



# **Implementing the Strategic Action Programme for the South China Sea and Gulf of Thailand (SCS SAP Project)**

**First Meeting of the Regional Task Force on Economic Valuation**

Teleconference, 26 June 2024

## **SCS SAP Project Background and Implementation Plan on Economic Valuation and Blue Economy**



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## **SECTION 2: BACKGROUND AND SITUATION ANALYSIS (BASELINE COURSE OF ACTION)**

### **2.1.1. National and Regional Economic Values for Coastal Habitat Goods and Services**

#### **2.1.1.1. Determining regionally applicable economic values for environmental goods and services**

1. The challenge facing the SCS project was that the only "ecosystem values" readily available were those of Costanza et al. (1997) that were based on global data and have subsequently been challenged on both economic and scientific grounds. The Project Steering Committee, composed solely of participating government representatives insisted not only that the project activities include the revision of the SAP but also the determination of regionally applicable economic values for environmental goods and services. Initially, the plan was for each national working group to review the economic data and information relating to their areas of expertise (mangroves, coral reefs, seagrass, wetlands, fisheries and land-based pollution) and to assemble data sets that would enable some form of regional analysis of values to be undertaken by the regional working groups. It became apparent by the end of the preparatory phase of the SCS project that, the national working groups contained specialists in the subject matter with few or no economists amongst the members. The Project Steering Committee therefore decided to establish a Regional Task Force on Economic Valuation (RTF-E) consisting of nine economists from the region charged with providing economic assistance and advice to the national and regional working groups addressing habitat, fisheries and pollution issues and determining "regionally applicable economic values for environmental goods and services". That task force reviewed the data and information assembled by the regional working groups and provided advice regarding the further elaboration and refinement of these data sets. In addition, work commenced on the development of simple guidelines for the conduct of economic valuation studies that could be applied during the implementation of demonstration site activities, particularly in support of the activities concerned with sustainable financing of the management regime and the assessment of alternative livelihoods and sources of income.

2. The Project Steering Committee subsequently allocated funds to the Regional Task Force to assemble an empirical dataset of economic values of goods and services provided by the coastal ecotones bordering the South China Sea. The task force assembled such data that were comprehensively reviewed during the two meetings of the Task Force convened in 2006 (UNEP, 2006b; 2006c). Data were taken from published sources in the international literature and from the "grey" literature of government reports. The focus was on data derived from studies along the coasts of the South China Sea although, in some instances, data from elsewhere in the seven participating countries were included. Data used represent "Farm Gate Prices" and this is assumed to be equivalent to the value of natural production, i.e., the value of the labour involved in harvesting is considered negligible in comparison with the "value" of the natural production. Data derived from secondary markets were included because the value added cannot be accurately determined in most cases.

3. As the compiled data were derived from diverse studies undertaken over the course of some twenty years, the methods used to undertake the valuations differ, as did the forms of the actual data and information contained in the publications and reports. Every attempt was made to ensure that the data contained in the final tabulations were based on primary data collection and did not represent merely the use of values derived elsewhere. In order to ensure that values were regionally comparable, all data were expressed as production values in US dollars per hectare per annum, including the values for ecosystem services.

4. Values were converted to a standard year (2005) by means of the Consumer Price Index (UNEP, 2007j) and values in local currency were converted to US dollars using the 2005 exchange rate. Tables 1 to 8 of Annex 4 of the report of the seventh meeting of the RTF-E (UNEP, 2007j) present the empirical data and derived values for the goods and services provided by mangroves, coral reefs, seagrass and wetlands bordering the South China Sea. The largest volume of data relates to the mangrove habitat. Discussion of these data provides an overview of all the issues faced in agreeing upon the final data sets for all habitats for use in determining regional values.

5. Surprisingly few data were available for either coral reefs or wetlands and it was identified that this was most likely an artefact as scientific data and information tend to be highly compartmentalised in the participating countries and it is often not easy to access data from sources outside an individual's own institution or organisation. The lack of data for seagrass habitats is less surprising because the actual extent of this habitat in the region could not be accurately determined at that time and the numbers of scientists involved in the study of seagrass ecosystems of the South China Sea marine basin is quite limited resulting in a comparatively small body of published literature.

6. These data sets were extensively discussed and reviewed by the regional task force and, where anomalies or questions remain unresolved or unanswered, the data were excluded from further consideration. Such cells are shaded in the tables presented in this section and it can be seen that a number of values for wild capture of fish, crab and prawns and for natural production of molluscs were been excluded from further analysis as the values were considered by the task force to be too high to represent natural production and more likely represent production from some form of mariculture. In the case of services, data were excluded from further consideration that the task force deemed to represent unrealistically high, or unrealistically low, values. The extremely high value for ecotourism for Youstefa Bay in Indonesia was excluded, for example, because this almost certainly represents the total annual value for all tourism at this location and not merely the value of tourism associated with the mangrove habitat in this Bay.

7. The valuation of the nursery function of mangroves is of some interest as apparently, in no case, has any attempt been made to value the natural production resulting from the use of mangroves by off-shore demersal fish and crustaceans as nursery areas. This is somewhat surprising in that McNae, for example, was able to demonstrate as early as 1974 a strong correlation between the off-shore catch of penaeid shrimp and the area of mangrove on the adjacent coastline (McNae, 1974) and such relationships could have been used to value this function. In contrast, valuations have been done either in terms of the market value of larval fish and crustaceans caught in the mangrove area for sale to mariculture farmers or through a shadow pricing method using the costs of producing such larvae through other means. Neither of these methods can be considered ideal, nor do they actually represent a "true" evaluation of the "nursery function"; nevertheless, they were used in the absence of other data.

#### **2.1.1.2. Determination of weighted mean national values**

8. Examination of any one portion of this dataset revealed wide variation in farm gate prices. Mangrove timber from Indonesia, for example, apparently varies from US\$ 76 to in excess of US\$ 5,000 per cubic metre. In this instance, a weak but significant negative correlation exists between the value per cubic metre and the stock or more precisely the area of mangrove. This issue of widely differing prices within each country is addressed through the calculation of weighted mean national values. As is well known, farm gate prices for environmental goods vary within countries reflecting both the local supply and the demand. Where blood cockle beds (*Anadara granosa*), for example, are located in close proximity to a centre of population, the unit farm gate price is higher than when an equivalent sized resource is located farther away.

9. In order to address this problem of the wide variation in prices within one country, the RTF-E decided to weight the data from each location and determine a "Weighted Mean National Value" that reflected both the prices for the same resource at each location and the "stock" of that resource at the same locations. Hence, the price at location A was multiplied by the stock (or area where the stock could not be estimated) in area A and this value was added to other values determined for locations B, C, etc. The summation was then divided by the total stock for which prices were available, thus providing the Weighted Mean National Value. This results in a national value that reflects the totality of the national stock rather than being a simple arithmetic average of all values.

#### **2.1.1.3. Determination of weighted mean regional values**

10. The determination of weighted mean regional values was undertaken in a similar manner to the computation of weighted mean national values but using data and information concerning the total stock (or area) in each country and the weighted mean national values. Thus, the weighted mean national value for each resource was multiplied by the stock for each country and the resultant values summed, then divided by the total stock (or area) of the habitat bordering the South China Sea. The absence of values in a particular table may reflect one of two circumstances:

(a) first, and most commonly, no data for farm gate prices and hence no value could be found for that resource in the country concerned; and, (2) secondly, that a particular resource is not used in the country concerned.

11. An example of the latter is the case of sipunculid worms that are highly prized in China and also eaten to a lesser extent in the Philippines but which are not consumed in the other countries of the region. Consequently, there are no market values from Cambodia, Indonesia, Malaysia, Thailand and Viet Nam reflecting the fact that these worms are not eaten and do not enter the market in these countries. Sipunculid worms are, however, found in all mangrove areas in all countries. The contribution of the weighted mean regional value for sipunculid worms to the total economic value of mangrove production in the region is therefore much smaller than if a benefits transfer method of determining value were used to value the entire South China Sea stock of sipunculid worms.

12. In the case of mangrove “fruit” or propagules, the value from China represents the price of *Avicennia marina* propagules that are used in soup and other dishes in southern China and are apparently not eaten elsewhere in the region. Propagules of other species are processed as sweets and eaten in Thailand but no farm gate price is available from that country. What is interesting is the apparent absence of a market for mangrove propagules in countries where propagules are purchased from local villagers for use in re-forestation and re-planting schemes. During the sixth meeting of the regional Working Group on Mangroves (UNEP, 2005a), there was a discussion regarding the value and sale of propagules during which it was noted that propagules from the Batu Ampur demonstration site were being sold for replanting elsewhere in West Kalimantan at a price for *Rhizophora* of 1\$ for 200 propagules. In Thailand and Viet Nam the price was cited at around 1\$ for 100 propagules, whilst in the Philippines the price was higher at 1\$ for 50 propagules. Markets thus do exist for these products but values are apparently not formally recorded in the literature.

#### **2.1.1.4. Determination of Total Economic Value (TEV)**

13. The SCS project task force agreed that the Total Economic Value of the habitats bordering the South China Sea should be estimated as the summation of the values of all goods and services produced by each habitat on an annual basis. The summation of the regionally weighted values therefore represents the Total Economic Value of the annual production per hectare, whilst the Total Economic Value for the entire area of each habitat is derived from the product of this value multiplied by the total area of the habitat bordering the South China Sea. In the case of mangroves, the annual values of production per hectare for both goods and services varies from 450 US dollars in Viet Nam and the Philippines to in excess of 21,000 US dollars in the case of China. The latter value reflects the high value for the service of sediment retention by mangroves determined by the difference in annual cost of dredging of the Fangchenggang Port before and after removal of mangroves. As the total area of mangrove in China is only 23 thousand hectares compared with nearly 2 million hectares along the Indonesian coast of the South China Sea, this very high value does not distort the regional value for this service which computes at a modest 66 US dollars per hectare annually.

14. The most comprehensive dataset is that for mangroves, whilst the least comprehensive are those for coral reefs and wetlands. Only three national datasets were found for coral reef goods and, in the case of wetlands, the bulk of the data are from Viet Nam. This results in a regional value of coral reef production of a modest 1,500 US dollars per hectare per annum and for wetlands of around 300 US dollars per hectare per annum. These should be compared with the regional value for mangrove of nearly three thousand dollars per hectare and the value of 1,118 US dollars per hectare for seagrass meadows. On first principles, one might expect the value of mangrove goods to exceed those for coral reefs and seagrass because the former will include values for mangrove timber and other direct derivatives that have few, if any, equivalents in coral reef and seagrass habitats. In contrast, one would expect that the service values for coral reefs would be greater than those for the other three habitats given the extensive coral reef tourism in the region.

15. Examination of the value of total annual production of goods and services by the four habitats from areas bordering the South China Sea demonstrates unequivocally the importance of mangroves in this region. The total annual value of mangrove production exceeds 5.1 billion US dollars annually compared with around 1.2 billion for wetlands and coral reefs and a mere 86 million US dollars for seagrass habitats. It is important to recognise that the values for goods and services, both individually and collectively, are extremely conservative as a consequence of

the manner in which they have been calculated using weighted means. Where data are lacking for a good or service from one country, the consequence will be a lowering of the weighted mean regional value. Given the absence of values for many goods and services in each habitat, the values are likely to be as low as 50% or less of the real value. For comparison, the values derived by Costanza et al. are presented along-side those from the work of the SCS project on economic valuation.

16. In all four cases, the values cited by Costanza et al. 1997 are greater than those determined in the present study and consequently would result in Total Economic Values ranging from 3 to 22 times greater than those determined in the present instance. It is important to recognise, however, that the two sets of values are not directly comparable since those of Costanza et al. relate to capital values whilst those of the present study reflect annual production values. Uniquely in the context of a foundational GEF International Waters TDA/SAP project, these values were applied in an analysis of the costs and benefits of the regional actions proposed in the Strategic Action Programme.

17. Furthermore, what has resulted from this work is a standardised method for computing national and regional weighted mean values of resources and services that can be applied more widely in handling and manipulating economic valuation data from multiple locations across any time span. The techniques can be applied in any region where multiple currencies, varying exchange rates and widespread inter-locational variation in farm gate prices are found. The specific targets of the revised SAP have been valued or, more specifically, the incremental benefit derived from achieving the target has been valued. The values saved by achieving the targets have been compared with the costs of implementing the actions defined in the regional SAP through a cost benefit analysis (see Annex 6 of UNEP, 2007j for details of the methodologies and procedures used to conduct the cost benefit analysis). This work of the TDA/SAP SCS project has also been published as a paper in the internationally peer-reviewed journal *Ocean and Coastal Management* (see Pernetta *et al.*, 2013).

#### **2.1.1.5. Valuing the impacts of land-based pollution**

18. The Regional Task Force on Economic Valuation has developed a framework for the valuation of land-based pollution impacts on coastal habitats that includes: a checklist of the impacts of land-based pollution on coastal habitats, specifying types of pollutants and their specific impacts on the four major habitats [mangroves, coral reefs, seagrass, and wetlands]; a framework for valuing the impacts of land-based pollution on the four habitat types, categorising the various specific impacts in the checklist into three categories, i.e. productivity, amenity, and human welfare; and procedures to undertake valuation of impacts of land-based pollution on the four habitat types, in which valuation techniques, indicator of measurement, data needed, and notes and assumptions were described for each specific impact identified in the checklist and framework.

19. The impact checklist, the framework, and the procedures for valuing the impact on the coastal habitats have been reviewed and checked by the members of all Regional Working Groups and guided adoption of SAP targets. It was identified that impacts resulting from land-based pollution either cause reductions in production of specific resources which can be measured in terms of losses in market value; in loss of ecosystem services resulting from ecosystem level impacts; and economic losses resulting from illness of individuals eating contaminated seafood. Detailed procedures for the economic evaluation of these impacts in terms of applicable valuation techniques for: productivity, amenity value, and human welfare are provided in the guidelines for economic valuation adopted by the SCS project and which underpin the cost-benefits analysis of action versus non-action presented in the SAP (the adopted guidelines on economic valuation were published as UNEP, 2007h).

## **PLAN FOR IMPLEMENTATION OF THE SAP ON ECONOMIC VALUATION AND BLUE ECONOMY OF THE SCS SAP PROJECT**

### ***Outcome 2.4 Updated Total Economic Values of coastal habitats for use in development planning and decision-making and blue economy***

2.4.1 Expanded datasets and estimates of economic valuation information on the goods and services of SCS coastal ecosystems

- National: Desk reviews on economic valuation conducted in countries
- Regional: Report on the methodology and best practices on economic evaluations, updating the Economic Valuation carried out under Phase 1 (2002-2008) to include new data from the region, considering TEEB methodologies, blue economies, and blue carbon.

Execution: Consultancy work with participation of RTF-EV

2.4.2. Compilation of good examples, and identify recommendations to strengthen a blue economy (and circular economy) approach and innovative financing for pollution and habitat management

- Regional: Report on good examples and recommendations to strengthen blue economy (and circular economy) approach and innovative financing for pollution and habitat management

Execution: Consultancy work with participation of RTF-EV

### ***Outcome 3.3 Relationships between central and local governments and the private sector strengthened and formalized***

3.3.1 Review of current Blue Economy examples from the SCS region with private sector engagement as part of blue economy strategies

- Regional: Compilation of ongoing private sector partnerships in blue economy, in parallel to output 2.4.2

Execution: Consultancy work in partnership with other regional organizations

3.3.2 Identification of blue economy and blue finance opportunities for private sector investment (e.g. fisheries, tourism, others) in implementation of the updated SAP

- Regional: Report on opportunities for private sector investment and long-term financing mechanism for the implementation of the updated SAP

Execution: Consultancy work in partnership with other regional organizations

3.3.3 Public-private partnerships and investment plan for the implementation of the updated SAP solidified through two blue economy partnership forums

- Regional: Partnership forum organized with commitments to support implementation of updated SAP

Execution: Consultancy work in partnership with other regional organizations

3.3.4. Updated and adopted National Investment Plans for land-based pollution and habitat management in the SCS

- National: National Investment Plans for land-based pollution and habitat management in the SCS

Execution: Consultancy work in cooperation with National economic experts

3.3.5. Identification of options for regional financial mechanism for land-based pollution and habitat management

- Regional: Prioritized List of Options for financing future implementation of land-based pollution mitigation and habitat management

Execution: Consultancy work in cooperation with RTF-EV