,	
	Value of investment	Restoration, replanting	
	Values of potential (commercial) sustainable use		
	Total Economic Value	Yr 2000 local currency total	
<b>Causal Chain analysis</b>			

<sup>11</sup> Tomlinson, P.P.. 1986 *Botany of Mangroves*, Cambridge University Press

<sup>12</sup> Barbier, E.B. 1997. *Economic Valuation of wetland: A guide for policy makers and planners*. RAMSAR Convention Bureau, IUCN

## ANNEX 7

### Results of Preliminary Ranking of Mangrove 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 priority of sites within clusters.

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 Mangroves were scored according to the agreed indicators and weights, presented and discussed in Annex 6 of this report.

#### Results

Table 1 presents the outcome of this exercise for all thirty-three, site characterisations and the 13 coastal Provinces of Indonesia with respect to the indicators of biological diversity, transboundary, regional and global significance. 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 combine the outcome of the ranking at a regional scale, nor is it possible to include all indicators in the initial cluster analysis at this time.

Within each national set of data however the comparative ranking reflects the regional importance of each site. Where the data set for a particular site is incomplete then the rank score will be automatically lower, this is particularly evident from a comparison of the Thai and Vietnamese rankings where the highest scored Vietnamese site is comparatively low due to the absence of certain data sets.

Table 1 presents two summary columns the first representing the rank with respect to biological diversity, transboundary, regional and global significance and the second the grand total representing the sum of the scores for both environmental, and socio-economic, classes of indicator. The first, second and third highest scores are highlighted in green, blue and yellow respectively and it can be seen that there is little apparent correlation between the rank determined via the environmental class of indicators and the rank determined on the basis of the sum of the environmental and socio-economic indicators.

Table 2 presents the rank scores for the socio-economic classes of indicator and it is apparent that the scores assigned within each national grouping display little, cross-group comparability. In the case of Thailand for example maximum scores are assigned to all sites for three of the indicators resulting in these being of little overall value in determining priority either at the national or at the regional level. In a number of instances these scores reflect inadequate data and information available to provide concrete, objective measures of say NGO and Civil society support. This is not unsurprising since at this stage the details of proposed interventions have still to be finalised.

#### Conclusions

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

Table 1 Comparative rank score for mangrove sites bordering the South China Sea based on site characterisations available to the third Regional Working Group meeting, March 2003. Indicators of biological diversity, transboundary, regional, and global significance are included together with their total and the grand total of both environmental and socio-economic indicators. Green indicates the highest, blue the second highest and yellow the third ranked sites rank in each national set.

SITES OR LOCATIONS	Indication of required GEF support	Area	True mangrove tree Spp.	Associate mangrove Spp.	Total fish Spp	Crustacean Spp.	Resident bird Spp.	No. Zones or plant associations	No. Trophic levels	Migratory bird Spp.	South China Sea Endemic Spp.	Endangered Spp.	TOTAL	GRAND TOTAL [Environmental & Socio-economic indicators combined]
<b>THAILAND</b>														
Trad	GEF funds	28	14	4	2	2	4	6	11	2	0	2	75.0	162.0
Tung Kha	National Pk	21	6	2	1	2	4	6	11	4	0	0	57.0	137.0
Pak Phranong	Existing	28	6	1	2	2	2	6	11	4	0	1	63.0	148.0
Kung Kraben	Existing	14	3	1	1	2	2	3	11	2	0	0.5	39.5	132.5
Pattani	Existing	21	10	1	2	2	1	6	11	2	0	2.5	58.5	142.5
Bandon	GEF funds	21	6	2	2	2	4	6	11	2	0.5	2	58.5	130.5
Welu	Existing	35	10	1	2	2	2	3	11	4	0	0.5	70.5	137.5
<b>VIET NAM</b>														
Hai Ninh		21	3	n/a	4	4	4	3	n/a	n/a	1	0	40.0	62.0
Tien Yen		21	3	n/a	4	4	n/a	3	n/a	n/a	1.5	0	36.5	48.5
Yen Hung		28	1	n/a	4	4	1	6	n/a	n/a	1	0	45.0	57.0
Cat Ba		7	1	n/a	n/a	4	4	3	n/a	n/a	1	0	20.0	60.0
Van Uc		7	1	n/a	4	4	4	3	n/a	n/a	0.5	0	23.5	37.5
Xuan Thuy		14	1	n/a	2	2	4	3	n/a	n/a	1	0	27.0	44.0
Can Gio		7	10	4	4	2	4	6	n/a	n/a	n/a	2.5	39.5	83.5
Thanh Phu		7	6	n/a	4	4	n/a	3	n/a	n/a	2	0	26.0	41.0
Soc Trang		14	6	4	1	n/a	n/a	6	n/a	n/a	2	1.5	34.5	39.5
Ca Mau		28	3	n/a	2	n/a	n/a	6	n/a	n/a	2	17	58.0	83.0
Sao Luoi		18	3	n/a	n/a	n/a	n/a	6	n/a	n/a	2	18	47.0	54.0
Kien Giang		19	10	n/a	n/a	1	n/a	6	n/a	n/a	0.5	2	38.5	38.5
Con Dao		20	n/a	n/a	n/a	n/a	n/a	3	n/a	n/a	n/a	n/a	23.0	40.0
<b>CHINA</b>														
Qinlan Bay		21	6	2	1	2	3	3	11	4	0.5	2.5	56.0	96.0
Dongzai Bay		21	6	1	1	1	3	3	11	4	0	2.5	53.5	111.5
Fangchenggang		21	1	1	1	2	3	3	11	10	0	2.5	55.5	131.5
Shoukou		14	1	1	1	2	3	3	11	6	0	2.5	44.5	93.5
Futian		7	1	1	1	1	3	3	11	6	0	2.5	36.5	92.5

Table 1 *continued*.

Comparative rank score for mangrove sites bordering the South China Sea based on site characterisations available to the third Regional Working Group meeting, March 2003. Indicators of biological diversity, transboundary, regional, and global significance are included together with their total and the grand total of both environmental and socio-economic indicators. Green indicates the highest, blue the second highest and yellow the third ranked sites rank in each national set.

SITES OR LOCATIONS	Indication of required GEF support	Area	True mangrove tree Spp.	Associate mangrove Spp	Total fish Spp	Crustacean Spp	Resident bird Spp	No. Zones or plant associations	No. Trophic levels	Migratory bird Spp	South China Sea Endemic Spp	Endangered Spp	TOTAL	GRAND TOTAL [Environmental & Socio-economic indicators combined]
<b>CAMBODIA</b>														
Peam Krasop		35	6	2	1	2	2	6	n/a	n/a	n/a	n/a	54.0	105.0
Dong Peng-botum Sakor		35	3	2	1	1	1	3	n/a	n/a	n/a	n/a	46.0	97.0
Ream Veal Rinh		28	6	1	1	1	2	3	n/a	n/a	n/a	n/a	42.0	93.0
<b>PHILIPPINES</b>														
Pasuquin		7	n/a	n/a	2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	9.0	74.0
Busuanga		21	3	2	4	n/a	1	n/a	n/a	n/a	n/a	n/a	31.0	83.0
Uluanga		21	1	n/a	4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	26.0	69.0
Dumaran		21	3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	24.0	46.0
<b>INDONESIA</b>														
East Java		35	3	1	2	1	1	6	3	4	1	1	58.0	114.0
Central Java		35	3	1	1	1	1	11	6	2	0.5	0.5	62.0	118.0
West Java		35	6	1	2	1	4	6	3	6	0.5	1	65.5	123.5
Banten		35	3	2	1	1	4	3	3	2	0.5	1	55.5	113.5
Jakarta		7	3	2	1	1	4	3	6	2	0.5	1	30.5	91.5
Lampung		35	3	1	1	1	1	6	9	4	1	1.5	63.5	119.5
South Sumatra		35	3	1	2	1	2	11	9	8	2	2	76.0	124.0
Babel		35	3	1	1	1	1	6	6	4	0.5	1	59.5	134.5
Jambi		35	3	1	1	1	1	11	9	8	2.5	2.5	75.0	146.0
Riau		35	6	1	1	1	2	11	9	6	2	2.5	76.5	138.5
West Kalimantan		35	6	1	2	1	4	11	9	4	2.5	1	76.5	147.5
Central Kalimantan		35	1	1	1	1	1	11	9	4	1.5	1	66.5	122.5
South Kalimantan		35	1	1	1	1	2	11	9	4	2	1	68.0	117.0



Table 2 Comparative rank score for mangrove sites bordering the South China Sea, based on site characterisations available to the third Regional Working Group meeting, March 2003. Indicators of national priority, stakeholder involvement and threats are included together with their total and the grand total of both environmental and socio-economic indicators. Green indicates the highest, blue the second highest and yellow the third ranked sites rank in each national set.

SITES LOCATIONS	Indication of required GEF support	Rate of change	Human stress	National priority	Cost	co-finance	Local Government support	Central Government support	NGO civil society involvement	Private sector	TOTAL	GRAND TOTAL [Environmental & Socio-economic indicators combined]
<b>THAILAND</b>												
Trad	GEF funds	20	10	20	10	5	8	3	8	3	87	162.0
Tung Kha	National Pk	20	6	20	10	5	5	6	5	3	80	137.0
Pak Phranong	Existing	20	6	20	10	10	5	6	5	3	85	148.0
Kung Kraben	Existing	20	10	20	10	5	8	6	8	6	93	132.5
Pattani	Existing	20	10	20	10	5	5	6	5	3	84	142.5
Bandon	GEF funds	20	6	20	10	0	5	3	5	3	72	130.5
Welu	Existing	20	4	20	10	0	2	3	5	3	67	137.5
<b>VIET NAM</b>												
Hai Ninh		20	n/a	2	n/a	n/a	n/a	n/a	n/a	n/a	22	62.0
Tien Yen		10	n/a	2	n/a	n/a	n/a	n/a	n/a	n/a	12	48.5
Yen Hung		10	n/a	2	n/a	n/a	n/a	n/a	n/a	n/a	12	57.0
Cat Ba		20	10	10	n/a	n/a	n/a	n/a	n/a	n/a	40	60.0
Van Uc		10	2	2	n/a	n/a	n/a	n/a	n/a	n/a	14	37.5
Xuan Thuy		5	2	10	n/a	n/a	n/a	n/a	n/a	n/a	17	44.0
Can Gio		20	4	20	n/a	n/a	n/a	n/a	n/a	n/a	44	83.5
Thanh Phu		15	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	15	41.0
Soc Trang		5	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	5	39.5
Ca Mau		5	10	10	n/a	n/a	n/a	n/a	n/a	n/a	25	83.0
Sao Luoi		5	2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7	54.0
Kien Giang		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0	38.5
Con Dao		5	2	10	n/a	n/a	n/a	n/a	n/a	n/a	17	40.0
<b>CHINA</b>												
Qinlan Bay		10	2	10	0	10	2	3	2	1	40	96.0
Dongzai Bay		15	4	10	0	10	5	6	5	3	58	111.5
Fangchenggang		15	6	20	0	10	8	6	5	6	76	131.5
Shoukou		20	4	2	0	10	2	6	2	3	49	93.5
Futian		20	2	2	0	10	8	6	5	3	56	92.5

Table 2 *continued*.

Comparative rank score for mangrove sites bordering the South China Sea, based on site characterisations available to the third Regional Working Group meeting, March 2003. Indicators of national priority, stakeholder involvement and threats are included together with their total and the grand total of both environmental and socio-economic indicators. Green indicates the highest, blue the second highest and yellow the third ranked sites rank in each national set.

SITES LOCATIONS	Indication of required GEF support	Rate of change	Human stress	National priority	Cost	co-finance	Local Government support	Central Government support	NGO civil society involvement	Private sector	TOTAL	GRAND TOTAL [Environmental & Socio-economic indicators combined]
<b>CAMBODIA</b>												
Peam Krasop		15	n/a	20	n/a	n/a	2	3	8	3	51	105.0
Dong Pengbotum Sakor		15	n/a	20	n/a	n/a	2	3	8	3	51	97.0
Ream Veal Rinh		15	n/a	20	n/a	n/a	2	3	8	3	51	93.0
<b>PHILIPPINES</b>												
Pasuquin		15	6	20	10	n/a	8	3	2	1	65	74.0
Busuanga		n/a	6	20	10	n/a	8	n/a	2	6	52	83.0
Uluanga		n/a	6	20	n/a	n/a	n/a	3	8	6	43	69.0
Dumaran		n/a	6	10	n/a	n/a	n/a	1	2	3	22	66.0
<b>INDONESIA</b>												
East Java		5	2	20	5	5	5	8	5	1	56	114.0
Central Java		5	2	20	5	5	5	8	5	1	56	118.5
West Java		5	2	20	5	5	5	8	5	3	58	123.5
Banten		5	2	20	5	5	5	8	5	3	58	113.5
Jakarta		5	2	20	5	5	8	5	5	6	61	91.5
Lampung		5	2	20	5	5	5	8	5	1	56	119.5
South Sumatra		5	4	10	5	5	5	8	5	1	48	124.0
Babel		20	6	20	5	5	5	8	5	1	75	129.5
Jambi		15	10	20	5	5	5	5	5	1	71	146.0
Riau		15	6	10	5	5	5	8	5	3	62	138.5
West Kalimantan		20	10	10	5	5	5	5	5	6	71	147.5
Central Kalimantan		20	10	10	5	5	5	5	5	1	66	122.5
South Kalimantan		15	6	2	5	5	5	5	5	1	49	117.0





**Key to Numbered Outputs Scheduled in Table 2 of the Workplan and Timetable of Agreed Activities in the Mangroves Sub-component.**

1. Final drafts of Review of Past & Ongoing projects to PCU
2. External review of Review of Past & Ongoing projects
3. Final draft for publication of Review of Past & Ongoing projects
4. Final drafts of Review of National Data and Information to PCU
5. External review of Review of National Data and Information
6. Final draft for publication of Review of National Data and Information
7. First draft of full demonstration site proposals
8. Final draft of demonstration site proposals