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EVALUATION

The GEF in the South China Sea and Adjacent Areas

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Cover photo: Artisanal and commercial fishers in Vietnam share the same resources in the South China Sea, by Aaron Zazueta, GEF Evaluation Office

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Foreword

The Evaluation Office of the Global Environment Facility (GEF) is pleased to present this impact evaluation of GEF support to the South China Sea and adjacent areas. The evaluation was undertaken to assess the environmental and institutional impacts of 20 years of GEF support addressing marine and coastal concerns in the South China Sea. It is the largest, most comprehensive impact evaluation undertaken by the Office to date.

The South China Sea is one of the most productive marine areas in the world but is increasingly threatened by political, economic, and social drivers that have created the three largest environmental pressures on this ecosystem: overfishing, habitat loss and degradation, and land-based pollution. Mainly through its international waters focal area, the GEF has sought to catalyze cooperation among the countries bordering the South China Sea so these pressures may be addressed at the appropriate scales, which extend across national boundaries.

What sets this evaluation apart from others that the Office has done before is the use of a systems approach, focusing on the large marine ecosystem of the South China Sea rather than on projects, sectors, or countries. This approach posed several methodological challenges, including unpredictable time lags between the end of GEF interventions and evidence of impact occurring, the effects of contextual factors interacting at different scales, and the actions of multiple actors. These challenges were most apparent on two fronts: the lack of data that would enable the assessment of environmental impact, and the difficulty in attributing observed changes to GEF-supported initiatives.

Attributing observed changes to the initiative being evaluated is central to any impact evaluation. Counterfactuals to measure the effects with and without the presence of GEF support can be identified at the level of interventions and of causal linkages at local scales, but are very difficult to identify at system scales. Furthermore, the GEF does not act alone; thus, attribution often accrues to joint activities rather than GEF-funded activities only. Finally, at the systems scale, changes may occur because of the dynamics of the system, to which an initiative may have given a catalytic push. In such a case, the counterfactual focused more on a historical "what if" analysis to decide whether the push would have been provided by others, or whether the change would have taken place regardless of the initiative having taken place or not.

Thus, for each aspect of progress toward impact that was assessed, the evaluation used a different approach to determine the extent of the GEF's contribution to the outcome. Given the multitude of factors and actors interacting across scales, the evaluation recognized that the GEF is only one of many actors contributing to nutrient pollution reduction and improvements in mangrove, coral, and seagrass cover at local scales; and to the increased

intersectoral cooperation and more robust environmental management frameworks at the national and regional scales. Environmental interventions began in the region in the late 1970s by actors that are still very active today. Through the process of accounting for other plausible explanations for the observed changes, however, the evaluation determined that the GEF did have a unique role in the South China Sea, which has enabled other actors to contribute to larger-scale regional processes and not just to national or local ones.

In general, the evaluation found that while environmental pressures in the South China Sea continue to increase, GEF support to the area has been relevant in addressing regional transboundary issues. It has contributed to reducing environmental stress in the majority of cases, as well as to improving or maintaining socioeconomic conditions in places where initiatives were implemented. Furthermore, the broader adoption of these successful initiatives has begun to take place.

The lack of data necessary to measure whether the desired impacts have indeed occurred turned out to be a major obstacle for counterfactual analysis in many of the sites. In some cases, the evaluation found that the technology to measure and report on environmental impacts and link them with GEF-supported interventions was inappropriate or did not exist. In many cases where a project had funded the establishment of monitoring systems, data either were not being collected regularly, were not compiled in a way that would make them useful for analysis and reporting, or both.

The evaluation was presented to the GEF Council in November 2012. After considering the evaluation's recommendations, the GEF Council requested the GEF Agencies ensure that systems for monitoring environmental impact are in place and are used for adaptive management and public accountability. The Council also requested that the Secretariat take into account the findings of this evaluation when screening future proposals submitted for GEF funding in the South China Sea and adjacent areas, particularly those supporting broader adoption and programs jointly implemented by two or more GEF Agencies.

I would like to thank the governments of Cambodia, China, Indonesia, Malaysia, the Philippines, Thailand, and Vietnam as well as the local communities, project management staff, GEF Agencies, and regional organizations that contributed their time and energy in providing information crucial to this evaluation. Our thanks also go out to the GEF partners—including the evaluation offices of the GEF Agencies—for providing feedback at various points in the evaluation, making the report's findings and recommendations richer and more useful for our stakeholders. The GEF Evaluation Office remains fully responsible for the content of the report.

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Abbreviations

ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
COBSEA	Coordinating Body for the Seas of East Asia
CPUE	catch per unit effort
DANIDA	Danish International Development Agency
EAS	East Asian seas
FAO	Food and Agriculture Organization of the United Nations
GDP	gross domestic product
GEF	Global Environment Facility
GIS	geographic information system
ICM	integrated coastal management
ICRMP	Integrated Coastal Resources Management Project
IF	Investment Fund
IIMS	Integrated Information Management System
IMO	International Maritime Organization
IUCN	International Union for Conservation of Nature
Lao PDR	Lao People's Democratic Republic
MPA	marine protected area
MPP-EAS	Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas
MRC	Mekong River Commission
NGO	nongovernmental organization
NOWPAP	Northwest Pacific Action Plan
OPS	overall performance study
PCB	polychlorinated biphenyl
PEMSEA	Partnerships in Environmental Management for the Seas of East Asia
PNLG	PEMSEA Network of Local Governments
PPP	public-private partnership
PSHEM	port safety, health, and environmental management
SAP	strategic action plan
SCS	South China Sea
SDS-SEA	Sustainable Development Strategy for the Seas of East Asia
SEAFDEC	Southeast Asian Fisheries Development Center
SGP	Small Grants Programme
SOC	state of the coast
TDA	transboundary diagnostic analysis
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific, and Cultural Organization
WWF	World Wide Fund for Nature

All dollar amounts are U.S. dollars unless otherwise indicated.

1. Conclusions and Recommendations

The Impact Evaluation of Global Environment Facility (GEF) Support to the South China Sea (SCS) and Adjacent Areas was carried out from December 2010 to September 2012. The evaluation covered 34 projects in 7 countries, spanning almost 20 years of GEF support. It is the first impact evaluation to be done by the GEF on international waters initiatives, and posed several methodological challenges due to the complex nature of the linkages between the social and ecological systems involved. The following conclusions were reached by the evaluation.

1.1 Findings and Conclusions

CONCLUSION 1: **Although environmental pressures in the South China Sea continue to increase, the GEF has made important contributions that are relevant to addressing regional transboundary issues.**

Except for marine capture fisheries, activities in economic sectors that are dependent on and affect the health of the SCS (which includes the Gulf of Thailand)—specifically, aquaculture, tourism, mining, agriculture, and shipping—have been steadily increasing over the last 50 years, with some accelerating in the last decade. Resource overexploitation, land-based pollution, and habitat degradation and destruction have been steadily increasing since the 1950s, resulting in an overall continuous decline in environmental conditions in the SCS. However, improvements have been seen locally, demonstrating that, given the right approaches, environmental decline can be slowed or reversed.

In complex systems such as the SCS, communication and trust are key to addressing transboundary environmental concerns. The GEF has increased opportunities for communication and collaboration by supporting networks of scientists, legal experts, and local government officials across the region. Through these networks, new knowledge, such as environmental assessment methods and ecological baselines, has been produced for the region. A notable knowledge product developed with GEF support is a transboundary diagnostic analysis (TDA), which has provided a scientific basis for the priority transboundary concerns in the SCS that need to be addressed. Exchanges of knowledge, experiences, and lessons learned have been supported through websites, study tours, congresses, forums, and other learning activities. In the process, awareness and technical skills have increased at the local, national, and regional levels—in some cases resulting in more environmentally conscious behavior and laws.

GEF support has allowed the development or testing of management approaches and tools to address SCS priority environmental concerns, such as integrated coastal management (ICM); port safety, health, and environmental management

(PSHEM); risk assessment and management; ecosystem valuation; fisheries refugia systems; and joint wastewater treatment systems. Strategic action plans (SAPs) at the local, national, and regional scales have been produced incorporating these tools and approaches. Financial mechanisms to implement these approaches, such as alternative livelihoods, revolving funds, public-private partnerships (PPPs), and user fee systems, were also introduced with GEF support. In several instances, supporting legislation at the municipal and provincial levels to implement these approaches has also been facilitated through GEF support. The GEF, along with other actors, has done the same at the national scale, such as through Executive Order 533 on ICM in the Philippines and the Sea Use Law in China. Many GEF project-implementing mechanisms and bodies have been incorporated into local government structures as permanent offices. These implementing strategies at the local and national scales fit within the larger framework of actions needed to address SCS transboundary concerns.

The GEF has made significant contributions in building trust by facilitating cooperative arrangements between community members and between government agencies at local and national scales. At the regional level, the GEF has facilitated five important intergovernmental arrangements in the SCS: a memorandum of agreement between two provinces in Cambodia and Vietnam for seagrass management; a joint framework for oil spill response in the Gulf of Thailand between Cambodia, Thailand, and Vietnam; the Sustainable Development Strategy for the Seas of East Asia (SDS-SEA); the Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), the SDS-SEA implementing mechanism composed of 11 countries and 19 noncountry partners; and the approval of priority actions for the SCS by seven countries through a SAP.

CONCLUSION 2: **The GEF has become a critical player in the region by linking initiatives at multiple scales and providing a channel for other donors and stakeholders to support these transboundary concerns.**

Although the GEF is a relatively new player in the region, it has gained a position in the regional network of actors comparable to those of long-standing organizations—in terms of the number and types of actors it is able to reach and influence—due to its mode of working through partnerships. A social network analysis shows that all major SCS regional actors with the greatest longevity addressing environmental concerns have been partners in GEF initiatives either as an Implementing Agency, executing agency, cofinancer, or collaborator in one way or another. GEF support has also helped link actors that generally work either outside the region or at the country level. An analysis of the reach of actors in the network shows that some actors would have had their reach reduced by as much as 44 percent in the absence of GEF initiatives. While it is possible that these links could have been established through means other than those supported by the GEF, the GEF's linking role for less central actors in the region was confirmed by a survey done as part of the present evaluation. With this broad reach, the GEF has a strategic position in mainstreaming global environmental objectives in the regional agenda.

Furthermore, an analysis of bilateral donor investments in East Asia since the 1980s shows that the GEF has become the primary funder of regional coastal and marine initiatives in the SCS in the last 20 years (table 1.1). Through its position, the GEF has provided opportunities for other donors and institutions to support regional initiatives in cases where they primarily contributed only to national or local objectives. GEF support was also found to have enabled long-standing organizations in the region to expand the nature and scale of their support in addressing transboundary environmental concerns.

TABLE 1.1 **Donor Grants Related to Regional Coastal and Marine Environmental Initiatives in the East Asia Seas, 1988–2008**

Donor	Total grants (current million $)
GEF	~142.63[a]
Sweden	~42
Canada	>25.1
United States	>24.2
European Commission	21.3
Australia	>16.2
Netherlands	8.8
Switzerland	6.3
Italy	5.5
Germany	4.1
Japan	1.4

SOURCES: GEF Project Management Information System, AidData for bilateral donor investments, and project documents.

a. Of this amount, $57.5 million is incident on the SCS.

CONCLUSION 3: **In 21 of 26 cases where comparative data could be obtained, the GEF has supported initiatives that reduced environmental stress, and improved or maintained socioeconomic conditions.**

Of the 27 sites that were covered in this evaluation through field verification, 20 had completed demonstrations or were at a stage where environmental stress reduction could be expected. As each site typically addressed multiple environmental concerns, the evaluation found that at these 20 sites, a total of 40 cases of stress reduction needed to be monitored (table 1.2). For 26 of these 40 cases (65 percent), data were available to determine whether stress reduction occurred. (Stress reduction may have occurred at other sites as well, but the lack of available and relevant environmental monitoring data meant that these changes could not be assessed by the evaluation.) In all, for 21 cases, data indicated a reduction in environmental stress, with almost half of these related to habitat and biodiversity concerns. In cases where stress reduction was not systematically measured, anecdotal accounts of stress reduction were obtained for four cases of habitat and biodiversity–related initiatives, and five cases addressing fisheries. These anecdotal accounts generally pertained to the reduction of destructive fishing practices (e.g., blast fishing, trawling) and mangrove cutting among local community members.

Since it was difficult to find comparable sites to measure the results with and without GEF support, larger-scale trends were used for counterfactual analysis. For each of the parameters measured—coral, seagrass, and mangrove cover as indicators of habitat health and biological oxygen demand as an indicator of coastal water quality—regional and national trends showed continuing declines in habitat and water quality. This shows that GEF-supported approaches have generally been effective at the specific sites where they have

TABLE 1.2 **Number of Cases of Reported Environmental Stress Reduction in Field-Verified Demonstration Sites**

	Number of sites			
Environmental concern	Expected to have stress reduction	With comparative data available	With measured stress reduction	With anecdotal reports of stress reduction only
Habitat and biodiversity	17	12	10	4
Fisheries	12	6	4	5
Pollution	11	8	7	0
Total	40	26	21	9

been implemented, as opposed to the rest of the respective countries and the region, where these approaches have not been widely implemented. In the four sites where specific pollution control technologies were demonstrated, improvements in water quality at points of wastewater discharge after the technologies were in operation show the direct effect of GEF support on environmental status.

In 9 of the 20 completed demonstrations that were sampled, GEF-supported management initiatives not only reduced environmental stress, but were also reported to help foster cooperative relationships, improve livelihoods, and diversify sources of income as a direct result of improvements in environmental status. This has reinforced the implementation and promotion of environmental management initiatives within the sites and elsewhere in the respective countries. In five other sites where environmental stress reduction was reported, alternative sources of income related to ecotourism and fisheries introduced to mitigate losses in livelihood have, for the most part, encouraged environmental protection behavior among community members—or, at the very least, have reduced behavior causing environmental pressure. In most cases, reports on socioeconomic impacts were anecdotal in nature, as these were typically not measured or monitored by the demonstrations. In two sites, alternative livelihoods were supported, but no information could be obtained on status or results.

Despite successful implementation of the demonstrations, the extent of stress reduction has been limited in several sites because of larger-scale factors that the demonstrations failed to and/or could not address. These sites have generally used habitat protection as the main approach, which does not consider the larger context in which the targeted concern exists. For example, in the Vietnamese islands of Con Dao, Hon Mun, and Phu Quoc, regulations apply only within the protected area. While fishers from within the target municipalities tended to comply with the new regulations, it was more difficult to ensure compliance from large-scale commercial fishers from outside the area. A similar situation was found in the Cambodian towns of Kampot and Sihanoukville, where local fishers tended to follow regulations, but trawlers from outside the area continued to fish in shallow waters against regulations. Overexploitation therefore continues in the adjacent waters beyond these areas of jurisdiction. Experiences at these sites demonstrate that other approaches have to be introduced at the scale of these drivers for these initiatives to result in broader environmental benefits.

Coral cover was found to have increased or been maintained within GEF-supported marine protected areas (MPAs) in five of the visited demonstration sites over at least a five-year period. In all five sites, ecotourism- and fisheries-related alternative livelihoods reduced fishing pressure and provided incentives to local fishers to protect the reefs. Despite this, fish abundance continues to decline in Con Dao and Phu Quoc, likely due to weak enforcement outside the MPAs. This decline is also due in part to environmental pressures that are not being addressed—or, as mentioned above, that the GEF-supported approaches are not designed to address at the scale at which they occur. Examples of these drivers are overfishing by commercial trawlers and land-based pollution from tourism and agriculture.

While there are insufficient long-term data to determine significant changes in seagrass cover, anecdotal information indicates an improvement in two of five sites where seagrass management took place.[1] GEF support has contributed to this

[1] Two of these sites (Kampot, Cambodia, and East Bintan, Indonesia) were not included in the 27 sampled sites. Kampot, however, was field-verified during a country visit.

by helping develop relevant legal and regulatory measures, increase public awareness of seagrass conservation issues, and improve enforcement and compliance through community participation. For example, in Kampot, Cambodia, and Bolinao, the Philippines, local community organizations reported that with GEF support they have expanded the area under management and regularly patrol for destructive fishing practices. Both sites have reported improved productivity and income from fishing. In Hepu, China, GEF support has resulted in seagrass beds being incorporated into an existing national park. However, destructive fishing practices and possibly poaching continue in most sites, especially outside the protected areas.

In four of the visited demonstration sites where mangrove protection and rehabilitation were supported, remote sensing analysis revealed that mangrove cover was increasing even before GEF support began. While the increase in mangrove cover may not be directly attributable to GEF support, the GEF has provided incremental value by sustaining the momentum of mangrove-related initiatives and, in some cases, facilitating their expansion. Increased crab productivity resulting from improved mangrove cover has strengthened mangrove protection efforts by community members in Trat, Thailand. GEF-supported ecotourism initiatives in Shankou-Weizhou, China, have similarly provided an incentive to community members to protect mangroves. Peam Krasop, Cambodia—which was not visited but was analyzed through remote sensing—was the only site that showed a continuous decline in mangrove cover over the last three decades. Here, drivers related to high migration into the area contributed to rapid deforestation at the time of GEF support.

GEF-supported demonstrations in seven of the nine visited sites addressing land-based sources of pollution have generally resulted in stress reduction and, in some cases, improved water quality. These improvements have led to an increase in property values, cleaner beaches, growth of the tourism industry in urban areas such as Xiamen, China, and Chonburi, Thailand, and better air quality and more sources of income for farmers in Guangdong, China. Organic pollution continued to increase in Manila Bay, the Philippines, despite improvements in some parameters, due to the large-scale drivers of population and economic growth which were beyond the geographical and technical scope of GEF-supported technologies and approaches.

CONCLUSION 4: **Broader adoption of GEF-supported initiatives is taking place and is critical to fully addressing environmental pressures at the appropriate scales, but faces constraints to further progress.**

As discussed above, even though changes at the demonstration site level are linked to changes in the transboundary water body, broader adoption of promoted approaches and technologies would be required to effect changes at a larger scale. Building on previous work carried out during the Fourth Overall Performance Study of the GEF (OPS4), the evaluation focused on three processes or mechanisms by which broader adoption may occur. The first is through **mainstreaming**, which involves elements of GEF-supported approaches being incorporated in laws, policies, regulations, programs, and other stakeholder initiatives that are usually already part of a regular program or mandate. The second is through **replication**, where the GEF-supported approach or technology is adopted in other localities at a comparable administrative or ecological scale. The third is **scaling-up**, where a similar initiative is implemented in a larger geographic area, often including new aspects or concerns of a political, administrative, or ecological nature. This last is useful in addressing issues that cannot be resolved at lower scales and in spreading the promoted interventions to contiguous areas. These three processes of broader adoption may be at work

at the same time for a given demonstration and may take place at different scales; often, one process may have to occur for another to take place.

Of the 27 verified demonstration sites, 20 were completed or were at a stage in which indications of broader adoption could be identified. While big differences in extent existed, 18 sites reported some form of broader adoption. In all, 13 cases of mainstreaming, 14 cases of replication, and 9 cases of scaling-up were reported. At the regional and national scales, broader adoption is more commonly seen in the mainstreaming of GEF-supported approaches (e.g., ICM, national SAPs) in national laws, and in mechanisms and nonbinding agreements among countries to address transboundary concerns. However, broader adoption at the local, national, and regional scales is impeded by several barriers, discussed below.

- **Conditions for broader adoption are not always present.** Broader adoption was found to be more likely to take place through mainstreaming, replication, and scaling-up when four key conditions are in place: (1) incentives to commit based on the attributes of the introduced technology or approach, (2) institutional capacities of the adopting governments, (3) available financial resources, and (4) appropriate policy frameworks.

  Mainstreaming and scaling-up were most successful in areas that had the same receptive capacity as those in the demonstration site—most notably, economic and governance capacities. In addition, mainstreaming works best where administrative and geographical boundaries match those of the problem being addressed. This finding was most apparent in sites demonstrating the ICM approach supported through the United Nations Development Programme's (UNDP's) PEMSEA stream, as GEF support to this stream has been provided the longest, and the demonstrations were designed with broader adoption as a primary objective (table 1.3).

  In both Xiamen, China, and Batangas Bay, the Philippines—the first two GEF-supported ICM demonstration sites—broader adoption has taken place through replication in other cities and provinces within their respective countries; mainstreaming at the municipal, provincial, and national scales; and scaling-up to include other water bodies and watersheds adjacent to these sites. The two cases have several characteristics in common. In both countries, there is a robust decentralization policy framework that delegates management of natural resources and environment-related services to local governments. In this sense, the ICM processes in Xiamen and Batangas Bay were aligned with country priorities—an important factor for their incorporation into national policy. The context was thus receptive to the lessons provided by ICM. Sufficient administrative capacities in the adopting

TABLE 1.3 **Comparison of Conditions Necessary for Broader Adoption in Scaled-Up Integrated Coastal Management Demonstration Sites**

Demonstration site/ area covered by scaling-up	Incentive for adoption	Institutional capacity	Availability of financial resources	Appropriateness of policy framework
Xiamen and Jiulong River Basin	High	High	High	High
Batangas Bay and entire Batangas Province	High	High	High	High
Danang and other coastal provinces in Vietnam	High	Low	Low	Low
Sriracha and other Chonburi municipalities	Low	Low	Low	High

local governments were also in place before they began to implement ICM. Economic growth was robust—both Xiamen City and Batangas Province and their adjacent areas have been among the highest-earning in their countries. In both places, the tourism and real estate industries have been important engines of growth. The experiences demonstrated that there are significant payoffs in giving environmental concerns attention early on in the process of economic development before the consequences of pollution become irreversible or too expensive to remediate.

The broader adoption process in Xiamen and Batangas Bay can be contrasted with experiences in Vietnam and Thailand. Danang, a Vietnamese port city, also experienced an economic boom with particularly strong growth in the tourism and real estate industries. Similarly, ICM has helped in planning growth and addressing environmental concerns early on. It has also been identified as an area for development by the Vietnam government. As part of a national law to implement ICM in 14 coastal provinces of the country, ICM was replicated in 3 provinces. However, the cities to which ICM is being expanded do not have the dynamism of Danang, nor access to as much fiscal resources. Decentralization policies in Vietnam, while delegating responsibility for natural resource management to local provinces, have not fully transferred the necessary financial resources to put this into action. Further, plans for the establishment of a national ICM training center in Danang have been slowed by a lack of expected funding from the central government. Existing capacities at the provincial level are another limiting factor.

In Thailand, the ICM demonstration that began in the municipality of Sriracha in the province of Chonburi started shortly after a new decentralization policy was passed that granted the local governments more responsibility in managing their natural resources. ICM activities initially focused on five municipal local government units in the vicinity of the Sriracha port. These units were selected primarily because of their history of collaboration, financial resources, and relatively strong institutions. Scaling-up allowed the local government units to share wastewater treatment facilities and therefore collectively cut costs. Beginning in 2009, the ICM approach was extended to all coastal local government units, and eventually to all upland local government units, covering all 99 municipalities of the Chonburi Province. However, there are significant differences between coastal and upland municipalities. Sriracha and its surrounding local government units have been able to develop their human and institutional resources on the strength of a growing port economy. Upland local government units, however, lack the fiscal resources generated by the economic spillover of the Sriracha port, the oil refineries, and the tourism industry. The incentives for upland adoption of ICM are also not as compelling as for inland local government units. In the case of coastal local government units, the rapid growth of tourism and real estate values are important incentives for protecting the beaches. Scaling-up in Chonburi faces the classic upstream/downstream dilemma, whereby upland local government units will have to invest in activities that will largely benefit coastal local government units.

The differences between the Xiamen and Chonburi experiences are that scaling-up in Xiamen has taken place gradually over almost two decades, and has so far involved only comparatively progressive cities that can support the costs of implementing the approach and coordinating with other cities. Scaling-up the unit of management has been relatively

easier in Batangas as well, given that the additional bays are all within the jurisdiction of the same high-income province, albeit composed of additional municipalities. Because the GEF-supported demonstration was initially done with the province as the primary administrative unit, it had an inherent authority to convene other municipalities in order to scale up ICM to include all other water bodies in the province beyond Batangas Bay. In Chonburi, on the other hand, the provincial government has not had as much of an implementing role. Sriracha has had to take on the leadership role of getting other municipalities in the province to adopt and scale up ICM, requiring the creation of new implementing structures both at the level of the additional municipalities and at the level of clusters of municipalities. In Chonburi, the costs of coordinating regulations and activities across municipalities of very different economic and institutional capacities may be too high, requiring significant political and financial support from the national government that is currently not present.

- **Systems for managing trade-offs and risks are not always in place.** Change in land or sea use as part of coastal area zoning often requires the displacement of stakeholders from their livelihoods and/or homes. In the process of achieving global environmental objectives, 15 of the 27 sampled demonstration sites have required trade-offs and posed risks to human welfare. In 11 sites, while executing agencies have clearly taken measures to address these concerns, the appropriate systems to identify and mitigate socioeconomic risks were reported to not always be in place; as a result, not all measures taken were adequate in preventing negative unintended impacts.

  Ten of the 15 demonstration sites involved a reduction in access to coastal resources, and therefore had alternative livelihoods as a measure to mitigate socioeconomic losses. As noted above, five of these sites were successful in providing supplemental income and reducing environmental pressure, but two were not successful because market needs and appropriate environmental conditions were not considered in designing livelihoods. More detailed information was not available for the other three sites.

  In 5 of the 15 sites, relocation of homes and livelihoods was necessary to make way for new uses of coastal areas. Such relocation has typically—but not always—been dealt with by providing financial compensation and resettlement sites to displaced communities. In two of these sites, both implemented by the World Bank, appropriate safeguard policies set in motion processes to mitigate risks to ensure that stakeholder concerns were addressed in a fair and timely manner. In the other three sites, the measures taken may not have met international standards. For example, UNDP's PEMSEA funding stream, which promotes the ICM approach, typically follows the respective country's policies in dealing with relocation and resettlement issues that arise in the course of coastal zoning and ICM program implementation. While some countries' practices might meet international standards, those of others do not. The evaluation could only ascertain the risks to, but not the actual impact on, the affected population of such resettlement practices. Resettlement issues that are not properly addressed may also pose a risk to the GEF's reputation.

  A similar reputational risk is seen in one site where insufficient stakeholder engagement was undertaken in forging PPPs in Puerto Galera, the Philippines. While this has greater implications for limiting the broader adoption of demonstrated approaches, it may also create distrust and disaffection among stakeholders and toward GEF-supported initiatives.

- **Reluctance of countries to support initiatives addressing regional transboundary environmental concerns and global environmental benefits.** East Asia is one of the few regions in the world that does not have a legally binding convention for the management of its regional seas. The multilateral environmental instruments in the region are mostly nonbinding and take the form of declarations, strategies, and action plans, most of which are not financed by the countries themselves. Disagreements among littoral countries over maritime domains and resources have greatly limited the area and terms on which most states are willing to engage in cooperation on marine environmental governance in the SCS. When these domains and transboundary resources are at stake, countries have preferred to work through legally binding instruments that are primarily economic in intent and bilateral in nature. It is difficult to get participating countries to agree to conduct environmental research and monitoring activities in the high seas and in the contested islands. Even though there is very strong evidence that fish stocks are declining and that all countries would gain from more productive fisheries, participating countries have been wary of entering into multilateral regional arrangements or in supporting activities related to the management of transboundary fish stocks. This reluctance is resulting in a tragedy of the commons at a regional scale, as seen in the continuing decline of the environmental health of the SCS.

  GEF support has mostly been able to move the transboundary environmental agenda forward where there is alignment with country priorities—and more specifically, where countries derive direct benefits. The GEF approach to the constraints posed by disagreements in maritime borders, as manifested in its strategic programming and in the design of its projects, has been to facilitate consensus among the participating countries and support regional cooperation wherever possible. Most of the regional support provided by the GEF has been in the form of foundational activities (e.g., transboundary diagnosis, priority setting, knowledge generation). Actual environmental responses that have been supported by the GEF have taken place mostly at the country level and on issues that do not require coordinated intergovernmental responses. Notable exceptions are the cooperation between Cambodia and Vietnam in the management of seagrass beds; the joint framework on oil spill response in the Gulf of Thailand adopted by Cambodia, Thailand, and Vietnam; and the SCS SAP.

- **Differences in the extent of country support for environmental multilateral mechanisms, and a current heavy dependence on donor funding—including GEF support—by regional environmental mechanisms.** As part of the GEF international waters approach, broader adoption by countries of a viable regional mechanism that provides specific core coordinating services is necessary in achieving global environmental benefits over the long run. This assumption is based on experiences elsewhere in the world and on countries' capacity needs to address transboundary environmental concerns in the region. But some countries have noted that they are not convinced of the need to create more regional organizations. Countries in the SCS have been engaged since the 1970s in a complex network of intergovernmental institutions, through which they have adopted an array of instruments pertaining to the region's critical environmental concerns. However, regional environmental initiatives of intergovernmental organizations have historically been mostly financed by donors. In contrast to their reluctance to commit financially to regional environmental initiatives, littoral countries have contributed

consistently to intergovernmental organizations that primarily address economic issues.

Since 1993, the GEF has provided a stream of financial support to PEMSEA, which has since functioned with an outreach broader than the SCS to include other seas of East Asia. While most countries acknowledge and appreciate the support provided by PEMSEA, not all have recognized PEMSEA as an international organization operating in the region. In 2009, eight countries signed an agreement recognizing PEMSEA as an international legal entity; to date, three of the seven GEF-eligible countries bordering the SCS have yet to sign this agreement. While four countries (China, Japan, the Republic of Korea, and the Philippines) have pledged voluntary contributions toward PEMSEA's annual operating costs, none of the signing countries plan to commit to regular financial contributions or to be financially liable for PEMSEA; instead, their approach is that each country should make voluntary contributions according to its means.[2]

Consequently, after 20 years of support, PEMSEA remains heavily dependent on GEF funding for continuation of its services. According to PEMSEA's 2010 budget, the GEF funded 86.5 percent of total operations and implementation costs, which involved a broad range of activities under the Implementation of SDS-SEA project (GEF ID 2700). PEMSEA is aware of the risks of dependence on a single major donor, and has developed a Financial Sustainability Framework Plan for strengthening PEMSEA through voluntary contributions and other financial mechanisms.

[2] The Philippines has signed a 10-year agreement providing PEMSEA with the use of a headquarters building and associated amenities. Timor-Leste has contributed $100,000 per year to PEMSEA; this is earmarked for activities undertaken on a cost-sharing basis by the PEMSEA Resource Facility and Timor-Leste.

The GEF has adopted a phased approach in its support to PEMSEA. As of this writing, a project proposal was expected to be presented for approval in the November 2012 Council for the last phase of GEF support. The GEF Evaluation Office was informed that one of the main objectives of this project will be to support a five-year transition to PEMSEA's full financial sustainability. Also, based on PEMSEA's Resource Facility Reengineering Plan and SDS-SEA Regional Implementation Plan, it is apparent that PEMSEA intends to expand its services by strengthening the PEMSEA Resource Facility. With GEF support over the next five years, PEMSEA plans to implement its Financial Sustainability Framework Plan to create various funding sources and sustainable streams of income, with the view of being financially sustainable by 2016.

Given that the current global economic recovery is likely to be slow and prolonged, it is uncertain at present how the resource-intensive core coordination and technical support functions of the PEMSEA Resource Facility as currently defined can be supported over the long term. If the GEF continues to channel funds toward increasing PEMSEA services over the next five years, it faces the risk that this expanded regional mechanism will face an abrupt financial shortfall and difficult adjustment once GEF financial support is phased out, if the required funding is beyond what the member countries themselves or other donors are willing to support with their own resources.

- **Low coordination and insufficient management of internal risks within the GEF partnership.** A programmatic approach has been an important aspect of GEF international waters support since development of the operational programs in 1996. This approach is key when seeking to contribute to transboundary environmental benefits by tackling the multiple dimensions that need to be addressed. These

dimensions include a better understanding of the interactions of diverse natural systems within a broad geographical area, the engagement of multiple countries and stakeholders, and—stemming from these—the long and unpredictable timelines and directions within which results take place.

The GEF has supported multiple complementary initiatives in the SCS that have proposed novel approaches to addressing coastal and marine environmental concerns previously identified in the region. These initiatives have contributed to increased communication among the various regional organizations and to cooperative engagement between countries. However, except for the GEF Small Grants Programme (SGP), these initiatives, while linked, were not integrated with existing regional organizations. They thus worked mostly in isolation from one another, were rarely coordinated, and on occasion have competed with one another.

While the lack of integration of GEF-supported initiatives to existing regional organizations has allowed for the development of novel approaches that might not otherwise have been possible, the evaluation identified several risks related to how these approaches developed. The lack of coordination among the GEF's otherwise complementary main financing streams has resulted in higher transaction costs for the countries, requiring governments to spread their qualified staff thin. In effect, the way GEF support has been delivered in the SCS has resulted in a higher number of regional initiatives that require financial and political support from countries—further contributing to competition and duplication among regional organizations. A low level of coordination and cooperation among the different GEF funding streams has also undercut the potential for the GEF to offer comprehensive solutions to address the region's challenging transboundary concerns. In addition, while the GEF's promotion of "champions" has been key to outstanding achievements of GEF support in the SCS and to major gains in broader adoption, the lack of management of the risks of relying on champions has resulted in approaches not being integrated, a lack of introspection, and losses in the momentum and synergy of GEF-supported initiatives.

Structural factors within the GEF partnership have played an important role. With equal standing in the GEF partnership, none of the GEF Agencies have the authority or incentive to convene others for collaboration on similar initiatives. In the past, the International Waters Task Force convened by the GEF Secretariat allowed for some coordination in the partnership. With the loss of prominence of focal area task forces since GEF-4 (2006–10), the modest coordinating functions of the International Waters Task Force have been further reduced. In recent years, the GEF has been experimenting with programmatic approaches such as the Coral Triangle Initiative, which seeks to tap into the competencies of several agencies. The GEF has tried to ensure coordination by assigning a lead agency to coordinate joint implementation of projects, but these entities report that they find it difficult to engage with other agencies as cycles, reporting requirements, and priorities differ.

The GEF has also sought to address regional programmatic issues through stocktaking meetings that convene all the GEF projects in a given region to discuss coordination and collaboration issues. The East Asian Seas (EAS) Stocktaking Meeting in October 2010 suggested recommended actions such as joint planning in project preparation and implementation, and strengthening of national interagency coordination mechanisms. However, it still failed to address the key structural issues related to the need for an incentive structure for GEF Agencies and

funding streams to collaborate, and the absence of an entity that can make Agencies accountable for coordination and collaboration.

CONCLUSION 5: **GEF projects in the SCS and adjacent areas have major deficiencies in the accessibility, use for management, and reporting of environmental monitoring data.**

Environmental monitoring data are being collected in 32 of 40 cases, but only in 19 cases were data available, due to information management systems either not being in place or not suited to country conditions.

Each of the 27 sampled sites aimed to improve environmental status in relation to habitat and biodiversity, fisheries, land-based pollution, or a combination of these concerns. Tallying the multiple concerns at each site, there were a total of 40 cases where environmental monitoring was to be conducted (table 1.4). Sixteen of 17 cases that were expected to be monitoring habitat and biodiversity parameters were found to be doing so. However, data were only available through publications or made accessible during field visits in nine of these cases. Of the 12 cases expected to monitor improvements in fisheries, 8 were found to be collecting data, and only in 6 were the data available. Of the 11 cases of sites expected to monitor coastal pollution from land-based sources, 8 were collecting data, but only 4 had the data available.

In 9 out of 20 sites that had completed demonstrations, no evidence was found of data being used and reported for management and public accountability. In six of the sites, GEF support was key to initiating habitat- and pollution-monitoring activities. While information management and reporting systems have also been supported to store monitoring data and make them accessible for analysis, management, and reporting, these sophisticated systems were found in most cases to have been used only when a high level of financial and technical support was provided by the GEF. Even then, the technology and standardized tools introduced—particularly the Integrated Information Management System (IIMS), a web-based geographic information system (GIS), and the State of the Coast (SOC) reporting system—saw limited adoption, partly because they were not well suited to local capacities. Lack of budget among local and national government agencies and frequent staff turnover have been common obstacles in continuing monitoring and evaluation activities, even in the few sites where human resources are readily available. Low adoption was also found in past non-GEF projects in the region that supported similar systems.

Notable examples where monitoring data have been used for management and/or public accountability were found in Batangas, Bolinao, Manila Bay, and Masinloc, the Philippines; Con Dao, Hon Mun, and Phu Quoc, Vietnam; Xiamen, China; and Sihanoukville, Cambodia. In these cases, the technologies and systems used typically already existed in the countries. For example, since 2007, Xiamen has been sending out text messages to fishers to disseminate monitoring data and prevent

TABLE 1.4 **Number of Sites Addressing and Monitoring Specific Environmental Concerns**

Environmental concern	Sites where monitoring was to be conducted	Sites with periodic data collection	Sites with monitoring data available
Habitat and biodiversity	17	16	9
Fisheries	12	8	6
Land-based pollution	11	8	4
Total cases	40	32	19

disasters. In Manila Bay, monitoring data showed that water quality criteria were not being met, and the reports produced through the IIMS were used by the Supreme Court of the Philippines to compel the responsible national agencies to fulfill their mandates in improving water quality in the bay to avoid administrative sanctions.

1.2 Recommendations

The GEF Evaluation Office has formulated three sets of recommendations from this evaluation. The first set refers specifically to the future of GEF support in the SCS and adjacent areas. The second set addresses monitoring and evaluation issues within the international waters focal area. The third set of recommendations is proposed to be incorporated when developing the international waters focal area strategy for GEF-6 (2014–18). The Evaluation Office did not have access to the proposals that are being prepared for the SCS and EAS, so it was not possible to assess if these adequately address issues raised in this evaluation. Thus, the Office also recommends that the GEF Council take into account the findings of this evaluation when considering further proposals for the SCS and adjacent areas and, where appropriate, that these findings be addressed by GEF Chief Executive Officer endorsement.

RECOMMENDATIONS RELATED TO THE SOUTH CHINA SEA AND ADJACENT AREAS

RECOMMENDATION 1: **GEF support should more fully draw on the GEF partnership to mainstream transboundary concerns within countries and existing regional organizations.**

The evaluation has identified important cases in which lessons of GEF support are being mainstreamed and are affecting aspects of the broader policy context. These have been significant accomplishments that, by and large, have been achieved through the same sectoral ministries or administrative structures receiving the specific stream of GEF support. The engagement of the relevant sectoral ministers has been a key aspect of the GEF approach to international waters since the operational programs were developed in 1996. The GEF Evaluation Office's *Program Study on International Waters 2005* also points out the importance of further engaging a broad range of relevant sectoral ministries in GEF projects (GEF EO 2005).

The GEF has already taken steps in this direction in the region—e.g., through the Yellow Sea SAP, which has brought countries to agreement on reducing fish catch by 40 percent. As indicated in this evaluation, several projects in the region have worked with different sectoral ministries in demonstrating approaches and technologies locally and in seeking their broader adoption. While the GEF should continue its bottom-up support through local demonstrations, it should strategically strengthen its work from the top down, seeking opportunities for transformational changes that can create more favorable conditions for broader adoption.

More specifically, the GEF could provide support to its well-positioned partners to look more actively for opportunities to mainstream transboundary environmental concerns to the broader policy framework of such ministries as the economy, finance, agriculture, public works, fisheries, and other sectors that affect drivers related to the management of transboundary environmental goods and services. This support need not be done through large investments, but rather by providing modest resources to agencies that already have access to these ministries.

Similarly, while continuing to support approaches such as the SDS-SEA and the SCS SAP, GEF support should draw on its prominent position in

the region to mainstream transboundary concerns related to regional environmental goods and services in intergovernmental regional forums.

RECOMMENDATION 2: **The GEF should give more attention to supporting countries to work together to address concerns related to regional environmental goods and services.**

The GEF should further ensure that its international waters funding is structured in such a way as to provide it with the flexibility to present countries with incentives to work together to address the "tragedy of the commons." It should also support collaborative endeavors among countries to improve the management of regional environmental goods, as exemplified by the fisheries refugia initiative developed by the SCS TDA-SAP project (Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand, GEF ID 885).

RECOMMENDATION 3: **The GEF should more clearly define the role and linkages of regional mechanisms in the context of its broader regional strategy, and ensure country and donor commitments to increasing levels of cofinancing to cover the full costs of regional services by the end of the next phase of support.**

The two previous international waters program studies recommended that the GEF give more attention to the sustainability of regional mechanisms (Bewers and Uitto 2002; GEF EO 2005). While it is clear that GEF support to PEMSEA should continue, the GEF should also—to be consistent with Recommendation 5—clarify how its support to PEMSEA fits in with and is linked to other major GEF-supported initiatives and the GEF's broader programmatic strategy in the region to support countries in working together to address transboundary environmental concerns.

The GEF should carefully assess the sustainability risks of providing its support toward the expansion of services provided by the PEMSEA Resource Facility and the implied higher costs that will have to be borne by the countries once GEF support phases out in five years. The GEF should assess the likelihood of this approach being able to draw the required levels of financial support from countries and donors, given midterm forecasts of the global economy and the reluctance that most countries have thus far shown in committing funds.

One option is to ensure country and donor commitments to increasing levels of cofinancing so as to achieve, by project end, payment for the full costs of the regional services put in place by GEF support. This might mean focusing GEF support on only the most critical functions, while requiring that expansion of the PEMSEA program and services be financed by sources other than the GEF. The GEF should draw on its prominent position in the region to engage the countries and other donors in a dialogue on the PEMSEA services they are willing to support. The GEF should also use its position to help PEMSEA attain robust cofinancing ratios on the costs of running PEMSEA and the technical services it provides, so as to demonstrate the financial viability of the approach proposed.

RECOMMENDATION 4: **UNDP needs to ensure that the social risks of the projects it finances in the SCS are identified and addressed.**

UNDP needs to ensure that PEMSEA and other executors of GEF support in the region properly identify the social risks of GEF-supported activities and that plans to prevent realization of risks or risk mitigation are in place, followed, and monitored. UNDP should ensure that PEMSEA and other executors of future GEF projects in the SCS and adjacent areas meet GEF Policy PL/SD/01, Agency Minimum Standards on Environmental and Social Safeguards.

RECOMMENDATION 5: **A more robust programmatic approach should be developed for GEF international waters support to the SCS and adjacent areas.**

Issues that have emerged in this evaluation, earlier overall performance studies (OPSs) OPS2 and OPS3, and the previous two international waters program studies regarding the current approach in the SCS and adjacent areas include the lack of an explicit indication of how different projects fit into a broader programmatic strategy, insufficient collaboration, and a failure to realize the full benefits of the complementarity intended among the various projects and distinctive competencies of the GEF Implementing Agencies. The GEF has attempted some solutions—such as joint Agency implementation of projects and, in the international waters focal area, the introduction of stocktaking meetings (first introduced in the Danube Black Sea and more recently in the EAS)—but these have not done much to overcome the hurdles. The GEF needs to strengthen its current programmatic approach in the SCS and adjacent areas by addressing the following gaps.

Accountability Gap

While multiple GEF projects in a transboundary water body typically have an implicit programmatic strategy,[3] such strategies have not been formally articulated or adopted by the GEF in such a way as to fully identify how different projects fit into an overall GEF strategy for the region. Nor is it clear how the different projects or agencies are accountable in relation to the broader strategy of GEF support to the countries in the region. While project documents clearly define the expected outcomes for which each project is accountable, less clear or left implicit are the interagency roles, operational links, and areas and extent of coordination and collaboration that are expected in the context of the GEF's broader regional strategy. The project-based approach, combined with the funding stream/Agency dynamics of GEF support in the SCS and adjacent areas, has contributed to the development of robust initiatives with strong identities that during implementation have a high risk of becoming disjointed. In the case of the SCS and adjacent areas, funding streams other than the SGP have little incentive to coordinate and join efforts during implementation. This undercuts the extent to which the benefits of the combined competencies of the various GEF partners can be realized. A comprehensive approach is needed to encompass the links and interactions of the full range of GEF funding in the region. A challenge will be to strike the right balance between clear accountability and overly prescriptive directives.

Tracking and Reporting Gap

GEF engagements with the magnitude of support given in the SCS and adjacent areas require more robust tracking and reporting of multi-Agency commitments to communication, coordination, and introspection among international waters projects and a common focus on global benefits. The GEF has introduced stocktaking meetings for this purpose, but—as indicated above—they have only skirted critical GEF partnership issues. Given the structural nature of the interactions among Agencies as equals, responsibility for more robust tracking and reporting with regard to multi-Agency collaboration and cooperation should be placed on the GEF Secretariat. This new function should be approached as an instrument for adaptive management. It should also allow for inputs from the various GEF stakeholders, including country representatives, and seek to identify and tackle critical issues affecting the functioning of the partnership and the execution of the broader GEF strategy in the region.

[3] The key elements of such a strategy, including for the SCS and the EAS, were presented in a technical document written for OPS2, "Geographically Based Programmatic Approaches" (Duda 2001).

Funding Gap

The GEF has not fully acknowledged that coordination and collaboration carries a cost. While costs of stocktaking meetings have been channeled through projects, project budgets have not always allocated additional funds to lead Agencies that coordinate the activities of other entities. Funds and staff time of the GEF Secretariat to play a oversight role, including attendance at regional meetings, have also been uncertain. Relatively small additional funds can make a big difference in ensuring that large amounts of GEF support move along the right track. The GEF should carefully identify, cost out, and finance the key functions needed to ensure proper oversight of coordination, introspection, and inter-Agency communication in major regional engagements such as the SCS and the EAS.

Distinctive Competency Gap

As indicated through this evaluation, entrenchment among Agencies and streams of funding has hampered the synergy of drawing on the distinctive competencies of Agencies within the GEF partnership. The GEF should ensure that, during project preparation, the most qualified Agency or GEF instrument is drawn upon to implement a given project or project component. For example, activities related to private sector investments and interactions with ministries related to finance and infrastructure are areas that the World Bank is already engaged in through its regular business. It is therefore the Agency best equipped in implementing these components in GEF projects or programs—even if the project or program is implemented through a different Agency. Similarly, the UNDP SGP has extensive experience in managing community-based demonstrations and is therefore most suited to implement components of GEF projects that take place at this scale.

RECOMMENDATIONS RELATED TO MONITORING AND THE USE OF MONITORING DATA

Monitoring and evaluation concerns have been among the most prominent raised by previous OPSs and international waters program studies. While significant progress has been made in terms of monitoring indicators, GEF-supported projects in the SCS and adjacent areas continue to have major gaps with regard to monitoring and evaluation systems that would allow for a fuller assessment of the impact of GEF support in the region.

RECOMMENDATION 6: **Impact monitoring and related reporting systems supported by the GEF should be consistent with local capacities and priorities. They should also be sufficiently flexible to accommodate the more user-friendly and affordable technologies that are rapidly emerging.**

The evaluation found many instances in which the GEF supported the introduction of information and communication technology for data storage and retrieval. In most instances, the use of such technology required specialized user skills and significant training. Thus, the IIMS, for example, has been used mostly for compiling data rather than exploiting its more sophisticated functions of modeling and generating reports. Consequently, less technically complicated solutions may be the most appropriate until local human and, especially, financial capacities are increased. Similarly, while the SOC reporting system is a useful tool that promotes the interaction of different government agencies and information sharing, slow adoption may be a result of too many indicators needing to be populated, which adds to the workload of government staff, and a lack of available data. A reporting tool that requires fewer indicators but presented more frequently may be more useful in sites with low technical capacity, complemented

by a more comprehensive but less frequent SOC report produced as the site builds greater capacity.

Greater capacity can only be built when governments make monitoring and reporting systems a fiscal priority; this in turn will be realized only when such systems are used as a decision-making and accountability tool rather than just for collecting and compiling data. Given the human resource constraints faced in several countries, it is unlikely that local governments will be able to attract and retain the required qualified staff or needed financial resources in the near term (Heeks 2002; Yeo 2002).

Also, the rapid pace of technological change is increasingly moving toward much more user-friendly and affordable technologies, such as smartphones, tablets, rapid provisioning of services, cloud computing, and georeferenced digital photography and data. These and other current technologies could be applied to data collection, storage, and retrieval; and have the advantage of more intuitive user interfaces. Such technologies are now within reach of the GEF but were not often found in the sites visited.

RECOMMENDATION 7: **Impact monitoring and evaluation data and information should be made available to the GEF Evaluation Office in a timely and transparent manner.**

The evaluation team encountered numerous problems in access to timely and complete data, reports, and general information needed to carry out the evaluation. Some of the problems were caused by inefficient information storage and retrieval systems. The evaluation found instances in which upon project closure, Agencies stopped supporting websites, or staff turnover resulted in a loss of institutional memory regarding the existence or location of information. In other cases, access to information was not given priority, and project executor and stakeholder responses were slow. In still other instances, requests resulted only in partial information or were ignored altogether. Also, researchers were sometimes reluctant to provide information they had not yet used in their own publications.

The GEF Agencies should take contractual and practical measures to ensure that monitoring and evaluation data and information for GEF projects are made available to the GEF Evaluation Office in a timely and complete manner. Agencies must also ensure that monitoring data and information include georeferenced boundaries and locations of demonstrations. These geospatial data should be provided at the GEF Chief Executive Officer endorsement, midterm review, and terminal evaluation of each project.

RECOMMENDATION TO THE GEF-6 INTERNATIONAL WATERS FOCAL AREA STRATEGY

RECOMMENDATION 8: **The findings of this evaluation should be considered in developing the international waters focal area in GEF-6 and, when applicable, the strategies of other focal areas.**

The evaluation presents findings that highlight many valuable experiences as well as factors that negatively affect progress to impact of GEF support. The findings and recommendations of this evaluation should thus be taken into careful consideration when developing the GEF-6 international waters strategy.

2. Evaluation Approach and Methodology

2.1 Purpose, Objectives, and Key Questions

The GEF Evaluation Office initiated this impact evaluation to follow up on a recommendation of OPS4 that an in-depth assessment of progress toward impacts in the international waters focal area be undertaken. OPS4 had focused on the likely impacts of individual projects and had not been able to adequately capture the contributions of the GEF as a result of the combined impacts of GEF projects over time and across the larger areas within which interventions are taking place. This impact evaluation thus focuses on assessing impacts or progress toward impacts of a cluster of projects geared toward improving the management of a large marine ecosystem.

The geographical focus of the evaluation is on the SCS (including the Gulf of Tonkin)[1] and the Gulf of Thailand. The marine area covered by the evaluation stretches in a southwest to northeast direction with a southern border between South Sumatra and Kalimantan (Karimata Strait), and a northern border at the Strait of Taiwan between the northern tip of the island of Taiwan and the Fujian coast of mainland China. The covered marine areas together are referred to as the SCS in this evaluation. The rivers that drain into these water bodies and their respective watersheds are also included. This geographical area was selected as the focus of this evaluation through a consultative process considering the following criteria: duration of GEF engagement, cumulative GEF funding, expected utility of the learning for other large marine ecosystem areas, and coverage in past evaluations (see annex 1 in volume 2 of this report). The SCS was assessed to be suitable in accordance with these criteria.

The main objective of this evaluation was to analyze the extent to which GEF support has contributed to, or is likely to lead to, changes in policies, technology, management practices, and other behaviors that will address priority transboundary environmental concerns. The impact evaluation sought to answer the following questions:

- To what extent has GEF support been relevant to the transboundary environmental threats in the SCS as well as to the action plans, priorities, and strategies that countries in the area have adopted to solve environmental problems?
- What have been the effects of GEF support (positive or negative, intended or unintended) on

[1] The "South China Sea" is the international name for this area as recognized by the International Hydrographic Organization, and is therefore the name used throughout this evaluation. It is called the South Sea (南海 Nánhǎi) in China, and the East Sea (Biển Đông) in Vietnam. In September 2012, the president of the Philippines issued Administrative Order No. 29 renaming "maritime areas on the western side of the Philippine archipelago as the West Philippine Sea" to cover the areas within the Philippine Exclusive Economic Zone.

country efforts and achievements in addressing critical transboundary environmental problems and concerns?

- What are the critical factors (internal to the GEF or related to implementation of GEF projects, and in the context in which GEF support takes place) that affect the extent to which GEF support is likely to lead to actions (by countries and other stakeholders) that would result in the reduction of transboundary environmental stresses and improvement of environmental and socioeconomic status?
- What can be learned from the successes and failures of the GEF-supported interventions that would be applicable in the SCS and elsewhere?

The evaluation has adopted a mixed-methods approach: both quantitative and qualitative tools have been used. Both primary and secondary sources were used for gathering information. Emphasis has also been placed on gathering information from several sources to facilitate triangulation (Nightingale 2009). The evaluation covers a portfolio comprised of 34 GEF projects ($112 million) and 150 small grants ($3 million) with an aggregate GEF funding of $115 million. It covers seven countries—Cambodia, China, Indonesia, Malaysia, the Philippines, Thailand, and Vietnam—that surround the SCS and are eligible for GEF funding.

The approach paper for the evaluation was approved by the Director of the Evaluation Office in December 2010. Fieldwork was initiated in April 2011 and completed the following October (see annex 12 for a timeline of key activities). The study was conducted by a team that included GEF Evaluation Office staff, and several national and international consultants.

2.2 Conceptual Framework

The evaluation design takes into account three main aspects: (1) the theory of change implicit in the GEF's interventions and its implementation approach; (2) the characteristics of the complex, linked social and ecological systems that GEF interventions are trying to influence; and (3) the challenges associated with assessing the impact of GEF interventions, given the nature of these systems and of the interventions.

GEF INTERNATIONAL WATERS THEORY OF CHANGE

A theory-based evaluation designs its questions around an intervention's theory of change, or the logic of how the intervention is expected to lead to the desired impacts (Fitz-Gibbon and Morris 1996; Weiss 1997). An intervention's theory of change may have been made explicit when the intervention was designed; sometimes it is implicit, which requires the evaluators to reconstruct it and make it explicit.

Within the context of evaluation of GEF interventions, van den Berg and Todd (2011) emphasize the need to go beyond project boundaries to assess how the GEF has made an impact in the larger scheme of things and to check whether there have been unintended consequences of GEF-supported interventions. The GEF Evaluation Office has developed a review of outcomes to impacts approach to track progress toward impact and underlying factors.

In preparation for OPS5, the Evaluation Office has developed a general framework for the GEF's theory of change. For this evaluation, this general framework was used as a tool to generate and test hypotheses to help understand the causal pathways to global environmental benefits. It was used to assess impact achievements and progress toward impact, and to track processes that lead to progress toward impact.

FIGURE 2.1 **General Framework for the GEF Theory of Change**

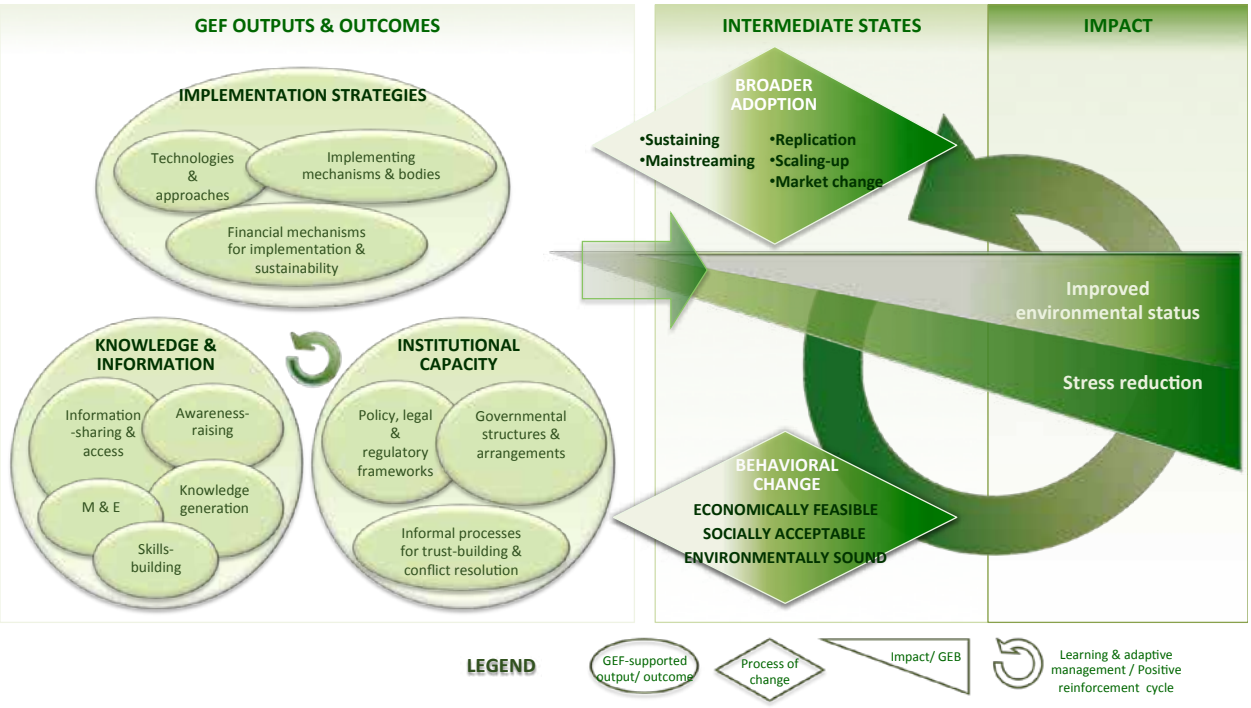


Figure 2.1 shows how the GEF provides support for activities that directly or indirectly address drivers that are expected to affect environmental degradation. When considering their intended results, the GEF typically finances activities that may be classified as falling into three categories: implementation strategies, institutional capacity development, and knowledge and information. Outputs and outcomes of GEF activities—and their interactions with their contextual environment and actions by other actors—are expected to lead to broader adoption of the promoted approaches and technologies, and to institutional action and behavioral change.

Within the context of GEF support in addressing international waters–related transboundary concerns of the SCS, activities such as TDA, monitoring of environmental status, awareness campaigns, and establishment of information portals may be understood as **foundational activities** that contribute to the knowledge and information base necessary for decision making and implementation of interventions. Activities focused on policy analysis and the development of regulatory frameworks, administrative reforms, institutional structures, etc., may be seen as supporting the development of **institutional capacity**. Activities such as the implementation of conservation practices (e.g., for mangroves, coral reefs, and seagrass), wastewater treatment and livestock waste management, the establishment of implementing mechanisms such as multisectoral management committees and task forces, etc., may be seen as **implementation strategies**.

Broader adoption of demonstrated approaches and technologies; implementation of SAPs or SAP elements at a wider scale; enforcement of appropriate environmental laws and regulations; and change in the behavior of individuals, local communities, businesses, policy makers, and other stakeholders are expected to lead to the removal of environmental threats or to better ways of

managing natural resources and to improvements in environmental status.

CHALLENGES OF ASSESSING IMPACT IN A COMPLEX ADAPTIVE SYSTEM

A growing body of scientific literature shows that ecosystems are inextricably linked to socio-economic systems (Galaz et al. 2006). Understanding these linkages is important in shaping responses to the environmental and socio-economic concerns of these systems. These linked, constantly interacting, natural and human systems are often referred to as "complex adaptive systems" (Anderies, Janssen, and Ostrom 2004; Liu et al. 2007) or social-ecological systems (Ostrom 2009). The SCS large marine ecosystem has many of the characteristics associated with complex adaptive systems,[2] albeit as a polycentric system with multiple actors possessing diverse interests influencing each other's behaviors (Ostrom 2010). It is a system comprised of nested scales of ecological and administrative units with spatial and temporal boundaries that often do not match (Cash et al. 2006; Folke et al. 2002; Folke et al. 2007). Processes taking place at one scale can have profound effects on events that take place at other scales, thus requiring concurrent attention to the links among developments at the local, national, regional, and global levels.

In complex systems, the linkages between interventions (inputs) and observed changes are often nonlinear: the eventual result may not be proportional to inputs and outputs, and may be greatly affected by initial conditions, intervening factors, or other contextual factors. In such systems, the presence of recursive processes (feedback loops), tipping points (thresholds), choke points, random surprises, and other nonlinear processes often makes prediction of outcomes difficult (Holling 2001; Taleb 2007). Progress toward intended impacts may stall for long periods but then may suddenly cross critical thresholds to bring about substantial change in conditions. Furthermore, the extent of actual impact may be constrained by the initial conditions, starting point, or "path," which limits the types and number of subsequent opportunities that lead to progress.

The attributes ascribed to complex adaptive systems such as the SCS pose several challenges in evaluating impacts and in the extent to which any given change or accomplishment can actually be attributed to an intervention or set of interventions. Key challenges include assessing cause-effect links in the context of unpredictable time lags between interventions and system responses, nonlinearity of the causal chain, nested and mismatched scales of natural and governance systems, path dependence, and multiple actors with diverse interests (Davies 2005; Mee, Dublin, and Eberhard 2006; Sanderson 2000). These challenges need to be addressed when assessing the impact of GEF activities in the SCS.[3]

Given the nature of concerns addressed by GEF support, long and unpredictable time lags are often

[2] From a sustainable use perspective, the adaptive capacity of a system is limited to its resilience; once this capacity is exceeded, the system may permanently shift into another state of equilibrium that no longer provides some services that are critical to human welfare.

[3] These complexities are coming to the fore in academic analyses and critiques of the Coral Triangle Initiative in its early stages. For example, Fidelman and Ekstrom (2012) analyzed the text of hundreds of documents to develop network depictions of the multiple institutions and policy domains with jurisdictional and functional overlaps. Despite—or perhaps because of—the multiple policy domains, some core functional matters have been found to lack adequate treatment in the Coral Triangle Initiative, especially food security of the millions of people dependent on marine biodiversity and environment (Foale et al. 2012).

incurred before environmental status changes become evident. Moreover, GEF interventions in the SCS are spread out over a long period of time—the preparation of the first GEF project in the region commenced in 1992, whereas implementation of several others included in the evaluation began in 2010. These circumstances make it imperative that both the evidence on long-term achievements related to impact and progress toward long-term impact be taken into account.

This evaluation examines the interactions of the multiple scales in detail. For example, when assessing the development of regional environmental instruments and mechanisms, attention is given to the global conventions related to the Rio process in terms of the geopolitical concerns of individual countries that affect the extent to which they are willing to commit to regional arrangements. Results at the local scale are assessed in consideration of national-scale policy frameworks and stressors that transcend local boundaries.

For large marine ecosystems where causal chains are often shaped by nonlinear processes, it is important not only to measure changes in environmental and socioeconomic status, but also to understand how the system is affected by actors adapting to each other's behavior (Ostrom 2009). In some situations, the chances of impact occurring may increase when certain prerequisite conditions exist or have been achieved. It is therefore important to assess the extent to which these prerequisite conditions have been achieved and/or exist, as this is one means of measuring progress made toward impact. Where relevant, this evaluation has taken such patterns into account and results of GEF support have been assessed in this light.

Thus, when appropriate, the evaluation sought to assess the extent to which GEF support has contributed to conditions that, in this type of system, are likely to lead to desired long-term results. For example, attention was given to the extent to which GEF projects have helped generate better information and better information-sharing systems among stakeholders; identify and test new technologies and approaches to address specific problems; and establish better mechanisms for communications, joint decision making, and collaboration among countries. While examining chains of causality linking GEF interventions with results, much attention was also given to initial conditions or "paths," including trends and accomplishments in progress prior to GEF support and to concomitant events or actions that could have influenced results. The intention was to assess what is working, under what circumstances, and why (Pawson et al. 2005; Pawson and Tilley 1997). This was also important in determining the limits on the extent of impact to which GEF support can contribute, given the context in which it has been delivered.

ATTRIBUTION AND CONTRIBUTION

Often the primary goal of an impact evaluation is to attribute outcomes to particular interventions. Assessing the impacts of GEF funding is generally difficult to distinguish from those of partners that provide cofinancing and capacity for GEF-funded activities. Even where the GEF has funded specific components within a project that may be distinguished from those funded by other partners, these have been funded on a premise that they will be able to draw on the synergies with components funded by the other partners and vice versa.

Where determining attribution has not been feasible, the focus has been on determining the contribution of GEF support. Several scholars make a useful distinction between the two terms (Kotvojs and Shrimpton 2007; Leeuw 2012; Mayne 2012; Patton 2008; Stern et al. 2012). While "attribution" is generally used to denote that both the

cause of an effect and the quantitatively measured net effect have been assessed, the term "contribution" is used to show that a given intervention has made a noticeable difference to an observed result in a multiple-factor context. While both attribution- and contribution-based analyses aim to make credible causal claims, contribution analysis is more practical in situations where experimental data are not available or are not feasible. According to Mayne (2011), credible claims of contribution can be made if the following conditions are satisfied:

- Presence of a reasoned theory of change for the intervention
- Implementation carried out as outlined in the theory of change
- Chain of expected results occurred
- Other rival explanations have either been considered and rejected, or their relative role in making a difference to an observed result has been adequately recognized

Mayne's conditions underscore the importance of an intervention's theory of change, evidence on implementation and actual occurrence of the chain of expected results, and adequate appreciation of the role that actors and factors that were independent of the project have played in affecting the given result. The approach followed in this evaluation aims to address these conditions when claiming causality for the results.

Given that GEF-supported interventions are implemented through partnerships among several institutions, this evaluation seeks to determine the impacts that these interventions have contributed to without distinguishing the results of activities supported by GEF funding alone from the activities of cofunders. However, the evaluation does aim to assess the roles that the different Implementing Agencies have played within the GEF partnership, and the GEF's role in various multi-actor contexts, without explicitly attributing impacts to specific members of the partnership. Whenever possible, the added value of the GEF's contributions was determined in light of the roles played by other actors at the regional, national, and local scales.

The determination of a counterfactual—i.e., what would have happened had the intervention not taken place—helps in assessing the net impact of an intervention. For interventions that target either small geographical units or individuals, and that do not pose challenges related to contamination (or effect on the neighboring units), experimental design–based evaluation helps in determining a counterfactual and assessing the net impact that could be attributed to an intervention. To be able to use such an approach for evaluation, this needs to have been included in the project design. Such projects are very few and limited in their scope.

The complex nature of the SCS poses several challenges in determining convincing counterfactuals. Other challenges in this regard stem from the characteristics of the intervention. The general approach in this evaluation has been to use methods that are most suited for a specific intervention given the constraints imposed by the system that is being influenced, the design of the intervention, the information available, and the method's cost-effectiveness. Where determination of a counterfactual has not been feasible, counterfactual analyses were nevertheless done through comparisons and innovative ways to eliminate rival explanations for observed changes where possible. Although comparisons do not allow precision in estimating net impact, they do shed some light on the results achieved and the underlying causal factors.

2.3 Tools and Approaches

As noted, a combination of quantitative and qualitative methods was used, with information

gathered from multiple primary and secondary sources to triangulate evidence. For all components of the evaluation, desk reviews were conducted of project documents, scientific literature, global databases, and reports produced by other organizations. Key informant interviews and stakeholder consultations with 373 individuals (see annex 11), online surveys, and field verification were also performed to validate and build more in-depth evidence. Standardized protocols designed to collect information for specific analyses were used whenever appropriate to make information comparable across projects, sites, and countries.

ANALYSIS OF REGIONAL CONTEXT AND TRENDS

To understand the socioeconomic trends in the SCS region, and the actual and likely effects of these on environmental trends that the GEF seeks to improve, the drivers-pressures-states-welfare-response framework was used (see annex 3A). This framework focuses on interrelationships, boundaries, and feedback loops among system components (Cooper 2012). The framework clarifies causal links between human activities (drivers, pressures), ecological systems (state), social and economic systems (welfare), and environmental policies and mechanisms (responses). The framework is not based on an assumption that the character and behavior of all components of the SCS international waters system and their relationships will be understood. Instead, it helps in the identification of crucial elements that underlie this complex system.

A model specific to the SCS based on the drivers-pressures-states-welfare-response framework was developed in collaboration with a pool of regional scientific experts. Publicly available regional databases and findings of peer-reviewed journal articles were then used to populate the model. The data were used to understand the changes that are taking place in the region and the likely changes that may be expected.

To understand the scope of regional environmental governance in the SCS, an analysis of bilateral and multilateral instruments and organizations was performed. A historical review of the evolution of regional actors and environmental initiatives was made to assess the starting conditions (including identified gaps) within which GEF support took place, including the support and role of other prominent bilateral and multilateral donors. Social network analysis was used in conjunction with this to help determine the GEF's niche through the respective roles and interactions of important regional actors (see annex 3B), using published independent reviews of regional organizations working on international waters–related transboundary issues to identify key actors. Online surveys were also conducted and analyzed using social network analysis to understand the roles of different regional actors and to appreciate the role played by the GEF within this context (see annex 3B, figure 7).

COUNTRY CASE STUDIES

At the national scale, an assessment of the GEF's contributions in light of those made by other actors was done through a case study approach. The objective of the country studies was to capture the national dimension in terms of organization of GEF activities, national processes, and impacts achieved at the national level through field visits and interviews with GEF stakeholders and knowledgeable individuals. This effort included analyses of historical timelines to assess the GEF's role vis-à-vis that of other actors in bringing about national-scale achievements in international waters–related initiatives (see annex 3C). The studies were particularly used to understand country perspectives on regionally important issues, and how the governance structures of these

countries interact with the regional arrangements in place. They were also used to better understand the policy context in which local demonstrations took place; the extent to which the results of GEF support has influenced broader national processes such as policies, programs, and institutional changes; and the perceived overall added value and relevance of GEF support and its results at the country level.

Of the seven countries that surround the SCS, four were selected for intensive country case studies based on the size of cumulative GEF funding for activities contingent on the SCS (and the Gulf of Thailand) and that address international waters–related transboundary concerns. These countries were China, the Philippines, Thailand, and Vietnam. A brief evaluation visit was also conducted in Cambodia. These five countries received by far the highest amounts in GEF support (see annex 2D, table 3). The role of GEF support in the remaining countries that were not covered by field visits was assessed primarily through desk reviews and key informant interviews.

FIELD VERIFICATION OF LOCAL IMPACTS

At the local scale, the evaluation assessed the specific results of GEF interventions considering processes that were set in motion, structures that were put in place, and accomplishments in environmental stress reduction. Field verifications were undertaken within the framework of country studies. To be considered as a site for verification, a site should have received at least $100,000 in cumulative GEF funding. Also, the activities undertaken at the site must have been designed to lead directly to environmental stress reduction in an international waters transboundary concern. Through review of project documents, 49 distinct demonstration sites were identified where 62 demonstrations of technologies and approaches had been executed or were being executed. In some of the sites, such as Xiamen, China, and Batangas, the Philippines, the GEF had supported demonstrations through several projects. In other sites, multiple demonstrations had been executed or were being executed within the framework of a single GEF project. A demonstration site was considered the unit of analysis, which allowed consideration of combined effects of linked demonstrations.[4]

Of the 49 sites, 36 were in the four countries selected for country case studies. Of these sites, 28 were sampled using a stratified random sampling approach, but 1 was excluded from the analysis due to logistical constraints at the outset (see annex 2C, table 2, for a list of sites covered). Of the 27 sites that were included in the analysis, 24 were covered through field visits. Further logistical constraints prevented visits to the other three sites; these were instead covered through in-depth interviews with executing staff and other key informants in their respective countries.

For the 27 sites, information on delivery of outputs and achievement of outcomes—which was often already reported by the GEF Agencies—was verified.[5] The effectiveness of GEF-supported demonstrations in reducing environmental stress and in improving environmental status was assessed. Information was also gathered on progress to impact and factors that affect progress. Much of the reporting in this evaluation on

[4] Without considering linked interventions in a demonstration site as a unit of analysis for demonstrations, it would be imperative that the results of activities in the demonstration site supported through different projects be distinguished. However, this is very difficult to accomplish, as follow-up activities tend to build on preceding activities.

[5] In addition, seven SGP SCS sites in Thailand and Vietnam that were not included in the sample were verified since the opportunity was available.

local stress reduction and environmental status change is based on these field verifications. The information that was gathered was recorded in a standardized protocol developed specifically for this evaluation. Twenty-one of the 27 sites had completed implementation of GEF-supported activities at the time this report was prepared in September 2012. However, only 20 sites could be assessed for impacts, as 1 site was not able to complete the output that was expected to contribute to impact by the time the demonstration was completed.

Where feasible, the information gathered through review of project documents and field visits was buttressed with information from other sources. For sites where mangrove conservation–related interventions were undertaken, additional information was gathered through remote sensing analysis to determine changes in the demonstration sites. Similarly, for coral reef sites, a meta-analysis of reef monitoring reports was done to assess if any changes could be linked to GEF-supported demonstrations.

COUNTERFACTUAL ANALYSIS

Since it was difficult to find comparable sites to measure the extent of stress reduction with and without GEF-supported demonstrations, larger-scale trends were used for counterfactual analysis. For each of the parameters measured—coral, seagrass, and mangrove cover as indicators of habitat health; and biological oxygen demand as an indicator of coastal water quality—regional and national trends were used to determine the extent to which GEF-supported approaches had been effective at the specific sites where they were implemented, as opposed to the rest of their respective country and the region, where these approaches have not been widely implemented. In sites where specific pollution control technologies were demonstrated, changes in water quality at the points of wastewater discharge after the technologies were in operation is a direct measure of the effect of GEF support in reducing environmental stress. Even for these interventions, determining counterfactuals for impacts made through the replication, scaling-up, and mainstreaming of GEF-supported demonstrations in the larger SCS system is difficult because of the vast array of contextual factors that affect environmental outcomes, many of which the interventions were not designed to influence.

As it is virtually impossible to systematically test the difference in results with and without GEF support at a regional scale, different types of comparisons were used for counterfactual analysis. For interventions such as the establishment of regional mechanisms or action plans, a comparative analysis was done with experiences in similar large marine ecosystems using specific criteria. To approximate the GEF's role vis-à-vis other regional actors, a "negative" social network analysis was used to complement other methods whereby the characteristics of the regional network of actors without the GEF and its initiatives were compared with those of the network with the GEF as it is now.

STAKEHOLDER INCLUSION AND EXPERT REVIEWS

The GEF Evaluation Office has drawn on various resources—such as the technical advisory group and reference group that were constituted for this evaluation, and the GEF International Waters Task Force—to strengthen the scientific and technical aspects of the evaluation and to seek input from key stakeholders.

The technical advisory group consisted of six scientific and technical specialists with expertise in international waters and/or evaluation. The group provided quality assurance support

on methodological, scientific, and technical issues. The International Waters Task Force—which consists of international waters focal area coordinators from the 10 GEF Agencies, the GEF Secretariat, and the GEF Scientific and Technical Advisory Panel—provided input on selection of knowledge products and facilitated ongoing communication with the GEF Agencies on the evaluation. Prior to the beginning of the evaluation, consultations with the task force were undertaken on the selection of the SCS as the site for the evaluation, as well as to seek input on the approach to the evaluation.

The reference group consisted of more than 30 people, including representatives from the GEF Secretariat and GEF Agencies, key staff involved in the execution of GEF projects in the SCS, and some non-GEF stakeholder institutions. A reference group meeting was conducted in Bangkok in September 2010 to discuss the draft approach paper with regional stakeholders. A second reference group meeting was conducted in September 2011 to present emerging findings. Besides the responsibilities it shared with the other groups, the reference group will play an important role in the follow-up to this evaluation.

3. GEF International Waters Approach and Portfolio in the South China Sea

3.1 Strategic Approach to International Waters

GEF projects supported through the international waters focal area focus on addressing transboundary concerns of water bodies such as large marine ecosystems, lakes, aquifers, or rivers that are shared by several countries. The presumption is that nation states need prompting and support to address environmental concerns that cut across country borders, and that an impartial facilitator can help them explore their common ground and gradually come to terms on ways to address such concerns. The GEF seeks to fill this facilitator or catalyst role.

During the early stages of its engagement, the GEF typically focuses on helping countries build trust and confidence in themselves and with other actors, a robust knowledge of concerns and their root causes, agreements on priority concerns, awareness of and agreement on an action agenda, national capacities to formulate and implement policy, and effective regional and national intersectoral mechanisms to carry out coordinated actions. These supported activities may also include development of mechanisms to monitor stress reduction, environmental status, and socioeconomic status.

Once an enabling environment has been created, the focus shifts to testing of implementation strategies and approaches including technologies, implementing mechanisms or bodies, and financial mechanisms. Subsequently, where appropriate, the GEF may also support activities that aim at broader adoption and change seeking to sustain, mainstream, replicate, or scale up accomplishments, approaches, or technologies that have been shown to work. Given the scale of investment required to address transboundary concerns and the GEF's self-ascribed catalytic role, investments and broader adoption processes are usually left to national governments and other actors. In some instances, however, the GEF may provide financing for a small proportion of funding required for such activities, particularly if they have shown high potential for broader adoption.

Not all GEF international waters focal area projects may follow this sequence of activities in addressing transboundary water concerns. Projects that are not consistent with this progression are often undertaken on an opportunistic basis because they facilitate country buy-in and/or make targeted contributions to a priority transboundary concern of the countries in the region.

The projects and grants that have been supported through other GEF focal areas are difficult to link to any unified approach to addressing international waters–related transboundary concerns of the SCS. The GEF financed them primarily to address concerns that are relevant to the respective focal area in which they were approved. However, the

crossover nature of these projects—also indicative of the overlap among the GEF focal areas—makes them relevant to international waters–related transboundary concerns. These have, therefore, also been included in the evaluandum.

The GEF international waters implementation approach recognizes that transboundary problems need solutions that link multiple scales and sectors. When supporting intergovernmental mechanisms at the regional level, the GEF also seeks to support local initiatives and national processes that help countries address transboundary environmental concerns. Within countries, the GEF emphasizes engaging the relevant country sectors—including different ministries and levels of government, the private sector, civil society, and other stakeholders—in policy making and implementation. The diverse priorities and perspectives of different ministries and stakeholders within a country also require mechanisms for dialogue and decision making.

3.2 Transboundary Dimensions of Coastal and Marine Concerns

The GEF international waters focal area uses the term "transboundary" to refer to concerns that involve more than one country. The management of environmental resources and ecological services may have several transboundary aspects.

- **Transboundary species:** migratory species, including fish stocks
- **Transboundary areas:** areas straddling the national boundaries of two or more countries where important species or resources are found (including rivers, lakes, and aquifers)
- **Areas of transboundary significance:** areas that may be wholly within one country's jurisdiction but whose environmental status will have transboundary consequences
- **Transboundary risks and threats:** problems that, due to their mobility, may cross national boundaries
- **Global significance:** the critical equilibrium states of specific species populations, ecosystems, and nutrients that need to be maintained for the provisioning of regional or global ecological goods and services

Concerns that are common to several countries (e.g., solid waste, local water shortages) but do not have any of these transboundary dimensions are usually not considered transboundary in nature, unless, when aggregated, they are of a magnitude that would take on regional or global significance.

The required government responses to transboundary environmental concern depends on which aspects need to be addressed. Government responses will also differ according to which transboundary aspects are relevant to each country. Government responses to transboundary concerns may or may not require coordination among countries.

TRANSBOUNDARY CONCERNS REQUIRING COORDINATED INTERGOVERNMENTAL RESPONSE

Coordinated intergovernmental responses may be in the form of either an intergovernmental agreement to implement actions jointly or an intergovernmental agreement to take on specific roles or tasks that are coordinated, with each one contributing to an agreed action or solution, but largely implemented independently. For example, key habitats, shared stocks, and migratory paths that extend across the boundaries of more than one country will require agreement and political will from all concerned countries to jointly protect these areas of common interest. Joint implementation may involve coordination of policing activities,

and the conduct of joint patrols and arrests. This may be especially important if part of the habitat or migratory path is in an area beyond any country's national jurisdiction or, as is more likely in the SCS, in an area claimed by several countries. Highly migratory fish stocks and their overexploitation by fleets from different countries also require concerted management, as the fisheries of all SCS countries may be affected by the unsustainable fishing practices of just one or a few countries (APEC FWG 2008). In this case, each country may agree on a regional management plan and take on different responsibilities, depending on the ecology of the fisheries most relevant to their geographical position and economic interests, as well as financial capacities.

TRANSBOUNDARY CONCERNS RESOLVED BY INDEPENDENT COUNTRY RESPONSE

Government responses that address transboundary environmental concerns but require little or no coordination may be in the form of

- a multilateral agreement to abide by the same standards, processes, or principles, but to take action independently with little or no need for coordination (e.g., international convention, code of conduct); or
- an independent country action that nevertheless contributes to addressing a transboundary environmental concern (e.g., national protected area).

Habitats that are entirely within national boundaries gain transboundary significance if they are critical to a life stage (e.g., feeding, spawning) of a migratory species or a species that has significance for global biodiversity. In such habitats, uncoordinated management actions by national or local governments to prevent habitat destruction and degradation may be sufficient. Some agreement among countries is necessary as to what regulations and standards must be enforced across a multicountry network of critical local habitats if protection of a particular species is to be successful. Transboundary threats such as oil spills, transport of hazardous wastes, invasive alien species transported through ballast water, and the growing concern of marine debris (Zhou et al. 2011) are similarly addressed through a low-coordination, multilateral agreement among countries, such as through harmonized national regulations and common maritime safety standards and response protocols.

A review of the oceanographic circulation of the SCS against potential and actual pollution hotspots shows that the likelihood of land-based pollution becoming a transboundary threat in a large marine ecosystem is not high, except in the Gulf of Thailand.[1] Pollution from land-based sources is likely to be confined to coastal waters, bays, and estuaries of individual countries. This, however, does not preclude the transboundary impacts of land-based pollution, such as the degradation of local habitats with transboundary significance. In this sense, pollution would be a concern threatening biodiversity and fish stocks beyond its area of immediate impact and, depending on the specific effects, might require a multilateral management response. From a global perspective, an increase in nutrient pollution is a transboundary concern as well, as it contributes to the disruption of the nitrogen cycle, which may result in biodiversity losses and changes in the prevalence of infectious disease (Galloway et al. 2008). Thus, while addressing land-based pollution in the SCS directly results in stress reduction for the country, transboundary impacts may also be achieved incidentally.

[1] For data used in the review, see Buszynski and Sazlan (2007), Cheng and Wang (2009), Coutsoukis (2002), Hu et al. (2000), Idris and Mohd (2007), Khemakorn (2006), Ocean Ambassadors (2001), Papi et al. (1995), UNEP (2008a); and Wang (2001).

3.3 The GEF Portfolio in the South China Sea

Thirty-four GEF-funded projects and 150 small grants that are both relevant to international waters–related transboundary concerns (thematic incidence) and are incident on the SCS and the Gulf of Thailand (geographical incidence; see annex 2B) comprise the GEF portfolio for this evaluation (table 3.1). In all, the GEF has provided funding of $115 million through 34 projects ($112 million) and 150 small grants ($3 million). Of the total funding, $91 million (79 percent) has been provided through the international waters focal area. About $15 million (13 percent) has been provided through the biodiversity focal area. A few activities have also been supported through the persistent organic pollutants focal area and the multifocal area (see annex 2E).

By GEF Agency, the World Bank ($52.3 million), UNDP ($33.6 million), and the United Nations Environment Programme (UNEP; $18.1 million) together account for 90 percent of GEF funding (see annex 2F). The World Bank primarily implements projects that focus on nutrient reduction and land-based sources of marine pollution, especially through wastewater treatment. These projects garner high levels of cofinancing because the GEF generally only supports some components of these projects, such as capacity building, whereas physical infrastructure construction—which requires considerable outlay—is supported through cofinancing by the recipient countries in the form of loans and internal resources. This pattern is reflected in both the level of cofinancing mobilized and the cofinancing ratio in World Bank–implemented GEF projects.

Projects implemented through UNDP and UNEP, on the other hand, account for relatively low levels of cofinancing; this is largely explained by the nature of the projects. However, there are also important differences in the cofinancing of projects implemented by the United Nations (UN) agencies and those implemented by multilateral development banks. Cofinancing of UN agency–implemented projects typically consists of resources from the countries or of grants mobilized from other donors. Multilateral development banks provide cofinancing in the form of loans, using the additional GEF resources as incentives for countries to test new technologies or approaches. Multilateral development banks also typically implement projects that are national in scope, while UN agencies tend to have more regional projects in their portfolios.

Based on the goals and objectives pursued and the GEF Agency involved, the GEF SCS portfolio can be classified into five separate funding streams:

- UNEP-implemented SCS projects
- UNDP-implemented PEMSEA projects
- World Bank–implemented Investment Fund (IF) projects
- UNDP-implemented SGP projects[2]
- Other projects

Table 3.2 presents a summary of fund allocations for the activities of these funding streams. The UNEP SCS, UNDP PEMSEA, and World Bank IF project funding streams together account for 12 projects, $65.65 million in approved GEF funding, and $606.14 million in cofinancing. Thus, although these three funding streams together account for only a third of the projects of the GEF SCS portfolio, they account for 54 percent of GEF funding and 88 percent of the cofinancing expected at approval.

[2] The SGP, while implemented through UNDP, is a GEF corporate program. As such, it represents a different modality of implementation from the other streams.

TABLE 3.1 **Portfolio of GEF Projects Incident on the South China Sea and Gulf of Thailand**

GEF ID	Project title	Focal area	Funding stream	Funding (million $) GEF	Funding (million $) Cofinancing	Agency	Country
4	Hon Mun Marine Protected Area Pilot Project	BD	Other	1.00	1.15	WB	Vietnam
396	Prevention and Management of Marine Pollution in the East Asian Seas	IW	UNDP PEMSEA	2.92	0.00	UNDP	Regional
514	The Role of the Coastal Ocean in the Disturbed and Undisturbed Nutrient and Carbon Cycles	IW	Other	0.00	0.00	UNEP	Global
584	Global International Waters Assessment	IW	Other	0.03	0.04	UNEP	Global
587	Ship Waste Disposal	IW	Other	10.00	11.60	WB	China
597	Building Partnerships for the Environmental Protection and Management of the East Asian Seas	IW	UNDP PEMSEA	8.74	6.64	UNDP	Regional
610	Removal of Barriers to the Effective Implementation of Ballast Water Control and Management Measures in Developing Countries	IW	Other	0.42	0.16	UNDP	Global
615	Mekong River Basin Water Utilization Project	IW	Other	11.35	5.30	WB	Regional
884	Reduction of Environmental Impact from Tropical Shrimp Trawling through Introduction of By-catch Technologies and Change of Management	IW	Other	0.17	0.16	UNEP/ FAO	Global
885	Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand	IW	UNEP SCS	16.75	17.89	UNEP	Regional
1031	Biodiversity Conservation and Sustainable Use of the Marine Resources at Con Dao National Park	BD	Other	0.99	0.88	UNDP	Vietnam
1128	Biodiversity Management in the Coastal Area of China's South Sea	BD	Other	3.52	9.23	UNDP	China
1183	Tonle Sap Conservation Project	BD	Other	3.60	15.54	UNDP/ ADB	Cambodia
1185	Integrated Coastal Resources Management Project	BD	Other	1.56	9.05	ADB	Philippines
1201	Conserving Marine Biodiversity through Enhanced Marine Park Management and Inclusive Sustainable Island Development	BD	Other	1.60	1.51	UNDP	Malaysia
1223	Removal of Barriers to the Introduction of Cleaner Artisanal Gold Mining and Extraction Technologies	IW	Other	1.19	2.18	UNDP	Global
1829	Coral Reef Rehabilitation and Management Project Phase II (COREMAP II)	BD	Other	0.75	6.71	WB	Indonesia
1916	Marine Aquarium Market Transformation Initiative	BD	Other	0.78	1.74	WB	Regional
2135	Guangdong—Pearl River Delta Urban Environment	IW	WB IF	10.00	432.38	WB	China
2138	Livestock Waste Management in East Asia	IW	WB IF	7.70	17.01	WB	Regional

(continued)

TABLE 3.1 **Portfolio of GEF Projects Incident on the South China Sea and Gulf of Thailand** *(continued)*

GEF ID	Project title	Focal area	Funding stream	Funding (million $) GEF	Funding (million $) Cofinancing	Agency	Country
2188	East Asian Seas Region: Development and Implementation of Public Private Partnerships in Environmental Investments	IW	UNDP PEMSEA	0.44	0.36	UNDP	Regional
2261	Building Partnerships to Assist Developing Countries to Reduce the Transfer of Harmful Aquatic Organisms in Ships' Ballast Water (GloBallast Partnerships)	IW	Other	0.10	0.28	UNDP	Global
2329	Global Programme to Demonstrate the Viability and Removal of Barriers that Impede Adoption and Successful Implementation of Available, Non-Combustion Technologies for Destroying Persistent Organic Pollutants	POPs	Other	4.11	7.66	UNIDO	Philippines
2474	Promoting Ecosystem-based Approaches to Fisheries Conservation and LMEs	IW	Other	0.06	0.04	UNEP	Global
2700	Implementation of Sustainable Development Strategy for the Seas of East Asia (SDS-SEA)	IW	UNDP PEMSEA	7.20	20.94	UNDP	Regional
2758	Coastal Cities Environment and Sanitation Project - under World Bank/GEF Partnership Investment Fund for Pollution Reduction in the LME of East Asia	IW	WB IF	5.35	21.68	WB	Vietnam
2759	Metro Manila Third Sewerage Project (MTSP) - under World Bank/GEF Partnership Investment Fund for Pollution Reduction in the LME of East Asia	IW	WB IF	5.35	87.81	WB	Philippines
2932	Alternatives to DDT Usage for the Production of Anti-fouling Paint	POPs	Other	3.55	4.11	UNDP	China
3187	Demonstration of Sustainable Management of Coral Reef Resources in the Coastal Waters of Ninh Hai District, Ninh Thuan Province, Viet Nam	IW	UNEP SCS	0.41	0.53	UNEP	Vietnam
3188	Demonstration of Community-based Mgt of Seagrass Habitats in Trikora Beach East Bintan, Riau Archipelago Province, Indonesia	IW	UNEP SCS	0.40	0.39	UNEP	Indonesia
3309	Participatory Planning and Implementation in the Management of Shantou Intertidal Wetland	IW	UNEP SCS	0.40	0.52	UNEP	China
3523	CTI West Pacific-East Asia Oceanic Fisheries Management Project - under the Coral Triangle Initiative	IW	Other	0.02	0.07	UNDP	Regional
3619	CTI Strategies for Fisheries Bycatch Management	IW	Other	1.61	4.13	FAO	Regional
3639	CTI GEF IW: LEARN: Portfolio Learning in International Waters with a Focus on Oceans, Coasts, and Islands and Regional Asia/Pacific and Coral Triangle Learning Processes - under the Coral Triangle Initiative	IW	Other	0.41	0.44	UNDP/ ADB	Global

NOTE: BD = biodiversity; FAO = Food and Agriculture Organization of the United Nations, IW = international waters; WB = World Bank.

TABLE 3.2 **Funding Streams for International Waters–Relevant GEF Activities**

Funding stream	GEF Agency	Number of projects	GEF funding (million $)[a]	Cofinancing (million $)[a]
UNEP SCS projects	UNEP	4	17.95	19.33
UNDP PEMSEA projects	UNDP	4	19.30	27.93
World Bank IF projects	World Bank	4	28.40	558.88
UNDP SGP projects	UNDP	150	2.87	3.04
Other projects	ADB, FAO, UNIDO, UNDP, UNEP, World Bank	22	46.82	81.99
All activities		184	115.34	691.17

NOTE: ADB = Asian Development Bank; FAO = Food and Agriculture Organization of the United Nations; UNIDO = United Nations Industrial Development Organization.

a. Only the amount estimated to be incident on the SCS has been reported.

These three streams have some characteristics in common: they all include demonstrations of specific approaches to improve environmental management, which if expanded are assumed to lead to improved conditions of the water body; and they include foundational activities that support these demonstrations, such as information management, awareness raising, and human and institutional capacity development as prerequisites for progress toward impact. However, the funding streams are complementary, in that they differ in terms of the nature of the initiatives they promote.

UNEP SCS FUNDING STREAM

The UNEP SCS funding stream is comprised of four projects: the SCS TDA-SAP (approved in 2001); Demonstration of Sustainable Management of Coral Reef Resources in the Coastal Waters of Ninh Hai District, Ninh Thuan Province, Vietnam (GEF ID 3187, approved 2008); Demonstration of Community-based Management of Seagrass Habitats in Trikora Beach East Bintan, Riau Archipelago Province, Indonesia (GEF ID 3188, approved in 2007); and Participatory Planning and Implementation in the Management of Shantou Intertidal Wetland, China (GEF ID 3309, approved in 2007). These projects were developed within the framework of the GEF's TDA-SAP approach. The UNEP SCS stream has sought to first work with SCS countries in the preparation of a science-based TDA that assessed environmental concerns and their causes, and a SAP to develop agreement among participating countries of the priority environmental concerns and actions to be undertaken at both the regional and national scales. The first project undertook the TDA-SAP exercise, along with the demonstration of SAP implementation at selected sites; the other projects are designed to implement the SAP and were prepared as part of the first project. All the interventions undertaken as part of the projects of this stream are incident on the SCS. The primary focus of these projects has been on coastal habitats and fisheries.

UNDP PEMSEA FUNDING STREAM

UNDP's PEMSEA stream is comprised of the Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas (MPP-EAS; GEF ID 396, approved in 1993); Building Partnerships for the Environmental Protection and Management of the East Asian Seas (GEF ID 597, approved in 1999, and commonly referred to as the PEMSEA project); Development and

Implementation of Public-Private Partnerships in Environmental Investments (GEF ID 2188, approved in 2003); and the SDS-SEA project (approved in 2007). The projects undertaken as part of this cluster are partially incident on the SCS, as they also cover other adjacent water bodies in East Asia.

The UNDP PEMSEA strategy has been to identify, develop, and/or adapt specific tools or approaches for coastal management; test them in specific sites where they can demonstrate early success; and then move on to replicate or scale up the approach in the country and across the region. The projects of this stream focus on the promotion of ICM, which aims to foster cooperation among stakeholders—especially among different agencies within local governments—with the primary purpose of addressing challenges to sustainable development of coastal and marine areas in the region. Initially, this stream focused on addressing coastal and marine pollution through ICM.

WORLD BANK INVESTMENT FUND FUNDING STREAM

Several GEF projects have been supported within the framework of the World Bank–GEF Partnership Investment Fund for Pollution Reduction in the Large Marine Ecosystems of East Asia (also called the Investment Fund). However, most of these projects are incident on other water bodies. Only two—the Coastal Cities Environment and Sanitation Project (GEF ID 2758) and the Metro Manila Third Sewerage Project (GEF ID 2759)—approved through this fund are incident on the SCS. In addition to these projects, two World Bank–implemented projects that are incident on the SCS—the Guangdong Pearl River Delta Urban Environment project (GEF ID 2135) and the Livestock Waste Management in East Asia project (GEF ID 2138)—although not approved within the framework of the fund, were developed following similar principles. Together, these four projects are here considered part of the World Bank IF stream. The projects in this stream primarily focus on investments addressing (1) pollution from secondary cities and their industrial complexes, (2) agricultural pollution, and (3) private investment and PPPs for pollution reduction. Thus, this funding stream generally provides support for activities at the local and national scales.

UNDP SMALL GRANTS PROGRAMME FUNDING STREAM

GEF-funded activities supported through the SGP comprise the fourth main funding stream. The overarching feature of the activities undertaken as part of this corporate program is the small size of funding involved—$50,000 or less for each individual grant—and the focus on civil society, especially community, participation. This distinct modality of funding differentiates it from the three main funding streams discussed above.

In all, 150 SGP grants address international waters–related concerns and are incident on the SCS (both thematically and geographically). These projects account for $2.87 million in GEF investment. Of the seven countries covered by this evaluation, Thailand accounts for 74 percent of the total number of small grants and 51 percent of the GEF funding through these grants. Of the 150 grants, 76 (51 percent) primarily address land-based sources of marine pollution; 58 (39 percent) address coastal habitats and fisheries; and 6 (4 percent) address coastal habitats, fisheries, and marine pollution–related concerns.

OTHER PROJECTS FUNDING STREAM

Twenty-two GEF projects are not supported through any of the three main funding streams or the SGP stream. In all, these account for 41 percent of GEF SCS funding. All 8 of the global projects,

4 of the 10 regional projects, and 10 of 16 national projects fall in this group. Compared to the three main funding streams, where all the projects are supported by the international waters focal area, 10 of these 22 "other" projects are supported by other focal areas (table 3.1). These projects have been implemented by a wide array of GEF Agencies (table 3.2). Of the projects that are not linked to a specific funding stream, the most important is the World Bank–implemented Mekong River Basin Water Utilization Project (GEF ID 615), which alone accounts for $11.4 million in GEF funding and is regional in scale. Another important project is the Integrated Coastal Resources Management Project (ICRMP; GEF ID 1185) implemented through the Asian Development Bank (ADB) in the Philippines, to which the GEF has provided funding of about $9.1 million.

4. Regional Trends in the South China Sea

Encompassing roughly 3.5 million square kilometers, the SCS—here including the Gulf of Thailand—is the world's largest body of water after the five oceans. It is located in Southeast Asia and, for the purpose of this review, is defined as stretching in a southwest to northeast direction, with the southern border between South Sumatra and Kalimantan (Karimata Strait), and the northern border at the Strait of Taiwan between the northern tip of Taiwan and the Fujian coast of mainland China. Important sea currents and migratory species patterns link the SCS with other East Asian seas, as well as with the Pacific and Indian Oceans. The SCS is adjoined to the west by the Gulf of Thailand, to the south by the Java Sea, to the east and southeast by the Sulu-Sulawesi Seas, and to the northeast by the East China Sea. The SCS region has a population of approximately 350 million, with at least 270 million living in coastal areas (Wilkinson et al. 2005). More than 25 percent of the national population in seven of the nine SCS littoral countries live in low-elevation coastal urban zones; in all countries, at least 10 percent of the population lives in such areas (UN-HABITAT 2008).

The region is among the richest in the world in terms of marine resources and marine environmental value. Over 300 hard coral species and 3,365 fish species have been identified in biodiversity hotspots within the SCS (UNEP 2004a). Estimates suggest that approximately 2 million hectares of mangrove forest (12 percent of the world's total) are located in countries surrounding the SCS (Talaue-McManus 2000). Approximately 5 million tons of fish are captured in the region per year, or about 10 percent of the world's total catch (Heileman 2008). All these resources support the economies of nine countries bordering the sea, seven of which have unresolved claims over the extent of their territorial waters—and therefore over the extent of these resources over which they have sovereignty. These disagreements and sometimes competition over the use of resources have affected the degree to which they are managed sustainably.

Using the drivers-pressures-states-welfare-response framework (annex 3A), economic sectors linked with the environmental health of the SCS large marine ecosystem and the key factors affecting them were identified and analyzed through indicators to determine their trends over the long (ca. from 1950), medium (ca. from 1980), and short terms (ca. from 2000). Trends in the conditions of particular aspects of the ecosystem were also examined to assess how the environment may have been affected by changes in these sectors.

4.1 Trends in Marine-Related Economic Sectors

Except for marine capture fisheries, activities in economic sectors that are dependent on and affect

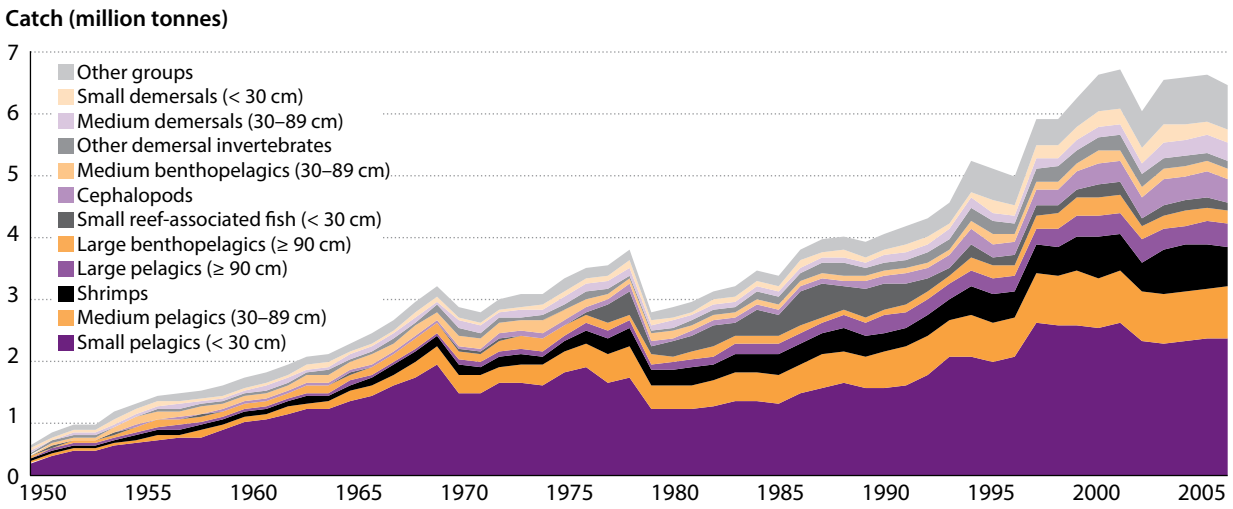
the health of the SCS have been steadily increasing, with some accelerating in the last decade.

Of the economic sectors that rely on the SCS to thrive, three are key to the region's economic progress: tourism, marine capture fisheries, and aquaculture. While these depend on the continuing health of the SCS to remain profitable, activities by these sectors also threaten to degrade the ecosystems that support them. Four other major economic sectors—shipping, agriculture, mining, and urban settlements—use the SCS as an ecological sink for the waste they produce. Shipping and offshore mining may also directly damage habitats and disrupt species migration paths through activities such as accidental grounding, collisions, spills, drilling, and construction of ports and pipelines. They may therefore also affect the productivity of economic sectors dependent on the SCS.

Well-protected coastlines and coral reefs attract tourists to the SCS every year. At the same time, tourist activity leads to pollution and destruction of coastal habitats to make way for tourist facilities, as well as to habitat degradation due to volumes of tourists greater than the environment's carrying capacity. All SCS countries have seen an overall steady increase in international tourist arrivals from 1995 to 2009, with some periods of temporary decline in 2002–05 and after 2008. These declines may be a result of the outbreak of the SARS epidemic (2002), the Indian Ocean tsunami (2004), and the more recent impacts of the global recession from 2008 onwards, when all countries—except Cambodia and Malaysia—experienced, at best, a leveling off in international visitor numbers.

Nearly 100 million people in Southeast Asia depend directly on fisheries or related service sectors. These include some 10 million people directly dependent on fisheries, roughly the same number of people in supporting industries, and the families of these workers (Williams and Staples 2010). To assess the trend in marine capture fisheries, the indicator used was landings of different ecological fishery groups. Figure 4.1 shows a series of peaks and steep declines in total landings from 1950 to 2006, which may indicate phases of development (increase), exploitation (stability), and overexploitation (decline) for the different

FIGURE 4.1 **Landings by Functional Group in the South China Sea Large Marine Ecosystem, 1950–2006**



SOURCE: Sea Around Us Project 2011.

fisheries. Thus, a downward trend in production could indicate a prior increased but unsustainable fishing effort.[1] "Other groups" begin a relatively sharp increase in 1986, perhaps indicating a shift to new types of fisheries. Species found near the bottom (i.e., benthopelagics, small demersals, and demersal invertebrates) appear to have experienced steep declines starting from the early 2000s, which is an indicator of declining fish stocks. As seen in the figure, however, the overall trend from 1950 to 2006 has been one of growth, indicating increasing fishing activity over the long term.

All countries during the 1950–85 period also showed a steady increase in marine and brackish aquaculture production, with sharp increases starting around 1985–90. China, Indonesia, Thailand, and Vietnam have seen the most significant increases. Thailand's production rose from 72,000 tons in 1987 to nearly 900,000 tons in 2009, while China saw production rise from over 700,000 tons in 1985 to 14.5 million tons in 2009. China is now the world's largest producer, accounting for 62 percent of global production (in terms of quantity) and 51 percent of global value. Indonesia, the Philippines, Thailand, and Vietnam are also among the top 15 aquaculture producers as of 2008 for quantity produced and growth rate (Gerber et al. 2010). It must be noted, however, that these figures represent production of the entire countries, not just production from waters within the SCS. While the greater portion of resources and ecological services used may not be in the SCS for countries such as China, Indonesia, and the Philippines, these trends do show that aquaculture as an economic sector has been growing overall in the region over the long term, particularly over the medium term.

[1] A downward trend in production for a particular species group would normally be the result of overexploitation, possibly combined with ecological shifts in overall species composition resulting from both fishing and other environmental and climate factors.

Though not always found in coastal areas, agricultural activity commonly affects coastal habitats in two ways: through siltation that smothers seagrass beds and coral reefs, and through fertilizer runoff that causes nutrient pollution. Agriculture may also cause habitat destruction where mangrove areas are cleared for conversion into coastal and deltaic (areas at the intersection of river and sea) rice farms.

Significant growth of the upland agriculture sector, as assessed through trends in meat and cereal production, is seen across all SCS countries from 1961 to 2006 except for Brunei Darussalam, Cambodia (for meat), and Malaysia (for cereal).[2] Meat and cereal production in China is one order of magnitude higher than in the other countries. China has seen the steadiest growth from 3 million tons of meat produced in 1961 to 70 million tons in 2007, with a peak of 72 million tons in 2006. Meat production in other countries, while rising, has been more unsteady with marked fluctuations in production over certain periods. The most significant growth in cereal production is seen in China, Indonesia, and Vietnam; with Indonesia's production rising from 66 million to 82 million tons in the 2006–09 period. The Philippines, Thailand, and Vietnam observed a leveling off in their production during this same period. China saw a marked reduction in cereal production from 1998 to 2003, with production falling from 458 million tons to 376 million tons. This was followed by a period of growth from 2003 to 2009 of up to 480 million tons—higher than the predecline production rate.

In the last several decades, agriculture in coastal areas has also become widespread. Large areas of coastal habitats around the SCS have been converted for rice farming, adding to losses in

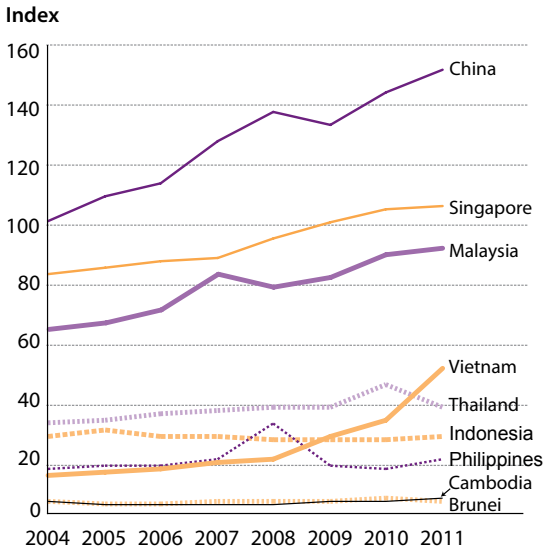
[2] Source: FAOSTAT, the corporate statistical database of the Food and Agriculture Organization of the United Nations (FAO).

ecological services that have been ongoing for centuries, and requiring agricultural technologies to overcome the challenges of water, salinity, and soil nutrition control before they can contribute to terrestrial food production. Estimates of such coastal habitat conversions are not readily available for analysis.

The SCS is especially significant in terms of its role in maritime transport, which increases the risk of collisions, oil spills, and the spread of invasive alien species through ballast water. Two proxies are used to determine trends in this sector: the merchant fleet by flag of registration, using vessel carrying capacity as a measure, and the Liner Shipping Connectivity Index. The index seeks to indicate the extent to which a country is integrated into the existing liner shipping network. The measure is based on containership deployment, container carrying capacity, number of shipping companies, liner services and vessels per company, and average and maximum vessel size. Higher index values indicate more active involvement in trade. Nearly all SCS countries have seen an increase in their index value over the period 2004–11, with Malaysia, Singapore, and China having index values exceeding 60, 80, and 100, respectively (figure 4.2). By way of comparison, the United Kingdom currently has an index value of 87.5, and the United States of 81.

A similar trend is seen in the deadweight tons capacity for each country's registered merchant fleet.[3] With the exception of two short periods, both China and Singapore have experienced continuing steep growths since 1980 in their deadweight tons carrying capacity. The Philippines, on the other hand, has been showing a decline since 1989.

FIGURE 4.2 **Liner Shipping Connectivity Index, 2004–11**



SOURCE: UNCTADstat (United Nations Conference on Trade and Development database), Liner Shipping Connectivity Index.

The SCS countries are significant in terms of their access to and production of numerous economically important minerals. Two types of mining affect environmental conditions in the SCS: land-based mining, which can cause siltation and heavy metal contamination; and offshore mining, which can destroy habitats and disrupt migration paths through drillings and installations, and cause oil leakages and spills. An increasing trend in land-based mining activity is approximated through increasing coal and gold production from 2005 to 2009 in key SCS countries.[4] China is the world's largest coal producer, with 3.05 billion tons in 2009, or nearly 45 percent of the total world production. China's output increased by 38 percent in the period 2005–09. While not comparable to the output of China, all other SCS countries with the exception of Thailand have experienced growth in the same period. Malaysia has seen the biggest

[3] UNCTADstat (United Nations Conference on Trade and Development database), Merchant Fleet by Flag of Registration and by Type of Ship.

[4] Coal and gold production data cited here are from BGS (2011).

increase in production in the region in 2008 and 2009, with an 83 percent increase in output.

Gold production is reported in over 90 countries worldwide but it is 7 countries, including China and Indonesia, that account for over 60 percent of world mine production. In 2007, China became the world's largest gold producer, and significant growth can be seen in recent years, most notably beginning in 2006. In 2009, China's production totaled 320 tons—a 12 percent increase from 2008, and a 25 percent increase from 2005. Indonesian production varied over the same period, predominantly due to fluctuating ore grades rather than an actual decrease in mining activity.

Increasing offshore mining is indicated by increasing oil supply, mainly in China. In 2010, there was a significant increase to 4.3 million barrels per day from 3.3 million barrels per day in 2000, primarily because of growth in new offshore production.[5] Indonesia has seen a noteworthy decline in its total oil supply over the 2000–10 period, and as of 2004 was no longer a net exporter of oil. It is, however, the sixth largest net exporter of natural gas and the second largest net exporter of coal. Brunei Darussalam, Malaysia, and Singapore have also seen declines while the Philippines, Thailand, and Vietnam have experienced slight increases in total supply over the same 10-year period, indicating new oil exploration ventures.

Disagreements over maritime territorial claims in the SCS are largely driven by the countries' intentions to explore for oil and gas fields in areas under dispute, indicating further growth to be expected in this sector in the future. Apart from the risk of oil spills and habitat destruction, drilling wastes from oil exploration that are often discharged into the sea contain oils, chemical-based drilling fluids, heavy metals, polycyclic aromatic hydrocarbons, and—occasionally—naturally occurring radioactive material that may bioaccumulate and contaminate the marine ecosystem (Kloff and Wicks 2004).

4.2 Trends in Environmental Pressures and Conditions

Resource overexploitation, land-based pollution, and habitat degradation and destruction have been steadily increasing since the 1950s, resulting in an overall continuous decline in environmental conditions in the SCS. Some recent improvement in coral cover has been seen in managed areas in the Philippines, Thailand, and Vietnam; the rate of mangrove deforestation is gradually slowing in some countries; and better coastal water quality was found locally in China due to improved pollution treatment technology.

Economic sectors linked to the health of the SCS tend to create environmental pressures, of which three types have been identified as the most critical in the SCS: resource overexploitation (particularly of fisheries), land-based pollution, and habitat degradation and destruction (Talaue-McManus 2000). These affect ecosystem health, as indicated by the status of coral reef, mangrove, and seagrass habitats; coastal water quality; and level of marine biodiversity.

Changes in fish catch per unit effort (CPUE) are routinely used as an indicator of fishing pressure on fish stocks. Specifically, a decreasing CPUE often signals overexploitation. Lymer, Funge-Smith, and Miao (2010) present data showing changes in CPUE per country and gear in the SCS region (table 4.1). Otter trawl CPUE has decreased by 21 to 58 percent for China (1970–2008), 8 percent for Thailand (1997–2002), and 43 percent for Indonesia (1990–2007). Purse seine CPUE has decreased by 35 percent, 25 percent, and 63 percent for Thailand (1997–2002), Malaysia (2000–08), and

[5] Energy data are from the U.S. Energy Information Administration's International Energy Statistics database.

TABLE 4.1 **Trends in Catch per Unit Effort/Catch Rates by Gear for Assessed Fisheries in the South China Sea (%)**

Fishing gear	China northern SCS 1970–2008	Vietnam demersal CPUE 1985–2003	Philippines Moro Gulf 2003–07	Thailand east coast 1997–2002	Malaysia peninsular east coast 2000–08	Indonesia FMA 711 1990–2007[a]
Overall	↓–43	↓–68				
Otter/pair trawl	↓–21 to –58			↓–8	↑+6	↓–43
Purse seine			↑+21	↓–35	↓–25	↓–63
Other seines					↓–3	
Drift/gill net			↓–47		↓–17	↓–36
Hand line			↑+48			

SOURCE: Adapted from Lymer, Funge-Smith, and Miao 2010, Table 7, p. 19.

NOTE: Increased (↑); decreased (↓) over time period indicated. Where data were available, a two-year average for the CPUE at the start and finish was used.

a. FMA 711 = Fisheries management area comprising Karimata Strait–Natuna Island–South China Sea.

Indonesia (1990–2007), respectively. Drift/gill net CPUE has decreased by 47 percent, 17 percent, and 36 percent for the Philippines (2003–07), Malaysia (2000–08), and Indonesia (1990–2007), respectively. The overall demersal (near-bottom) gear CPUE for Vietnam decreased 68 percent between 1985 and 2003, while the overall CPUE in China for the northern SCS decreased 43 percent between 1970 and 2008. Only three fisheries assessed experienced an increase in CPUE over the last decade. These are for purse seine (21 percent) and hand line (48 percent) in the Philippines (2003–07), and for otter trawl in Malaysia (6 percent between 2000 and 2008). Although the data are not comparable across different types of gear and time scales, it is apparent that the CPUE has greatly decreased for the majority of the countries and gears assessed over the last few decades.

According to the Sea Around Us Project (2011), overexploitation of stocks in the SCS large marine ecosystem began to occur in the late 1950s, and some stocks began to collapse in the late 1970s. The proportion of fish being caught from stocks already classified as "exploited" sharply increased from 30 percent around 1980 to almost 90 percent of all stocks in the SCS in 2000. Simultaneous assessments of coastal fisheries conducted in five of the seven SCS countries between 1998 and 2001 showed a regional trend of severe depletion, especially for demersal fisheries (i.e., those living or feeding near the sea floor), and biological and economic overfishing throughout the region (Silvestre et al. 2003; Stobutzki, Silvestre, and Garces 2006). These studies indicate that the majority of fishing fleets in the SCS have been either exploiting or overexploiting fish stocks over the long term, and especially over the medium term.

Indicators used to assess trends in land-based pollution are nitrogen fertilizer use and number of livestock in each SCS country by year. The trends therefore reflect only pollution from agriculture. Data for 2002–09 show that the use of nitrogen fertilizer during this period is clearly driven by China.[6] While use decreased from 2002 to 2004, it has steadily increased from 2004 to 2008, and more rapidly from 2008 to 2009. China and Indonesia have historically kept the largest number of livestock, followed

[6] FAOSTAT.

by Thailand, Vietnam, and the Philippines.[7] While there have been some smaller fluctuations in the number of livestock kept by countries in the SCS, the trend over both the medium and long term has been increasing, becoming relatively constant over the last decade. The long-term trend for nitrogen fertilizer use cannot be assessed, as no earlier regional data are available.

Trends in coastal water quality were assessed using biological oxygen demand and the frequency of harmful algal blooms as indicators. Biological oxygen demand is an indicator not only of agricultural pollution but also, more importantly, of sewage produced by coastal urban areas. Increasing trends in biological oxygen demand have been observed in all SCS countries from 1991 to 2007, with biological oxygen demand in China an order of magnitude greater than those of other countries. Note, however, that these figures are for the whole of China rather than just the SCS coast of the country. Thirteen eutrophication and hypoxia zones (water bodies with very high nutrient concentrations and very low or no dissolved oxygen) have been documented in the SCS since the 1980s (Diaz, Selman, and Chique 2011). Three are in the Philippines and two are in Vietnam. China and Thailand have six sites each, with the one at the Pearl River Estuary in China persisting since 2000. Additional hypoxic zones likely also form periodically in the region but are unrecorded, as consistent monitoring is not carried out in any of the countries.

By reducing nutrient inputs, eutrophication and hypoxia remediation and prevention are possible (GEF STAP 2011). This is well demonstrated by measurements taken at the Pearl River Estuary that show that, although the total volume of domestic and industrial wastewater discharged has more than doubled in the period from 1990 to 2003, the total volume of chemical oxygen demand has been reduced to less than a third over the same period because of the increasing percentage of wastewater treated and meeting discharge standards (Dai et al. 2006).[8] Though this shows an improvement in water quality in this specific estuary due to technological advances, there is still a concern that multiple substances—even if individually at low concentrations—will have cumulative effects, especially if the toxic products of these interactions have low degradation rates.

Like biological oxygen demand, harmful algal blooms are an indicator of nutrient pollution from both agriculture and coastal urbanization. Harmful algal blooms, however, may also be a response to a number of other disturbances where the ecosystem has been destabilized, such as overfishing, higher sea surface temperatures, or introductions from ballast water (Glibert et al. 2005). No data on harmful algal bloom events have been found at the regional level, nor for more specific areas, except in China. The frequency of harmful algal blooms in southern China appears to be increasing (Yan, Zhou, and Zou 2002), with over 100 events reported in the 1990s compared to just over 10 events in the 1970s.

The number of red tide events per year has been increasing over the last decade. It has been

[7] The animals include buffalo, cattle, pigs, goats, and sheep, because their numbers seem to be the greatest for most of the countries. Although this is a reasonable proxy, the impact of each of these animals is different. For example, a move from extensive farming with sheep and goats to intensive farming with cattle would be hidden by the data but would represent a hugely different pressure. Future analysis could also look at composition of animal stock (particularly for China).

[8] Chemical oxygen demand indicates only the volume of inorganic pollutants, usually from industrial effluents. Biological oxygen demand, which indicates the volume of organic pollutants, may still be increasing even when chemical oxygen demand is decreasing.

reported that from 2001 to 2009, the average annual occurrence of harmful algal blooms in Chinese coastal waters was 79, covering an area of approximately 16,300 square kilometers (CCICED 2010). It is estimated that recorded harmful algal bloom events and areas affected in the Chinese coastal waters are now 3.4 times as high as during the 1990s, and that an apparent trend of harmful algal bloom occurrences is spreading (CCICED 2010). Given the oceanographic characteristics of the area, the direct effects of pollution are manifested on the territorial waters of the countries where the pollution originates.

Marine and coastal habitat degradation and destruction trends were assessed by looking at the percentage change in agricultural land, which may result in both mangrove conversion and siltation of coral and seagrass habitats, and the extent of activity of bottom trawls and dredging gears, which affects coral and seagrass habitats.

From the 1960s until 2009, all countries saw an increase in the percentage of agricultural land, indicating increased pressure from siltation as well as agriculture-related pollution draining into the SCS.[9] Interestingly, however, most countries have also experienced both increases and decreases of various magnitudes in percentage of agricultural land. While an increase may mean that more mangrove areas are being converted into agricultural land, the opposite—i.e., a decreasing trend—may not indicate a decrease in habitat destruction; rather, it may indicate that more agricultural land is being converted into urban areas, thus substituting one form of environmental pressure with another.

All countries bordering the SCS have seen dramatic declines in mangrove cover over the past 30 years, though not entirely resulting from conversion to agricultural and urban land. The overall average percentage loss of mangrove cover from 1980 to 2005 for all nine countries bordering the SCS was about 28 percent (FAO 2007), with much of the decline occurring in the 1980s and 1990s. The most extensive mangrove cover, as well as the most extensive decline, was seen in Indonesia. Indonesian mangroves in the SCS region are largely confined to the western shores of Kalimantan and the south-eastern part of Sumatra. In Kalimantan, 90 percent of mangroves are currently allocated for timber concessions (Spalding, Kainuma, and Collins 2010). Malaysia has the second largest extent of mangrove cover among the nine countries. Most of the Malaysian mangroves occur in the states of Sarawak (29 percent) and Sabah (59 percent) on the island of Borneo. While the mangroves of Sarawak all border the SCS, those in Sabah mostly occur outside the SCS area, on the northeastern coast of Borneo. Loss in mangrove cover in Malaysia from 1980 to 2005 was about 18 percent (FAO 2007). Although estimates vary, it seems likely that 50 percent of Thailand's mangroves have been lost since the 1960s (Spalding, Kainuma, and Collins 2010).

All mangroves in Vietnam occur along the coast of the SCS. The majority of mangroves in Vietnam occur at the Mekong Delta and on the Ca Mau Peninsula as well as the Song Hong River Delta to the north. While considerable damage to mangroves has been caused both through the spread of chemical agents (during the Vietnam War) and through conversion for aquaculture, a mangrove reforestation program combined with coastline accretion have most likely led to no annual net losses in mangroves in the country (Spalding, Kainuma, and Collins 2010). Mangroves in the Philippines bordering the SCS are largely depleted, with 99.8 percent of the mangroves present on the island of Luzon in the 1950s now having disappeared. Rates of mangrove deforestation have nonetheless slightly declined in recent years (Spalding, Kainuma, and Collins 2010).

[9] FAOSTAT.

Burke et al. (2011) found that the most prevalent threat to coral reefs is overfishing, most particularly as connected to destructive fishing practices. Apart from this, most reefs in the region are faced with medium to very high threat levels from local activities such as coastal development, watershed-based pollution, and marine-based pollution and damage (Burke et al. 2011). Using socioeconomic and governance variables, the researchers determined that countries in the SCS have low to very low capacity to adapt to reef degradation and loss, especially on the western part of the large marine ecosystem.

Tun et al. (2008) found that there has been a general decline in the Southeast Asia region in the number of sites with previously "very good" or "good" coral cover, and a corresponding increase in sites with "fair" coral cover between 1993 and 2004. During this period, there was a substantial decline in reef conditions in the Philippines, Singapore, Thailand, and Vietnam.

A review by Bruno and Selig (2007) of reef monitoring data across the broader Indo-Pacific region shows that coral reef decline has been occurring since the 1960s, with the period 1997–2004 showing a decline of as much as 25 percent for the SCS countries. A severe El Niño–Southern Oscillation event in 1997–98 resulted in high sea surface temperature anomalies linked to coral bleaching, damaging an estimated 18 percent of the reefs in the region (Burke, Selig, and Spalding 2002). Between 2004 and 2008, there was again a decline in reef conditions in Indonesia and Malaysia. In the same period, improvements were observed in the Philippines, Thailand, and Vietnam.

As with coral and mangroves, seagrass distribution and diversity are particularly high in the SCS. Worldwide, there are approximately 60 recorded species of seagrass. Of these, approximately 18 are found in the shallow coastal waters of the SCS (UNEP 2004b), some of which are wide ranging and others endemic to a particular country. Seagrass losses of up to 50 percent have been reported for particular countries in the SCS (table 4.2). There is very little information on the extent of seagrass cover and loss for Cambodia, China, and Malaysia. Seagrass beds in this region are exposed to a number of threats, including coastal development, eutrophication, fishing by specific gears such as pushnets and shallow water trawls, siltation, pollution, landfill operations, loss of coral reefs and mangroves, urban expansion, substrate disturbance, industrial and agricultural runoff, and wastewater and sewage discharges—all predominantly due to an increasing coastal population (UNEP 2004b).

The destruction and degradation of benthic (sea floor) habitats such as coral reefs and seagrass beds can partly be attributed to destructive fishing practices such as trawling in shallow areas. Data on landings from bottom trawling from the 1950s show a sharp increase from the early 1980s until about 2000, when a steep decline begins (Sea Around Us Project 2011). Given such large landings over a relatively short period of time, and given the well-established negative impacts of bottom trawling on the benthic habitat and fish stocks that

TABLE 4.2 **Seagrass Area Losses in Countries in the South China Sea**

Country	Seagrass area (hectares)	Number of species recorded	Area lost (%)
Cambodia	25,240	8	—
China	1,960	8	—
Indonesia	555	12	30–40
Malaysia	164	11	—
Philippines	3,295	10	30–50
Thailand	1,473	12	20–30
Vietnam	4,200	14	40–50

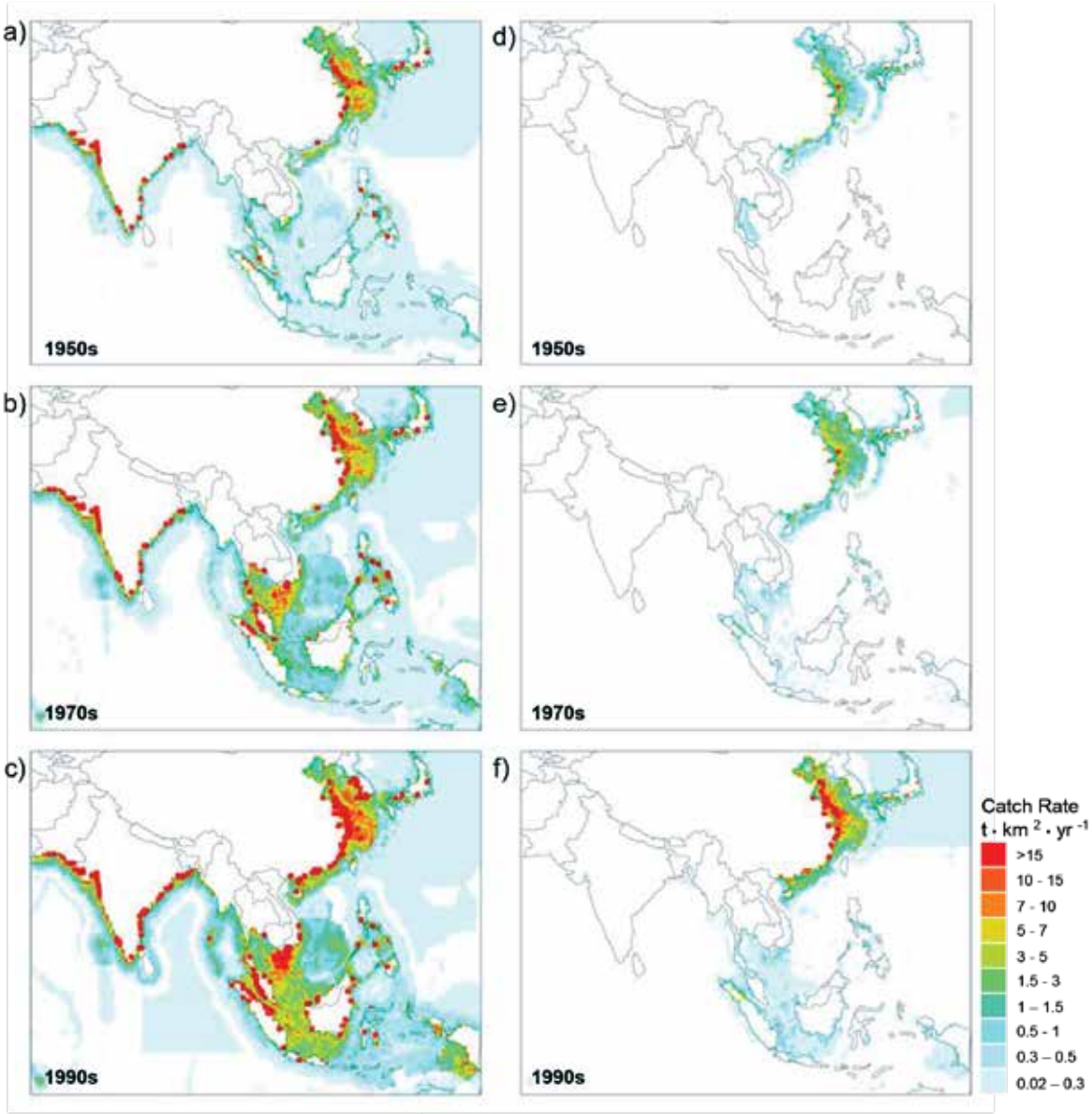
SOURCE: UNEP 2004b.

NOTE: — = not available.

rely on this habitat through their various life cycles (for a review, see, e.g., Jones 1992), it comes as little surprise that landings from bottom trawling have been decreasing over the last decade.

Figure 4.3 a–c shows a spatial distribution of catch rates by bottom trawlers in the 1950s, 1970s, and 1990s. Both catch rates and their spatial distribution have drastically increased over these 20-year periods. Figure 4.3 d–f shows a spatial distribution of catch rates by dredgers over the same periods. Although dredging is not as widespread and does not have such high catch rates as bottom trawling in the SCS, its spatial distribution has greatly expanded since the 1950s, subjecting more seagrass and coral reef habitats to threats of

FIGURE 4.3 **Catch Rates Associated with Bottom Trawl and Dredge Gears**



SOURCE: Watson, Revenga, and Kura 2006.

destruction. After intensive bottom trawling and dredging, it may take several years or even decades (depending on the depth and local conditions) for the benthic habitat to recover sufficiently to support relatively healthy fish populations (Jones 1992; Tuck et al. 1998). Again, while the results of these studies that show increasing activity of bottom trawlers are based on models, other direct assessments (e.g., Stobutzki et al. 2006) show that this is indeed the case in the region, except in the Philippines (Cruz-Trinidad 2003).

Coastal and nearshore ecosystems have undergone and continue to undergo rapid conversion for many uses, including for terrestrial farming, aquaculture (fish and shrimp ponds, seaweed farming, and cage culture), urban land use, ports, and tourism. Consolidated data are not available to track the loss and conversion of natural habitat and hence indicate the extent of biodiversity loss and threat. While there are no data available showing changes in marine biodiversity in the SCS over time, the International Union for Conservation of Nature's (IUCN's) Red List of Threatened Species shows that there are 258 vulnerable species, 36 endangered species, and 10 critically endangered species in the Pacific West Central area.[10] Vulnerable, endangered, and critically endangered species are considered to be facing high risk, very high risk, and extremely high risk of extinction in the wild, respectively (IUCN 2011). Given the increasing environmental pressures as shown above, an increase in the number of endangered species is likely.

4.3 Trends in Environmental Drivers

Although engagement in environmental initiatives appears to be increasing to some extent, the main drivers of environmental decline continue to increase, bringing into question the viability of economic sectors dependent on the health of the SCS.

Four main drivers that likely influence the extent of environmental pressures in the SCS are the following:

- Population growth, migration, and poverty
- Economic growth, demand, and export
- Political factors
- Environmental engagement—i.e., awareness and participation in environmental issues and initiatives by the public at large and the economic sector in particular, including compliance with environmental regulations

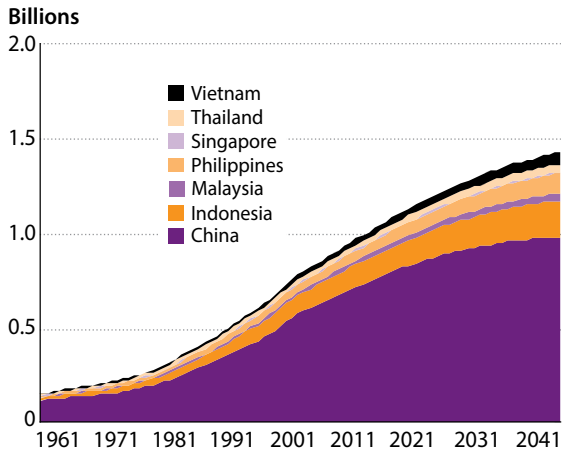
Total population in the countries surrounding the SCS has been increasing steadily since the 1960s.[11] In 2011, the total population in the region reached an estimated 1.92 billion, with 1.38 billion living in China and 0.54 billion living in the other countries. Although the total urban population in the SCS countries has been increasing steadily since the 1960s, there is a noticeable acceleration in the rate of this increase since the mid-1990s, particularly in China, Indonesia, and the Philippines. The estimated total urban population living in this region was nearly 156 million in 1961; it was nearly 900 million in 2011, which is almost a fivefold increase in 50 years (figure 4.4).

Economic growth has also increased over the last 50 years, along with a sharply increasing demand for seafood in the last 30 years. In all countries in the SCS region, the gross domestic product (GDP) growth rate, which has been used traditionally to measure how fast an economy is growing, experienced swings but mostly remained positive—meaning that economies were growing sometimes

[10] IUCN Red List of Threatened Species, accessed October 2011.

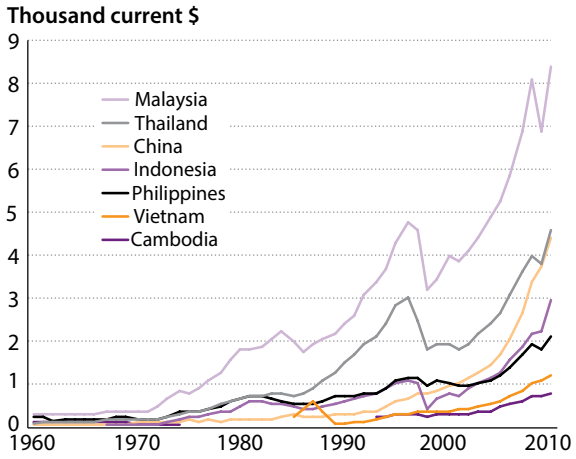
[11] FAOSTAT.

FIGURE 4.4 **Total Urban Population**



SOURCE: FAOSTAT.

FIGURE 4.5 **Gross Domestic Product per Capita**



SOURCE: World Bank, World Development Indicators.

at rates as high as 14.5 percent annually. Some periods were marked by a negative GDP, most notably in the late 1990s. Over the last decade, the economies of most countries in the region have been growing at around 5–12 percent until 2009, when some of the countries experienced small negative growth (around 2 percent). In 2010, all economies in the region again grew at rates between 6 percent and 15 percent (figure 4.5).

Coupled with population and economic growth is the increase in fish and seafood demand as shown by trends in consumption and export. The steep increase in fish and seafood consumption since the 1980s has been dominated by China, followed by Indonesia, Thailand, the Philippines, and Vietnam.[12] All countries show a very similar trend, with almost constant or slightly increasing fish and seafood consumption in the 1960s through the end of the 1970s. In the 1980s and mid-1990s, fish and seafood consumption rose sharply from a regional total of about 12 million tons to more than 50 million tons.[13] Over the last decade, fish and seafood consumption have been fluctuating, but overall, the trend in the region has been increasing. Fish and seafood exports, on the other hand, have risen sharply over the last decade and reached 13.6 million tons in 2007. Again, exports were dominated by China, followed by Thailand, Indonesia, and—more recently—Vietnam.

A study by Du et al. (2004) suggests that the structure of the Chinese diet is shifting away from a high-carbohydrate diet to a high-meat diet as a response to an increase in income—with detrimental health effects. An increasingly meat-based diet, which is also increasingly raised in part on grain, can have major environmental consequences ranging from pollution to rising pressure on water resources (see, e.g., Myers and Kent 2003). Meat exportation in the region is overshadowed by the amount exported from China, with other countries playing a very minor role. Meat exports have been less steady than fish and seafood exports, with sharp

[12] China's increased aquatic food consumption is dominated by freshwater fish.

[13] FAOSTAT.

fluctuations, especially over the last two decades. In 2007, meat exports had another decline. While the overall trend from the 1960s until the late 1990s was an increase, the last 10 years have seen a slightly decreasing overall trend in the export of meat by China.

It was difficult to find quantifiable indicators for trends in political factors and environmental engagement. Certain qualitative indicators do exist in this regard, notably the strengthening of environmental regulations and institutions over the last 15 years in China, Indonesia, the Philippines, Thailand, and Vietnam (Chua, Bernad, and San 2003; PEMSEA 2005; UNEP 2007c). Moreover, the media attention given to environmental disasters has brought environmental issues to the public eye, thus pressing governments to act (Mee 2010). These factors indicate increasing environmental engagement in the SCS region.

In the face of these steadily increasing drivers, it is no surprise that the growth of economic sectors linked to the health of the SCS has accelerated in the last decade. The resulting decline in environmental conditions particularly threatens the viability of tourism, marine capture fisheries, and aquaculture, as these sectors rely on equally viable coastal habitats and fish stocks to survive. The preceding analysis shows that landings in marine capture fisheries have declined even as fishing effort continues to increase and fishing fleets expand their areas of exploitation. The sharp growth in aquaculture production may be an indication of the growing need to augment supply from marine capture fisheries because of declining fish stocks. Currently, aquaculture and tourism continue to grow, but declining coastal water quality will eventually discourage tourist arrivals to coastal areas, and may disrupt nutrient cycles to an extent that can no longer support aquaculture under current technology (Chua and Paw 1989; Liu et al. 2007).

5. Regional Context of GEF Support

5.1 Early Environmental Initiatives and Actor Interactions

Littoral countries in the SCS engage in a complex network of intergovernmental institutions, through which they have adopted an array of regional instruments pertaining to the region's critical environmental concerns.

Initiatives for the transboundary governance of maritime-related concerns began to take shape in the region in the 1960s through the UN Economic and Social Commission for Asia and the Pacific. The commission, which is the UN Secretariat's arm in the Asia-Pacific region, is significant for initiating the creation of what is now the Mekong River Commission (MRC), the Committee for Coordination of Joint Prospecting for Mineral Resources in Asian Offshore Areas. The commission was also instrumental in setting up other institutions such as the ADB, which is a financial institution that now has a broader mandate beyond—but still relevant to—environmental concerns in the SCS. Activities revolved around flood control and disaster management, transport, and resource exploration. Fisheries-related technical programs also commenced in the 1960s, such as the Southeast Asian Fisheries Development Center (SEAFDEC).

It was not until after the 1972 Stockholm Conference on the Human Environment that a series of plans and strategies toward regional environmental management was spurred through initiatives by UNEP and the Association of Southeast Asian Nations (ASEAN). Early coastal and marine initiatives were concerned with building the capacities of countries to assess coastal resources and to exchange information through networks. These addressed mostly topics related to pollution, which was common to regional initiatives in other parts of the world at the time. ASEAN, founded in 1967, had its first initiative for environmental cooperation in the form of a Subregional Environment Programme in 1977 in cooperation with UNEP. This program became the framework for the priorities, specific projects, and activities for regional cooperation, and identified the marine environment as one of its priorities (ASEAN 2009a; Kato and Takashahi 2001).

Also in 1977, UNEP, through its Regional Seas Programme, started the first program for the regional management of the EAS at the request of the countries that first formed ASEAN—Indonesia, Malaysia, the Philippines, Singapore, and Thailand. This cooperation led to the Action Plan for the Protection and Development of the Marine Environment and Coastal Areas of the East Asian Seas Region (the EAS Action Plan), which was mainly formulated by UNEP with assistance from other UN agencies, and adopted in 1981 by the participating countries. The plan was coordinated by UNEP but mostly implemented at the country level. In 1981, the member countries constituted

the Coordinating Body on the Seas of East Asia (COBSEA) to assist countries in plan implementation. COBSEA expanded by 1994 to include Australia, Cambodia, China, the Republic of Korea, and Vietnam.[1] Among the aims of the EAS Action Plan were the implementation of a regional marine science program to assess the status of the coastal and marine environment and the impacts of pollution on coastal habitats, and the development of a training and support program to combat pollution (UNEP 1983). An evaluation of the plan reports that projects tended to focus on country-level studies, training, and other forms of capacity development. But since government offices to which activities were assigned had no experience or regional networks, activities rarely reached a regional scale (UNEP 1987). COBSEA has since continued to coordinate the implementation of a series of long-term strategies related to regional marine and coastal issues, such as pollution monitoring and MPA networks.

Besides initiating instruments for regional environmental management, UNEP launched a global program of action to address land-based sources of pollution, which was implemented at the regional level through its Regional Seas Programme. Other UN agencies that have had some regional initiatives in the coastal and marine field—especially from the late 1970s to early 1990s—were UNDP in environmental education, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) Intergovernmental Oceanographic Commission in research, the International Maritime Organization (IMO) in marine pollution, and the Food and Agriculture Organization of the United Nations (FAO) in fisheries. Also since 1975, under the auspices of the Intergovernmental Oceanographic Commission, IMO, UNEP, and UNDP have been conducting marine pollution research and monitoring in the Malacca Straits and discussing how to address security and environmental concerns. Also with UNESCO, FAO and UNEP were investigating the impacts of pollution on fisheries and coastal habitats.

To complement these developments, ASEAN began engaging with countries outside the region through economic cooperation programs with science and technology components. These components introduced initiatives related to ICM, fisheries, and coastal pollution. The series of projects under the three-phase ASEAN-Australia Cooperation Program (1985–99), for example, aimed at providing technology—and training country personnel to use this technology—for conducting baseline assessments of coastal resources (AADCP 2007; AusAID 2004). Methods developed under these projects are now used globally through habitat monitoring networks (Williams 2007). Scientists trained through the program have gone on to become regional experts and leaders, further developing research capacities in their respective countries. The two-phase ASEAN-Canada Cooperative Programme on Marine Sciences (1984–99) focused on establishing pollution and marine water quality monitoring standards, including the formation of a red tide network that enhanced cooperation among scientists in governments and universities in the region (ASEAN 2009b; Chansang 2005; SIDSNET 2009).

The ASEAN-US Cooperative Program on Marine Sciences: Coastal Resources Management Project (1986–92) is notable for introducing ICM in the region (Chua 2006). The project aimed to address both pollution and habitat degradation, and had a regional steering committee; it resulted in the development of coastal management plans only at the site level. Another ASEAN-US initiative, the Environmental Improvement Project (1992–96), intended to introduce waste management and cleaner production in private firms using a regional approach. The

[1] COBSEA, accessed December 16, 2010.

project included demonstration, awareness-building, training, and information networking components but lacked a national strategy component to address the conditions needed to achieve widespread adoption and change (Stevenson 2004).

The first ASEAN Strategic Plan of Action on the Environment (1994–98), a response to the 1992 Rio Earth Summit, aimed, among other things, to increase government–private sector interactions, the capacity of countries to implement international environmental agreements, control of transboundary hazardous wastes, and coordination of regional environmental programs. The ASEAN Working Group on the Coastal and Marine Environment was created to take the lead in formulating plans and activities related to the coastal and marine environment, for approval by the ministerial ASEAN Senior Officials on the Environment.

An action plan for transboundary marine concerns was agreed upon in 1995 for ship-borne pollution and movement of hazardous wastes. National focal points were identified for each concern; however, the extent of the plan's implementation is unclear. Subsequent plans mention the need for a regional framework for coastal and marine management. The Southeast Asia START Regional Center was commissioned in 2002 to develop a draft framework for a regional action plan based on past bilateral programs, but no final plan has been developed so far. In the same year, the European Union–funded ASEAN Center for Biodiversity conducted a gap analysis in preparation for the establishment of a network of ASEAN MPAs. Criteria for MPAs and marine heritage parks were later approved by the ASEAN Senior Officials on the Environment (C. H. Nguyen 2009). ASEAN has not implemented any major coastal and marine-related programs since.

Although much wider in geographic scope and clearly economic in focus, the Asia-Pacific Economic Cooperation, which started with 12 member countries and has now expanded to 21, also created specific working groups in 1990 to formulate coastal and marine initiatives that include the SCS. The Marine Resource Conservation Working Group and Fisheries Working Group have been merged as the Ocean and Fisheries Working Group, bringing together the conservation and sustainable resource use objectives of the two groups. The Asia-Pacific Economic Cooperation has also developed action plans and agendas specific to the marine environment, beginning with the Action Plan for Sustainability of the Marine Environment in 1997; the latest, the Paracas Action Agenda, was adopted in 2010.

The Economic and Social Commission for Asia and the Pacific began to focus on the environment and sustainable development after the 1972 Stockholm Conference. It initiated the Ministerial Conference on Environment and Development in cooperation with ADB, UNDP, and UNEP in 1985, and implemented a specific Regional Action Programme on the Management of Coastal Zones and Nonliving Marine Resources Development in Asia and the Pacific in 1997 with funding support from the Netherlands government.

Other key environment-related intergovernmental organizations in the region are concerned primarily with the fisheries sector. The most prominent of these have been the FAO's Asia-Pacific Fisheries Council and Network of Aquaculture Centres in Asia-Pacific, and SEAFDEC; the latter was established by the South East Asian Countries in 1967 with the support and membership of Japan. The FAO-initiated bodies provide mechanisms for regional policy development and support, while SEAFDEC provides capacity-building and technology support through research in cooperation with ASEAN. In 1998, ASEAN and SEAFDEC established a formal partnership on fisheries and aquaculture technical cooperation.

Different actors have taken on different degrees of prominence at the subregional level, specifically in the Gulf of Thailand and the Mekong River Basin. Of the two subregions, the Mekong River Basin has had a long-standing governing body in the form of the MRC. A wide range of donor agencies—including the GEF—nongovernmental organizations (NGOs), and private companies have been channeling assistance through the MRC since it expanded its mandate beyond research in 1995. No transboundary governance mechanism has ever been successfully established in the Gulf of Thailand. The GEF, however, has facilitated the signing of two transboundary arrangements for specific concerns. SEAFDEC has also organized a series of meetings with the littoral states since 2008 to discuss common guidelines for fisheries management.

Disagreements among littoral countries over maritime domains and resources have greatly restricted the area and terms in which most states are willing to engage in cooperation on marine environmental governance in the SCS.

Efforts to protect the rich marine resources of the SCS are complicated by the area's long-term maritime border disagreements, as seven of the nine countries bordering the sea have marine territorial claims that overlap under the United Nations Convention on the Law of the Sea provision for delineating Exclusive Economic Zones[2] (Shen 2002; U.S. EIA 2008). Efforts at collaboration have been made under Part IX, Section 2, of the United Nations Convention on the Law of Sea, which exhorts cooperation among nations bordering the same enclosed or semi-enclosed seas in the areas of scientific research and management of marine resources (Austin 1998; Von Hoesslin 2005). The situation, however, remains volatile (Emmers 2007). Schofield et al. (2011) report that despite improving relations across the region, long-standing tensions remain over contested islands and maritime jurisdiction. These tensions have led to incidents that threaten regional stability—even to the progress of ASEAN as a regional political body[3]—and can undermine progress in other marine governance domains.

Jurisdictional disagreements can undermine political and governance effectiveness and act as a "speed hump" to negotiations on issues such as fisheries management that intrinsically relate to boundary delimitation (Rosenberg 2005; Wang 2001; Yu and Mu 2006). With populations growing, and industrialization and urbanization rapidly increasing within SCS countries, this is increasingly associated with rising demands for energy resources. Where overlapping maritime claims and energy concerns exist, uncertainty and political deadlock can create instability and complicate progress in sustainable marine governance. As most of the SCS is under some form of territorial dispute, only the management of the more central coastal zones is not affected by maritime disputes, leaving a vast area of the SCS out of reach of most management initiatives.[4]

Jurisdictional disagreements among most of the participating countries within the SCS is an important constraint that places limits on the themes that are addressed, the geographical locations in which actions can take place, and the type of

[2] These overlapping claims are Brunei Darussalam, China, Malaysia, the Philippines, and Vietnam over different parts of the Spratly Islands; China and Vietnam over the Paracel Islands; and Cambodia, Malaysia, Thailand, and Vietnam over various islands in the Gulf of Thailand.

[3] As the mid-2012 disputes in the SCS have shown, ASEAN's emerging solidarity can be weakened through the intervention of bilateral relationships, even concerning parties outside ASEAN.

[4] The Chinese newspaper *Global Times* estimates that of the 700,000 square kilometers of the SCS, the area under dispute covers about 500,000 square kilometers ("South China Sea Conflict," accessed July 12, 2012).

instruments of cooperation that are used. ASEAN has played a role in trying to come to a resolution by signing a Declaration on the Conduct of Parties in the SCS with China in 2002. Despite the cultural differences, the Southeast Asian countries (to which China does not belong) have defined a collective identity in resolving conflict that they have called "the ASEAN way"—noninterference in internal affairs, peaceful resolution of conflicts, and nonuse of force. This approach developed in coping with the disagreements in maritime and terrestrial claims and a history of tensions among the ASEAN countries that emerged after their independence from colonial forces (Goh 2003; Severino 2001).

Based on consultation and consensus, the ASEAN way favors a step-by-step approach as opposed to the adoption of legally binding commitments. The ASEAN way is clearly reflected in the plans and strategies adopted by regional organizations, which tend to be voluntary and focus only on some of the concerns that affect the SCS. Although the conflicting claims and the ASEAN way do not always dissuade the participating countries from working in a coordinated manner, the result is close scrutiny of proposed initiatives by the participating countries to assess how they might affect their respective claims. Thus, although the ASEAN way provides a means for regional issues to move forward, it may also serve to slow action on regional environmental issues, as countries will be hesitant to introduce change that may run counter to the interests of another Southeast Asian country (Koh and Robinson 2002).

5.2 Country Approaches to Regional Environmental Concerns

In-place regional multilateral instruments are mostly nonbinding and are in the form of declarations, strategies, and action plans. When territorial disagreements and transboundary resources are at stake, countries have preferred to work through legally binding instruments that are primarily economic in intent and bilateral in nature. The MRC is the exception.

East Asia is one of the few regions in the world that does not have a legally binding convention for the management of its regional seas. Instead, the littoral countries of the SCS are engaged in an array of global, regional, and bilateral instruments. Legally binding agreements in the SCS are in the form of global conventions or bilateral agreements. As with regional intergovernmental organizations, these instruments have developed gradually over the last three decades in response to emerging regional environmental pressures. These have also come into being in the context of country commitments to global environmental governance processes, especially the United Nations Conference on Sustainable Development (Stockholm, Rio, etc.).

Twenty-three global maritime-related instruments in which at least one of the SCS countries participates were found to be geographically relevant to the SCS large marine ecosystem. The great majority of these instruments are legally binding conventions concerned with marine pollution and biodiversity (table 5.1). Nevertheless, some treaties, such as the United Nations Convention on the Law of the Sea and the Convention on Biological Diversity, do not provide detailed legally binding

TABLE 5.1 **Primary Concern of Global Maritime-Related Instruments in Which at Least Two SCS Countries Participate**

Primary concern	Number of instruments
Marine pollution	10
Biodiversity	6
Fisheries	2
Land-based pollution	2
Maritime territory	1
Other	2

standards for littoral countries to address the problems in the SCS. Fisheries, land-based pollution, and maritime territory have the least number of global instruments. These concerns are addressed at context-specific scales.

Bilateral instruments within the SCS generally involve China, Malaysia, and Vietnam as one or both of the parties, indicating these countries' preferred mode of dealing with shared natural resources. Many of these instruments are concerned with fisheries and technical cooperation, and are primarily for mutual economic benefit rather than oriented toward environmental management. Malaysia and the Philippines have forged the only environmental management–oriented bilateral agreement in the region with the Turtle Islands Heritage Protected Area, which is in the adjacent Sulu Sea. China tends to form bilateral cooperations on broad environmentally related concerns only with countries outside the region.

Multilateral instruments in the SCS assume various forms ranging from declarations of intent, to shared action plans and strategies requiring budgetary commitments, to legally binding agreements or cooperation arrangements. Twelve of the multilateral regional instruments covering the SCS involve non-SCS countries, which means that commitments are shared with countries in the greater East Asia or Asia-Pacific region; these were often partly initiated by the outside parties.

Twenty-eight multilateral and 14 bilateral maritime-related regional instruments were identified, with 27 pertaining to coastal management rather than resource exploration and exploitation (see annex 4B, tables 20 and 21). An examination of these instruments reveals that the majority of environment-focused instruments emerged only in the last decade, indicating a progressive mainstreaming of environmental issues among regional priorities. Twelve of the instruments were concerned with fisheries, 14 with pollution, and 15 with biodiversity or habitats (table 5.2). Of the 27, 14 multilateral and 4 bilateral instruments were found to be viable frameworks for action in the form of an action plan, strategy, or other stronger commitment (see annex 4B, tables 20 and 21). Two have not been adopted for implementation because of insufficient country support. Except for the bilateral agreements, none are legally binding.[5]

TABLE 5.2 **Regional Bilateral and Multilateral Instruments Relevant to the SCS and Its Transboundary Environmental Concerns**

Form of commitment	Fisheries	Pollution	Biodiversity/ habitats
Declarations, resolutions, statements	3	5	5
Action plans, strategies, memorandums of understanding	7	8	8
Agreements, cooperations, memorandums of agreement	2	1	2
Total	12	14	15

Regional environmental initiatives of intergovernmental organizations have been mostly financed by donors. Implementation support has been provided by networks of civil society organizations and government.

BILATERAL FINANCING

Many bilateral donors, such as Australia, Canada, Denmark, Germany, Sweden, and the United States, have a history of supporting coastal

[5] Of all the UNEP regional seas areas, only three do not have a legally binding convention—the EAS, which includes the SCS; the North West Pacific Seas; and the South Asian Seas, all of which are in Asia.

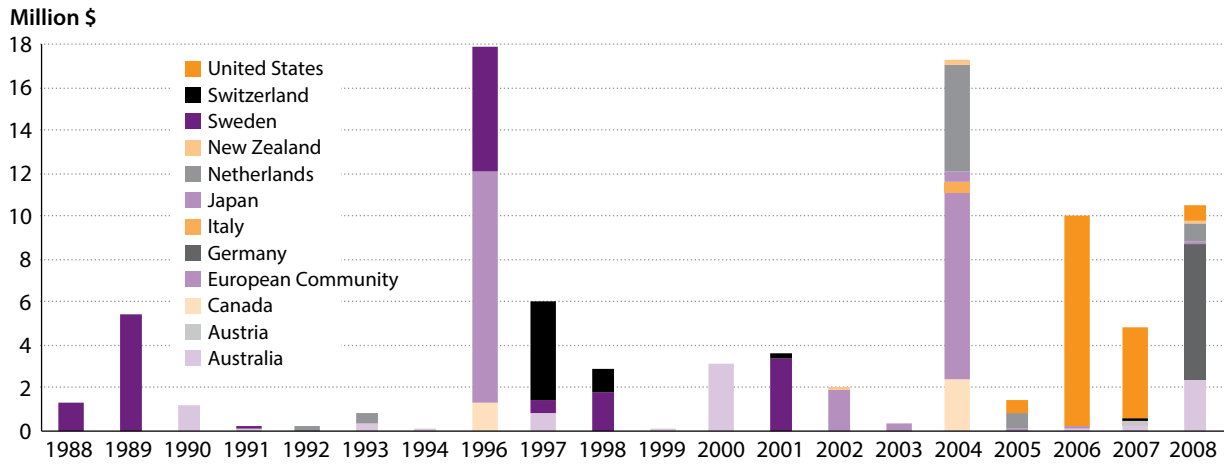
and marine initiatives in the region. While the majority of this work has been through bilateral programs with individual countries (Chansang 2005; Nasuchon 2009; PEMSEA 2004), the projects developed from regional plans and strategies have been financed mostly by bilateral donors. As shown earlier, these undertakings have involved support for scientific networks and discussion forums, capacity building for research, and guidelines for marine water quality and biodiversity conservation. Bilateral donor support has typically been through projects lasting about five years, and extending over multiple phases (Chansang 2005; Rijsberman 1998). Some intergovernmental organizations rely on bilateral donor support for their core operational programs such as COBSEA and MRC (see annex 4A, table 17). An analysis of regional environmental funding shows that bilateral donor support for regional initiatives in East Asia peaked around 1996 and 2004 (figure 5.1). Again, this indicates the influence of the United Nations Conference on Sustainable Development processes in driving environmental initiatives in the region.

MULTILATERAL FINANCING

Non-GEF multilateral support for regional environmental concerns in the SCS has come mainly from three sources: ADB, UNEP, and the World Bank. UNEP's support has been in the form of grants from its own resources; support from the banks has been mostly in the form of loans. UNEP has channeled most of its support through COBSEA, while the banks have tended to have bilateral projects rather than regional ones because they structure their lending along country rather than regional lines. Earlier initiatives by the banks related to environmental management were long-term programs supporting subsistence fisheries with the goal of poverty alleviation. More recently, their efforts have increasingly taken the form of water and sanitation projects (ADB 1994; IEG 2010).

UNEP has provided a substantial proportion of the funding for implementation of the EAS Action Plan since it was adopted in 1981. This financing came originally from UNEP directly to COBSEA, which

FIGURE 5.1 **Bilateral Support in East Asia for Regional Marine and Coastal Initiatives, 1988–2008**



SOURCE: AidData.

NOTE: No data were reported for 1995.

is staffed by UNEP. Subsequently, funding was channeled through the EAS Trust Fund, which was set up when COBSEA was created. Other donors, such as the Swedish International Development Agency, have also contributed to the Trust Fund for specific projects. From an annual contribution of $86,000 from the four founding COBSEA members, the annual pledges to the Trust Fund now total $170,000, although country payments have been irregular. COBSEA core costs are calculated at $400,000 annually. Since 2000, UNEP has gradually reduced its contributions, stopping them entirely in 2005. COBSEA's costs have subsequently been met largely by the Trust Fund, which is expected to be exhausted by 2012 (UNEP 2008b).

Since 1990, the World Bank has financed a total of 21 projects that are both relevant to international waters–related transboundary concerns and incident on the SCS and the Gulf of Thailand. These projects account for loans totaling $2.52 billion. Of the 21 projects, 7 are also supported by the GEF with grants totaling $44.5 million. Only two of the projects are regional in scope; both of these are GEF-supported.

ADB, on the other hand, has historically taken a more regional approach, working closely with ASEAN on transboundary pollution, implementing a project with the Swedish International Development Agency in the SCS to build capacities in countries that were at that time not part of ASEAN, and initiating the Greater Mekong Subregion program and Southeast Asia Water partnership (ADB 1994; T. D. Nguyen 1999; Torell 1991). From 1990 to 2011, ADB implemented 47 projects for $104.4 million that addressed international waters–related concerns and were fully or partially incident on the SCS.[6] Of the 47 projects, 11 were regional, all of which were supported through ADB-administered grants totaling $14 million. Concerns addressed by regional projects include marine pollution (seven projects), fisheries (five projects), coral reefs (three projects), and seagrass (one project).

SUPPORT FROM CIVIL SOCIETY NETWORKS

Supporting and complementing the work of regional intergovernmental organizations, civil society organizations and networks of government and civil society organizations have contributed toward the development of regional governance initiatives. Many of the ASEAN coastal projects were implemented by the International Centre for Living Aquatic Resources Management—now known as the WorldFish Center, which is part of the CGIAR global network of agriculture-related research centers (Ahmed and Santos 1999). The Southeast Asian Programme in Ocean Law, Policy and Management was a network of high-level scholars, government officials, and private individuals formed in 1981 in anticipation of the implementation of the 1982 UN Convention on the Law of the Sea. The network, funded by the Canadian government, aimed to foster regional cooperation through research, training, publications, and forums with scientists and policy makers in the Asia-Pacific region (SEAPOL 2001).

Similar to this was another Canadian-funded initiative, the informal South China Sea Workshops. This series of meetings, which began in 1990, allowed academics and government and military officials to unofficially discuss and develop collaborative projects as a way to mitigate conflict in the SCS. One outcome of the workshops was joint research expeditions assessing the status of ecosystems in uncontested areas (UBC Law 2000).

[6] These projects involved a gross outlay of $696 million, of which $369 million was provided as ADB loans and $33.8 million as ADB-administered grants (excluding those from the GEF).

IUCN, a network composed of government agencies and NGOs, has been working at a global level on biodiversity issues since 1948.[7] In Asia in particular, it leads the Mangroves for the Future initiative to promote coastal investment for sustainable development in countries most affected by the 2004 Indian Ocean tsunami—including Indonesia, Thailand, and Vietnam—and the Mekong Water Dialogues to facilitate transparent and inclusive decision making in the Mekong region—Cambodia, Lao People's Democratic Republic (PDR), Thailand, and Vietnam.

WWF (the World Wide Fund for Nature; previously the World Wildlife Fund) is an NGO that has been working in the region for more than 30 years.[8] Although its offices are at the country level, WWF has been instrumental in bringing countries together to work at an ecosystem or "ecoregion" scale, such as the Mekong River Basin (China, Cambodia, Lao PDR, Thailand, Vietnam), the Sulu-Sulawesi Seas (Indonesia, Malaysia, the Philippines), the Yellow Sea (China, Japan, the Republic of Korea), and—more recently—the Coral Triangle (Indonesia, Malaysia, Papua New Guinea, the Philippines, the Solomon Islands, Timor-Leste). Its efforts have contributed to the adoption by the concerned countries of a Sulu-Sulawesi Marine Ecoregion Action Plan and a Coral Triangle Initiative Regional Plan of Action. A proposal for the first GEF international waters project in the region was formulated through WWF with ASEAN (GEF and UNDP 1993). Besides working with governments, WWF has been able to pool the resources of the private sector, NGO networks, UN agencies, development banks, and various bilateral donors in support of its transboundary conservation programs.

Recently, the international NGOs Conservation International and The Nature Conservancy have been playing a more active role in the region. With financial support from the U.S. Agency for International Development, WWF, Conservation International, and The Nature Conservancy are coordinating their regional efforts to contribute to the Coral Triangle Initiative—which they were also instrumental in getting governments to develop. Mangroves for the Future is another partnership between governments, UN agencies, bilateral donors, civil society organizations, and the private sector that has recently emerged to serve areas affected by the 2004 Indian Ocean tsunami, but which has expanded to some countries in the SCS as well.

In contrast to their reluctance to commit financially to regional environmental initiatives, littoral countries have contributed consistently to intergovernmental organizations that address primarily economic issues. Regional environmental bodies tend to obtain more funding support from relatively large member countries with higher per capita incomes and a high proportion of their coast bordering the large marine ecosystem.

Despite the dependence on external funding, history shows that countries in the SCS have provided continuous support to intergovernmental organizations that may have coastal and marine initiatives, but primarily address economic issues. Nine regional intergovernmental organizations were identified through literature reviews and interviews as key players in the coastal and marine governance of the SCS. Three—the Asia-Pacific Fisheries Commission, the Network of Aquaculture Centres in Asia-Pacific, and SEAFDEC—are fisheries institutions. Two—the Asia-Pacific Economic Cooperation and ASEAN—are primarily economic in nature, but have committees that focus on fisheries and coastal issues. The Intergovernmental Oceanographic Commission Subcommission for the Western Pacific (WESTPAC) is dedicated to marine research. All six entities have existed for at

[7] IUCN, accessed December 22, 2010.

[8] WWF, accessed December 22, 2010.

least 20 years with sustained funding. For example, member countries of SEAFDEC, an organization focused on improving fisheries technologies, contribute about $400,000 per year to pay for its secretariat. Host countries also cover most of the operating costs ($7.7 million) for its four technical departments, which are located across the region (SEAFDEC 2011). Only about $1.8 million of the annual budget comes from other donors such as the Swedish International Development Agency to fund special projects.

Intergovernmental organizations with primarily environmental management or sustainable coastal and marine development aims such as the MRC, COBSEA, and PEMSEA currently rely heavily on donor funding, and do not have sustainable levels of funding commitments from member countries. The implications of this situation are explored in chapter 11 on factors affecting broader adoption. The MRC, which has a wider mandate addressing broader development issues rather than just environmental management, has managed to attract a large number of donors and partners for its projects.

ASEAN and the Asia-Pacific Economic Cooperation similarly rely on external funding to implement action plans that involve environmental coastal and marine initiatives (APEC 2012). Economic benefit is thus the main incentive for countries to commit their support to initiatives; purely environmental initiatives rank lower in priority in terms of country funding. This situation is similar to that discussed in the previous section: that legally binding maritime-related instruments in the region tend to be economic in intent and bilateral in nature, while environmentally focused instruments tend to be in the form of weaker commitments.

A comparison of the governance characteristics of the SCS–Gulf of Thailand large marine ecosystem with the governance mechanisms of six large marine ecosystems most similar to it (see Mahon et al. 2010) indicates that country willingness to invest in regional environmental concerns is often related to the country's wealth. Most of these large marine ecosystems (see annex 4C, table 24), except for the Sulu-Sulawesi, had their first regional initiatives through UNEP's Regional Seas Programme. Governance bodies in large marine ecosystems that quickly adopted legally binding conventions and/or have country-supported implementing mechanisms and regular activities tend to have a high proportion of large littoral countries with high per capita income. Territorial disputes are a factor in five of the ecosystems, but these disputes do not appear to be a significant factor in the willingness of countries to find areas of cooperation on coastal and marine issues.

The East China Sea and Yellow Sea large marine ecosystems, in particular, are culturally the most similar to the SCS–Gulf of Thailand large marine ecosystem and similarly do not have regional conventions. Yet they have regular monitoring and planning activities funded primarily by member countries of the Northwest Pacific Action Plan (NOWPAP), which covers both ecosystems. The countries did not tap into GEF support at the large marine ecosystem scale until after they had taken the initiative to establish activity centers to implement their action plan. An important factor at play may be that three of the four littoral countries involved are upper middle to high income.

The same level of engagement is seen in the Persian Gulf and Gulf of Oman (part of the Arabian Sea large marine ecosystem), covered by the Regional Organization for the Protection of the Marine Environment, which has seven upper-middle to high-income countries out of eight members. Oil pollution is the primary focus of interventions in this area, and provides a clear economic incentive for countries to address.

In water bodies where high-income countries have a smaller territory, their contributions also tend to be lower, affecting the operational budget of the governance mechanism. In these cases and in large marine ecosystems that have few or no large high-income littoral states, GEF support has typically played an important role in supporting regional environmental activities.

5.3 Regional Environmental Architecture

Multiple organizations with different primary functions address regional environmental concerns in the SCS. These organizations are, for the most part, well connected through a smaller set of organizations with a long history in the area. However, funding issues and overlapping mandates have resulted in duplication, competition, and gaps in initiatives.

What has evolved in the SCS over the last 30 years is a complex network of regional organizations covering a wide range of functions, with no single organization dominating or holding a central coordinating role. Social network analysis shows that there is a smaller group of about six organizations—ADB, ASEAN, COBSEA, IUCN–World Commission on Protected Areas, SEAFDEC, and UNEP—that have more connections as a result of their long work history in the region. These organizations also have a history of mutual interaction, but each also interacts with a specific group of less well-connected actors or with entities in their own sphere of influence with which the others do not have relationships. A survey of 26 regional actors carried out as part of this evaluation showed that these six entities consider a total of 87 organizations and sectors (e.g., local governments, NGOs, academia) to be important to their international waters–related work. Of these 87, only 17 organizations and 9 sectors are common to at least two respondents. Most of the interactions pertain to knowledge and information initiatives. Eighty-nine percent of the relationships are reciprocal, but only 26 percent are legally binding, usually among national governments and UN agencies. Furthermore, many of these relationships were identified as important primarily because they serve to connect organizations to other stakeholders in the region or countries—demonstrating how, in such a polycentric setting, organizations that link actors to other actors are considered valuable.

This complex network of organizations and regional instruments would appear to address the critical coastal and marine concerns in the region. But many of the instruments that have been adopted are declarations of intent or plans that lack specific funding commitments. Action plans have generally been used as broad frameworks to develop projects that have been funded largely by bilateral or multilateral donors rather than through countries' own resources. This has in turn resulted in gaps and overlaps in implementation, with some priorities not given attention depending on which areas donors are willing to fund. Many proposals and programs have thus been underfunded (ESCAP 1998; Kato and Takashahi 2001). In addition, intergovernmental organizations generally address only issues that are not contentious among countries and that do not involve initiatives in areas with jurisdictional disagreements (i.e., most of the SCS). They also rarely address concerns that would require coordinated responses across countries, leading to further gaps.

There are many reports of duplication and inefficiency due to a lack of coordination and collaboration. Assessments of regional environmental institutions and the meeting minutes of the governing bodies of regional organizations often refer to potential areas for joint action and cooperation. As mentioned earlier, the major actors in the region have a history of interaction, often participating in each other's meetings. In reality,

these assessments and minutes indicate that more coordination in planning and implementation is needed (PEMSEA 2011c; Tan Kheen-Jin 2003; Tengberg and Cabanban 2013), and that the multiplicity and overlap of programs often lead to competition, donor fatigue, confusion among countries, and wasted resources (COBSEA 2009; MFF 2009; UNEP 2005b).

The nonbinding institutional configuration and the gaps that exist reflect, to a large extent, the preference of the SCS countries. On the one hand, the so-called "ASEAN way" has been to avoid situations of direct conflict among countries. The ASEAN emphasis has been to develop regional frameworks rather than binding commitments, and to leave implementation up to each country according to its capabilities (Kato and Takashahi 2001). This approach has been compatible with China's preference to work through bilateral channels rather than through binding multilateral instruments (Beukel 2010; Yu and Mu 2006).[9]

The multiplicity of underfunded organizations is partly a result of low country financing to these organizations. Dependence on donor funding for regional initiatives has allowed donors to influence the priorities of regional organizations that actually get implemented. Regional mechanisms also seem to have been promoted by international organizations as a response to processes such as the Stockholm Conference and Rio Summit. Countries have apparently endorsed the creation of these new regional entities, but unlike with economic or political regional organizations, have not been as eager to assume full financial responsibility for organizations addressing environmental issues.

[9] Also see http://www.ecolex.org.

6. Contributions and Limitations of Regional GEF Support

6.1 Building on Existing Initiatives

The GEF has built on existing initiatives in the region and has helped enable the implementation of activities that address transboundary environmental concerns prioritized by countries and other regional organizations by supporting activities at different scales.

The GEF began supporting activities in the SCS in 1993, a time when the Earth Summit for Sustainable Development in Rio de Janeiro had generated considerable attention for environmental issues. Coastal countries had signed the Rio global environmental conventions and were in the process of ratifying them. Regional maritime initiatives prior to the start of GEF support in the region were concerned with laying the foundation for better management through improved knowledge, skills, and technology. Activities in this regard included meetings, training, and research; and the development of management plans, monitoring protocols, and databases. The ASEAN and COBSEA action plans prepared during this period identified pollution, the rehabilitation of damaged natural habitats, and the establishment of protected areas as important priorities. These plans also identified broad areas of need such as the strengthening of regulatory frameworks, long-term monitoring of environmental status, and further capacity development; specific actions were mostly left for countries to undertake.

The GEF's initial support in the region focused on pollution, addressing a concern that had been identified a decade earlier and providing a means to implement the plans and studies produced by ASEAN, COBSEA, and UNESCO's Intergovernmental Oceanographic Commission (box 6.1). Several of the scientists, policy makers, and other experts who worked on these regional initiatives have since become key leaders in GEF projects in the region. Direct links can be established from GEF projects back to these early initiatives through individuals who have championed specific ideas or approaches.

The overall approach of the GEF has been to demonstrate the relevance and utility of specific approaches and technologies to address environmental concerns at the site level and to support their broader adoption. In contrast to most other donors in the region, the GEF came into the region seeking to encourage countries to work jointly to address transboundary environmental concerns. GEF support thus sought to address conditions occurring at different scales.

Two global, nine regional, and four national GEF-funded projects had regional components. An analysis of the intended contributions of the regional components of completed GEF international waters projects showed that most of the activities were aimed at information sharing and

BOX 6.1 **Regional Planning Instruments and the GEF's Role in Implementation**

The GEF's contributions in the SCS have included the implementation of existing regional action plans through a framework that has provided opportunities for collaboration, and implementation of an action plan that identifies specific targets based on clear scientific baselines. When GEF-supported initiatives for the management of environmental concerns in the SCS and adjacent areas began in the mid-1990s, two action plans were already being implemented by UNEP-initiated regional seas bodies in the same areas. These were the EAS Action Plan, first adopted by COBSEA in 1981, and NOWPAP, adopted in 1994. The objectives of the UNEP SCS and UNDP PEMSEA streams reflect the involvement of COBSEA and NOWPAP member countries in the development of GEF projects in the region and the subsequent integration of these regional priorities into GEF-supported activities. For example, both the EAS Action Plan and NOWPAP identify the creation of regional databases on environmental and legal information, and the establishment of environmental monitoring systems, which both funding streams initiated in some form and with varying degrees of success. The first project in the UNDP PEMSEA stream (MPP-EAS) addressed the standardization of pollution monitoring methods, and the exchange of technology and expertise among countries—targets that had been identified in the EAS Action Plan—within the ICM framework. The SCS TDA-SAP project conducted many studies on habitats—another long-standing priority in the EAS Action Plan—as part of an ecosystem-based management approach. Both GEF initiatives have moved these priorities and targets further along by going beyond studies and isolated activities, and implementing management approaches in a holistic manner through local demonstrations linked to national- and regional-scale processes. The second project supported through the UNDP PEMSEA stream formulated a broad-based SDS-SEA that integrated the targets of the EAS Action Plan, as well as other international commitments related to sustainable coastal and marine development. The SDS-SEA was adopted in 2003 by 12 countries, most of which were part of COBSEA, NOWPAP, or both. In 2008, a revised SCS SAP that provided very specific actions, targets, and budget requirements was approved by countries bordering the SCS, all of which were also members of COBSEA. In this sense, the GEF has built on previous initiatives by providing the means to implement and expand on foundational activities that had already been prioritized by countries in the region but not funded.

access (48 percent), and the establishment of implementing mechanisms and bodies (48 percent). A few activities were focused on the development of environmental monitoring and evaluation systems (9 percent) and financial sustainability mechanisms (9 percent).

GEF support to the SCS at the regional scale has taken place through its three main streams of funding: UNDP PEMSEA, UNEP SCS, and—to a lesser extent—the World Bank IF. The outputs and direct outcomes of GEF support through these streams together contribute to creating the foundational conditions for sound regional environmental governance in the SCS. Knowledge was enhanced through assessments that filled in critical knowledge gaps in the region, and through the training of well over 3,000 individuals in approaches, methods, and techniques for marine and coastal management. Information exchange was promoted through websites, publications, study tours, professional networks, and conferences. These activities improved the environmental awareness of decision makers and of the public regarding the importance of marine and coastal resources. Higher awareness among these stakeholders has contributed to the passage of laws and the adoption of regional instruments to address transboundary issues.[1] GEF support has helped countries identify, test, and develop methods and technologies to address specific environmental concerns, some of which have been replicated within the countries and from one country to another. Table 6.1 provides

[1] Chapter 8 provides specific information on these processes at the country level.

TABLE 6.1 **Key Contributions of GEF-Supported Knowledge and Information Initiatives at the Regional Scale**

Contribution	GEF initiative
	Knowledge and information
Knowledge generation	• International waters assessment for the SCS-Gulf of Thailand large marine ecosystem • TDA • Economic valuation of regional ecosystems • List of fisheries species of transboundary significance
Skills building	• More than 3,000 participants from the region trained through internships and workshops on ICM, risk assessment, oil spill response, environmental monitoring, sustainable management of habitats, fisheries refugia, and economic valuation • One Area of Excellence and seven ICM Learning Centers in partnership with universities, with the one in Xiamen being highly successful • Regional task forces (PEMSEA and SCS TDA-SAP project)
Information sharing and access	• Legal information databases (PEMSEA and SCS TDA-SAP project) • Networks of legal practitioners (PEMSEA and SCS TDA-SAP project) • Networks/technical working groups of scientists (PEMSEA and SCS TDA-SAP project) • Design of web-based GIS on habitats prioritized for management • Information portals (SCS TDA-SAP project, PEMSEA, and IW:Learn websites) • EAS Congress • Forums for mayors and NGOs • PEMSEA Network of Local Governments • Regional Twinning Network on Integrated River Basin and Coastal Area Management • Design of an IIMS • Design of an SOC reporting system • *Tropical Coasts* biannual magazine and monthly e-newsletter
	Institutional capacity
Intergovernmental frameworks for cooperation	• Memorandum of agreement between the provinces of Kien Giang, Vietnam, and Kampot, Cambodia • Joint Statement on Partnerships in Oil Spill Preparedness and Response for the Gulf of Thailand and Framework for Joint Oil Spill Readiness and Response • Regional SAP • SDS-SEA (Putrajaya Declaration)
Implementing intergovernmental bodies/arrangements	• PEMSEA as regional implementing mechanism of SDS-SEA (Haikou Partnership Agreement) and as a legal entity separate from the GEF project • Coordination Center for Oil Spill Response in Gulf of Thailand • Agreement between the government of the Philippines and PEMSEA establishing the PEMSEA Resource Facility Center
	Implementation strategies
Technologies and approaches	• Manuals on management practices and reporting system • Method for prioritizing habitat sites for management • Framework for valuation of impacts of land-based pollution • Management plan for regional fisheries refugia system • Risk assessment and management • ICM Code and Recognition System • PSHEM Code and Recognition System • Decision support frameworks (MRC and Livestock Waste Management projects)

SOURCE: Terminal evaluations, terminal evaluation reviews, and project implementation reports.

an illustrative list of key outputs and outcomes achieved by GEF-supported initiatives at the regional scale.

UNDP PEMSEA FUNDING STREAM

The UNDP PEMSEA stream is the GEF's longest running stream of support, working primarily through partnerships with governments, the private sector, academia, the media, and civil society organizations at various scales to accomplish its aims of sustainable development. While focused largely on site-level ICM demonstrations, it has conducted numerous training workshops, internships, and courses to build capacity across the region on specific tools and methods. It has directly trained at least 2,000 individuals on ICM, risk assessment, GIS, and other relevant tools. Projects in the UNDP PEMSEA stream have also collaborated—with varying degrees of success—with universities in the region to develop ICM centers in various countries. It has also developed manuals, case studies, a biannual magazine (*Tropical Coasts*), a monthly e-newsletter, and a variety of learning products that can be accessed on the PEMSEA website. An IIMS and SOC reporting system have been developed to complement monitoring of environmental and governance targets; these are discussed further in chapter 7.

This funding stream has also helped set up regional support networks to facilitate horizontal learning and exchange across the region. It supported the creation of the PEMSEA Network of Local Governments (PNLG), which includes the heads of local governments that have adopted ICM (box 6.2), and the Regional Twinning Network on Integrated River Basin and Coastal Area Management, which enables the management bodies of bays in the region and elsewhere to learn from each other's experiences. The UNDP PEMSEA stream has also supported a multidisciplinary experts group, a regional network of legal practitioners, and the creation of a legal information database.

The funding stream was initially more focused in working with local and national governments. In its later phases, it has placed a deliberate emphasis on partnership building with nongovernment stakeholders at different scales, while also establishing incentivizing awards and certifications that provide special recognition to high-achieving ICM sites throughout the region. The main achievements of this stream in terms of regional cooperation have been the adoption of the SDS-SEA by countries in the region and their membership in PEMSEA. Affirming their commitment to the vision of the SDS-SEA, PEMSEA country partners

BOX 6.2 PEMSEA Network of Local Governments

The PNLG is a self-sustaining regional mechanism that became an independent entity in 2006. It was launched in 2001 with GEF support as a means for chief executives of local governments that had adopted ICM to share their experiences in a peer-to-peer learning setting. It has also become a way for members to promote ICM to other local governments that are considering its adoption, often through study tours to the ICM sites of member governments. The PNLG charter was signed in 2006 at the second EAS Congress. It is currently composed of 26 member and 7 observer local governments from 9 countries. Membership is open to all local governments, both within and outside the region. In 2009, the PNLG became a noncountry partner of the EAS Partnership Council, thus giving it a voice in decisions regarding SDS-SEA implementation. The annual PNLG conferences are hosted in turn by member governments and have a thematic focus. The municipality of Xiamen hosts the PNLG Secretariat and contributes to the funding of PNLG activities. Other funding sources include PNLG membership fees and PEMSEA country budgets funded by the GEF (PEMSEA 2010).

also signed the Manila Declaration on Strengthening the Implementation of ICM for Sustainable Development and Climate Change Adaptation in the Seas of East Asia Region in 2009, and the Changwon Declaration Toward an Ocean-based Blue Economy in 2012. Two other important accomplishments made possible through the UNDP PEMSEA stream are the Gulf of Thailand Joint Statement and Framework Programme for Joint Oil Spill Preparedness and Response and the PSHEM Code, both of which are discussed later in this report.

The UNDP PEMSEA stream has—partly in response to GEF encouragement—sought to promote a broader framework for regional cooperation and to transform itself into a mechanism to support country efforts on the path to sustainable development. In 2003, 12 East Asian countries adopted the SDS-SEA. The SDS-SEA outlines a vision, operational principles, objectives, approaches, and actions that could be taken to address sustainable development issues in coastal areas with national, regional, and global significance. It focuses on on-the-ground implementation by taking actions at the local government level, and identifies roles and ways by which different stakeholders can contribute to the region's transformation toward sustainable development. It is intended as a regional framework for implementing the UN Millennium Development Goals, the World Summit on Sustainable Development Plan of Implementation, Chapter 17 of Agenda 21, and the UNEP Global Programme of Action for the Protection of the Marine Environment from Land-based Activities, among other international commitments to which countries have agreed.

For the most part, the SDS-SEA does not include new activities but serves as an instrument to identify who is doing what to foster opportunities for collaboration and resource sharing among countries, regional organizations, financing institutions, and other stakeholders in the region. One of the SDS-SEA's intended functions is as a framework by which partners can jointly seek funding for similar or complementary initiatives. The SDS-SEA follows in the tradition of previous SCS regional plans insofar as it is nonbinding and presents a framework to capture work done in the region by multiple actors. It differs from other such plans in that it is much broader in scope (i.e., sustainable development rather than just environmental management), and was endorsed by the countries and many key actors in the region.

The SDS-SEA has set a target for the establishment of ICM in 20 percent of the coastlines of East Asia by 2015. As of 2011, PEMSEA reported that it had helped introduce ICM in 11.5 percent of the region's coastline, resulting in various levels of adoption. An important SDS-SEA feature is a monitoring and reporting system for its implementation. The five-year SDS-SEA Implementation Plan adopted in July 2012 specifies hazard management; habitat and fisheries management; and water use, conservation, and pollution reduction as specific concerns to be addressed through ICM.

In 2006, PEMSEA was recognized as the regional coordinating mechanism for implementing the SDS-SEA by 11 East Asian countries and 12 stakeholder organizations, or noncountry partners. As a regional mechanism, PEMSEA includes four components:

- The EAS Partnership Council, which is composed of an intergovernmental session formed by all participating governments, and a technical session, which includes the signatory noncountry partners
- The Resource Facility, which acts as the secretariat and provides technical services
- The EAS Congress, a venue for stakeholders to share lessons learned and for partners to report

on their progress in SDS-SEA implementation every three years

- The PEMSEA Partnership Fund, the depository for voluntary contributions by country members and other international organizations

The 11 PEMSEA country partners include 8 that are GEF-eligible (Cambodia, China, Indonesia, the Democratic People's Republic of Korea, Lao PDR, the Philippines, Timor-Leste, and Vietnam)[2] and 3 non-eligible countries (Japan, the Republic of Korea, and Singapore). In 2009, eight of the partner countries recognized PEMSEA as an international legal entity separate from the PEMSEA GEF project. China, Japan, and the Republic of Korea provide funding for the PEMSEA Resource Facility; the Philippines hosts the PEMSEA headquarters and assumes the associated costs. The 19 noncountry partners include NGOs, research institutions, private sector organizations, regional organizations, other GEF-supported regional programs, and the PNLG.

UNEP SCS FUNDING STREAM

The UNEP SCS stream has given considerable attention to facilitating agreement among countries on transboundary environmental priorities and corresponding actions to address these priorities. It has done so by engaging regional technical expertise to ensure acceptance by participating countries through science-based decision making. The funding stream has also given much attention to capacity development by linking institutions and fostering exchange within the region. It supported four regional task forces and six regional working groups on emerging transboundary concerns. It organized mayors' roundtables, an NGO forum, and regional scientific conferences to facilitate networking and the exchange of experiences among participants. Over 1,000 individuals have been trained on issues related to environmental monitoring, sustainable management of habitats, fisheries refugia, and economic valuation. Participants of the networks who were interviewed for this evaluation reported that they have continued exchanges with some of the institutions and individuals. A website was developed to widely disseminate the project's numerous publications as well as to encourage information sharing through a web-based GIS; this is further discussed in chapter 12.

The SCS TDA-SAP project systematically identified 22 habitat sites (from an initial list of 135 sites) in six countries to demonstrate the efficacy of some promising approaches to address transboundary concerns. These sites were assessed and ranked by working groups that included representatives of governments and other stakeholders. Supported by the project, these working groups used technical criteria to rank sites' global and regional significance in terms of their biological diversity and transboundary relevance. Eleven sites were supported through funds from the SCS TDA-SAP project. Seven more sites were planned to be proposed as separate projects to the GEF; three such projects have already been approved (Sustainable Management of Coral Reef Resources, Community-based Management of Seagrass Habitats, and Management of Shantou Intertidal Wetland).[3] Self-funded demonstrations were undertaken by the participating countries in two other habitat sites.

The project brought new methods and tools to mainstream environmental concerns into development processes. Economic valuation approaches

[2] The Democratic People's Republic of Korea received GEF support only during the first UNDP PEMSEA project, from 1994 to 1999.

[3] The four remaining demonstration sites were not able to receive GEF support because of the lower quality of the proposals and inadequate cofinancing commitments.

introduced by the regional economic task force of the SCS project were used in at least two local sites as a basis for decision making. In a coral reef in Sulawesi, Indonesia, the analysis was used to determine if a mining project should proceed. In Bolinao, the Philippines, the municipal government successfully used valuation as a basis for litigation for damage on its seagrass bed caused by a coal spill incident brought about by vessel grounding.

Three important regional accomplishments of the SCS TDA-SAP project are the elaboration of a SAP with the participation of China and the GEF-eligible coastal ASEAN countries; a Memorandum of Agreement between the provinces of Kampot, Cambodia, and Kien Giang, Vietnam, signed in 2008 for joint seagrass habitat management; and the introduction of the fisheries refugia concept (see box 6.4). All of these are addressed later in this report.

Actions in the SAP formulated by regional scientific working groups are identified according to habitat (coral reef, mangrove, seagrass, wetlands) or environmental concerns (fisheries, land-based pollution), and supported by detailed budgets and time frames. Major components of the SCS SAP are research and environmental monitoring, and public awareness. Generally, each concern includes an action involving the formulation of guidelines for the use of a specific habitat or resource. An economic valuation of habitats in the SCS is included as part of a cost-benefit analysis for implementing the SAP. Quantitative goals are linked to specific target sites with ecological significance to the large marine ecosystem that have been identified using scientific criteria. It also identifies management, environmental, and socioeconomic indicators specific to each concern that are meant to be measured before, during, and after plan implementation. Because no implementing mechanism has been finalized, however, the means for reporting on these indicators has not been defined.

WORLD BANK INVESTMENT FUND FUNDING STREAM

The World Bank IF funding stream has supported pilots that test new systems and technologies generally for municipal waste management in the SCS. Only the Livestock Waste Management project was designed with a regional component; still, most of this project's components have been implemented at the national and local levels. The project's regional dimension involved knowledge exchange, which was designed to take place through the PEMSEA EAS Congress. A partnership memorandum was signed between the World Bank and PEMSEA, whereby PEMSEA agreed to be the instrument for coordination, information dissemination, promotion, knowledge management of lessons learned from the demonstrations, and monitoring of progress in pollution reduction in line with SDS-SEA objectives. Tools to support decision making were also developed through the project.

Though not supported through any of the three main funding streams, the World Bank–implemented MRC Water Utilization Project is significant in that it assisted the MRC in establishing mechanisms to improve coordinated, sustainable water management in the Mekong River Basin. The project supported the development and negotiation of a set of rules to help facilitate implementation of the Mekong agreement. Support included the development of a decision support framework, which consists of three main elements accessed through a single user interface: a knowledge base, a suite of simulation models, and impact analysis tools. The project also provided international legal assistance, capacity strengthening within the MRC, and technical training for national governments and staff. It helped facilitate MRC engagement with non-MRC members China and Myanmar (IEG 2012).

6.2 Innovative Approaches

GEF support enabled complementary initiatives in the SCS to address coastal and marine environmental concerns previously identified in the region using innovative approaches. A characteristic common to these initiatives is that they were linked to—but not integrated with—existing intergovernmental mechanisms.

One of the main obj ectives of the GEF international waters focal area has been to support regional mechanisms to help countries identify priorities and coordinate actions to address transboundary environmental challenges.[4] This has been pursued by the GEF in the focal area since its first operational strategy in 1996, and is clearly articulated as an expected outcome of the GEF-5 (2010–14) international waters strategy (GEF 2010).

To achieve this objective, the GEF supported innovative regional approaches in the SCS primarily through two funding streams: UNDP PEMSEA and UNEP SCS. While sharing some important similarities, these two streams of GEF support were from the start set on different, complementary paths. Both streams worked toward the same broad goals of contributing to the implementation of Agenda 21 and helping countries meet their commitments to global environmental conventions. Beyond these broad similarities, the respective approaches have been complementary—as they were intended to be, as indicated in the project document of the first project supported by the UNEP SCS stream, the SCS TDA-SAP.

The UNDP PEMSEA stream has focused on the introduction and replication of ICM mostly in urban areas, due to its initial emphasis on marine pollution management and prevention in the broader EAS region. Adopting a sustainable development outlook, this stream of funding has typically addressed situations in which the costs and effects of environmental degradation take place within a country's boundaries rather than across them. The UNEP SCS stream, on the other hand, has adopted an ecosystem approach specifically within one of the East Asian seas (the SCS). It has given more attention to habitat protection in generally low-disturbance (i.e., rural) areas, ecological services, and regional and global goods that require country cooperation. Through both streams, as detailed in box 6.1, the GEF has built on existing plans in the region and on some of the approaches and experiences to address coastal and marine concerns, rather than supporting existing regional institutions.

The MPP-EAS project was the first project supported through the UNDP PEMSEA stream of funding, and the first approved by the GEF with incidence in the SCS. It was originally proposed by WWF and ASEAN, based on the ASEAN Senior Officials on the Environment Action Plan. The proposal was to follow up on an initiative that dated to 1975 involving the UNESCO Intergovernmental Oceanographic Commission, IMO, UNEP, and UNDP on pollution prevention and management in the Malacca Straits; the ASEAN's subsequent marine pollution studies funded by Canada; and the ICM project funded by the United States and implemented by the International Centre for Living Aquatic Resources Management that had just been completed in 1992 (Soegiarto 2005).

Around the time the MPP-EAS project was approved by the GEF, there were at least two potential institutional candidates (both created through UNEP's Regional Seas Programme) through which the project could have been executed. By 1994, at the request of the member countries, COBSEA had been reengineered, with a revised action plan with

[4] The GEF-5 international waters strategy (GEF 2010) refers to regional mechanisms as joint mechanisms or instruments, underscoring the fact that countries need to come together to form these.

more explicit implementation objectives within the context of an ecosystem management framework, a renewed mandate to support a larger number of member countries (including all seven bordering the SCS) in meeting their commitments to the UN conventions, and a trust fund supported by the member countries that could capture resources for implementation of the revised action plan.

During roughly the same period, from 1991 to 1993, preparations were under way to develop another UNEP regional seas action plan—NOWPAP, adopted in 1994 by China, Japan, the Republic of Korea, and the Russian Federation. (Although part of the region, the Democratic People's Republic of Korea, opted not to participate.) NOWPAP's objectives were geared toward joint environmental assessment and monitoring, ICM, and support to member countries in implementation of international marine pollution conventions. A NOWPAP Trust Fund was established to fund the plan's implementation and accept funds from noncountry sources.

When the MPP-EAS project was approved by the GEF in late 1993, its coverage had been expanded to include other East Asian seas outside the scope of ASEAN; the Democratic People's Republic of Korea was the only participating country that was not a member of either COBSEA or NOWPAP.[5] Rather than the GEF's choosing to support initiatives through COBSEA, NOWPAP, or both, the UNDP PEMSEA stream evolved to support a newly created regional mechanism in 2006 involving countries that were members of COBSEA and NOWPAP, as well as the Democratic People's Republic of Korea, Lao PDR, and Timor-Leste. This new regional mechanism—PEMSEA—now acts as a suprastructure designed to coordinate, monitor, and report on country efforts contributing to the aims of COBSEA, NOWPAP, and the other regional commitments of its member countries. NOWPAP has been a member of the PEMSEA-initiated EAS Partnership Council as a noncountry partner since 2006, while COBSEA is an informal collaborator.[6]

Two important considerations stemming from the GEF's strategic decisions had the effect of steering GEF funding away from existing regional programs, specifically COBSEA and UNEP's Regional Seas Programme. While the large marine ecosystem approach adopted by the GEF in the international waters focal area in 1995 and UNEP's regional seas approach are similar insofar as they both seek to address transboundary concerns, they differ in that the Regional Seas Programme defines boundaries on the basis of the countries bordering the water bodies, while the large marine ecosystem approach focuses on ecosystem boundaries. The GEF did not take the route of UNEP's Regional Seas Programme because, in its early years, the GEF was very careful not to fund existing programs of its Implementing Agencies. The regional seas framework was also seen as too large a scale to be practical, while the large marine ecosystem was seen as a smaller and more manageable scale (box 6.3).

[5] ASEAN and COBSEA were both part of the discussions during the development phase of the project proposal. Some of the people engaged in project preparation indicated in interviews for this evaluation that, at the time, ASEAN was viewed as a difficult organization to work with given the many tensions among countries; and that COBSEA, largely financed by UNEP, did not have the support of all the participating countries.

[6] Examples of collaboration between PEMSEA and COBSEA include a workshop on partnership opportunities at the UNEP Global Programme of Action for the Protection of the Marine Environment from Land-based Activities intergovernmental review meeting in Beijing, the preparation of a joint policy brief on the UNEP program's implementation in the EAS region, co-convening of the EAS Congress, and technical inputs from PEMSEA to COBSEA projects on marine spatial planning and coastal erosion. COBSEA chose not to be a PEMSEA partner because some member countries raised the issue of the inappropriateness of COBSEA as an intergovernmental body becoming a noncountry partner of a "project entity" (COBSEA 2008).

BOX 6.3 **Addressing the Scale Dimension of Regional Environmental Concerns**

Unlike other focal areas, which typically work at the country level, the mandate of the GEF international waters focal area is to help countries address transboundary concerns; this has meant tackling very difficult regional-scale issues and their associated complexities and challenges. Many bioregionalization frameworks for the management of coastal and marine systems have been developed and advocated by different scientific schools of thought. Examples are the Regional Seas Programme initiated by UNEP, the seascape and marine ecoregion approaches implemented by international NGOs, and the large marine ecosystem approach introduced by the U.S. National Oceanic and Atmospheric Administration and adopted by the GEF (Bensted-Smith and Kirkman 2010; also see the FAO Fishing Areas Geodatabase). While each of these approaches has something to contribute and has helped move the agenda forward, often, the extent to which they have spread and been adopted has depended more on the capacity of the advocates of each approach to promote the framework than on its scientific merits.

Growing scientific evidence indicates that it is important to consider the appropriate ecological scale, the stakeholders at different administrative scales affecting management of resources, and the appropriate temporal scale—considering the response times of both natural and social systems—of the transboundary concern itself, as well as its immediate drivers (CBD Secretariat 2010; Mee and Adeel 2012). Given the nature of the problems the international waters focal area addresses, a perspective that encompasses regional dimensions is critical. It is also particularly important to consider the characteristics of the existing governance arrangements at the scales at which the transboundary concerns take place, and to then adapt the approaches accordingly (Ostrom 2010).

The GEF's second major initiative in the region was to focus on the formulation and implementation of a TDA-SAP for the SCS, using a large marine ecosystem rather than country boundaries. This project, implemented by UNEP, was first proposed through COBSEA in 1996. The approved project document, while not providing direct financial support to COBSEA, identifies that entity's role as the means by which any regional outputs of the project would be approved by the countries—i.e., the project's regional outcomes would be considered to be achieved once COBSEA adopted them.

When the project finally began implementation in 2002, its coordination unit, while housed with the COBSEA Secretariat in Bangkok, responded directly to UNEP headquarters in Nairobi. This circumstance was in part due to the fact that, since 2000, UNEP had begun to reduce its contributions to COBSEA; also, there was a high level of staff turnover within UNEP's coordination unit. During implementation, there was communication between the SCS TDA-SAP project coordination unit and COBSEA, and the project's coordinator regularly reported to COBSEA meetings. However, the revised SCS SAP in 2008 was approved not by COBSEA but by the project's steering committee, which was composed of the project's beneficiary countries; there were objections from some countries that any formal discussions or actions on SAP approval and implementation should go through COBSEA, not the project steering committee.[7]

The terminal evaluation of the SCS TDA-SAP project notes that although the project was undertaken within the overall framework of COBSEA, its operational linkages with COBSEA were minimal,

[7] In contrast, a similar GEF-supported TDA-SAP project in the Yellow Sea large marine ecosystem (GEF ID 790) was endorsed by NOWPAP to support its activities around the time UNEP was reducing its funding to NOWPAP. The GEF Yellow Sea large marine ecosystem project fully recognizes NOWPAP as a partner, and vice versa. Although its regular operations are largely funded by country contributions, NOWPAP continues to develop project proposals based on its action plan for GEF funding.

which would have been critical in carrying the GEF's transboundary environmental agenda forward.[8] When countries approved the revised SAP in 2008 through the SCS TDA-SAP project's steering committee, discussions took place regarding COBSEA being the suitable body for implementing the SAP after project completion. COBSEA signed a resolution accepting the task, and requested that its secretariat draft a proposal for SAP implementation for funding by the GEF. By this time, the high costs of operating the COBSEA secretariat without continued UNEP support were fast depleting the trust fund. Despite urging by UNEP, COBSEA member countries indicated that, given the economic crisis, they were not in a position to increase their contributions to support operating costs, much less implement the SAP. Strapped by a lack of resources, COBSEA has not continued to support the architecture constructed by the SCS TDA-SAP project.

The flexibility of GEF support allowed the initiatives supported by these two streams of funding to be led by champions who had the vision to engage with, but remain at arm's length from, established regional organizations. The structural and financial independence that was made possible by GEF support allowed the initiatives to establish links with other regional organizations without having to deal with the constraints of larger bureaucracies, or with processes that might have compromised their ability to adapt to the evolving regional context. This flexibility was a key factor in the remarkable accomplishments of these two funding streams. On the other hand, as illustrated above, insufficient linkages with existing regional structures may also result in lost opportunities to follow through on these accomplishments.

6.3 Support to the Regional Environmental Architecture

Over the last 20 years, the GEF has become the primary funder of regional coastal and marine environmental initiatives in the SCS. Through these initiatives, the GEF has provided opportunities for other actors to expand their reach beyond the type of work and political scale with which they are normally engaged. These initiatives have also allowed the GEF to reach a wider network than expected, given its relatively short history in the region.

The GEF has so far provided the greatest amount of funding for regional-scale activities relating to international waters in the SCS, and in the EAS in general. As table 6.2 shows, GEF support to regional issues in the EAS is almost equivalent to the support provided by all other major donors combined since the 1980s. Its regional support in the SCS alone is greater than the support provided by any other donor to international waters and biodiversity initiatives in East Asia. Moreover, as indicated in figure 5.1, funding for regional environmental initiatives greatly decreased from 1990 to 1995 due to the shift in donor priorities to country- and local-level initiatives.

Although a social network analysis shows the GEF to be similar to development banks and international NGOs in terms of its function as donor and the actors with which it works, it is unique in that it provides grants rather than loans and implements interventions through other actors. Another characteristic that distinguishes the GEF from the banks is its focus on global environmental concerns; this translates into greater support for regional programs, whereas banks generally fund national projects that are often related to infrastructure. Bilateral donors, while providing long-term grants as does the GEF, have not sustained their regional engagement in a programmatic way

[8] The project had also been intended to coordinate with other major regional projects and programs, such as the SCS Informal Working Group, "with joint planning of workshops and groups of expert meetings to ensure complimentarity [sic] and provide mutual support to the activities undertaken by each project" (SCS TDA-SAP project document).

TABLE 6.2 **Donor Grants Related to Regional Coastal and Marine Environmental Initiatives in the East Asia Seas, 1988–2008**

Donor	Total grants (current million $)
GEF	~142.63[a]
Sweden	~42
Canada	>25.1
United States	>24.2
European Commission	21.3
Australia	>16.2
Netherlands	8.8
Switzerland	6.3
Italy	5.5
Germany	4.1
Japan	1.4

SOURCES: GEF Project Management Information System, AidData for bilateral donor investments, and project documents.

a. Of this amount, $57.5 million is incident on the SCS.

like the GEF, except perhaps in the Mekong River Basin.

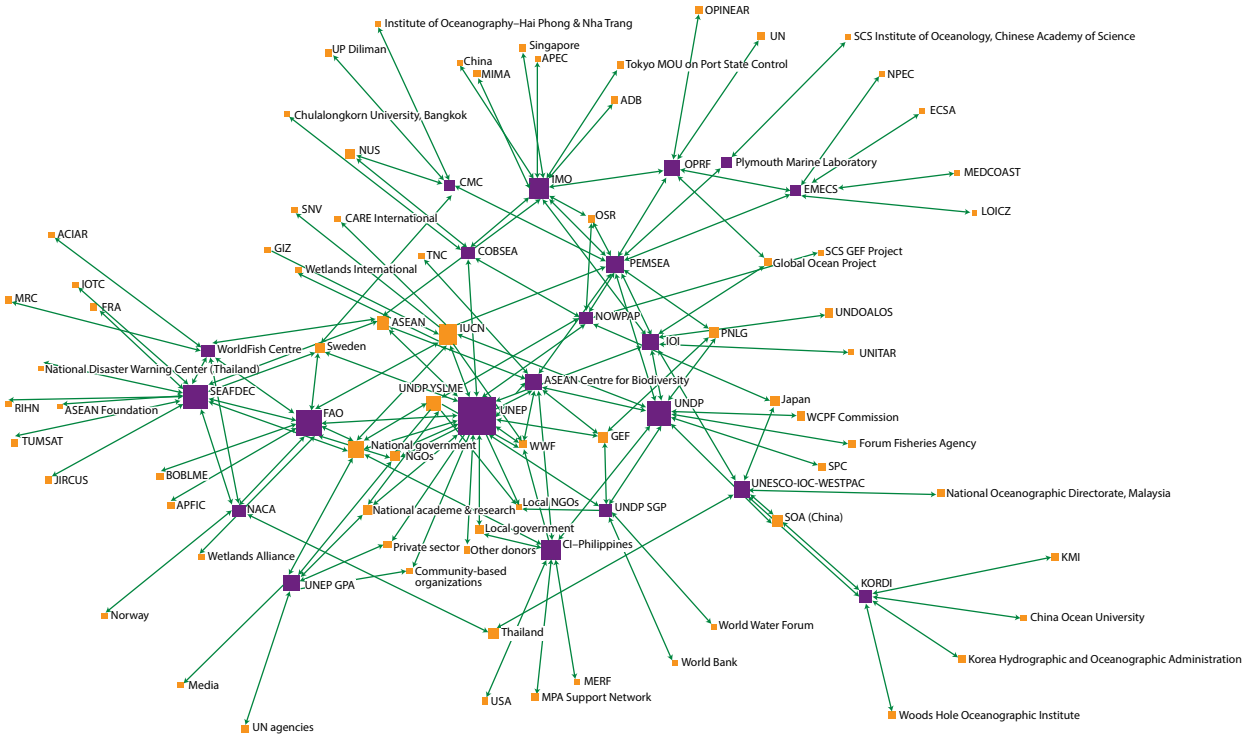
As a primary donor at the regional scale, the GEF has helped major regional actors further fulfill or expand their environment-related mandates. All major regional actors with the greatest longevity in the SCS have been partners in GEF initiatives, either as Implementing Agency, executing agency, cofinancer, or collaborator in one way or another. A social network analysis carried out as part of this evaluation shows that, among the long-standing multilateral organizations involved in coastal and marine initiatives (e.g., ADB, ASEAN, COBSEA, FAO, SEAFDEC, UNDP, and UNEP), strong links would exist even in the absence of the GEF and its initiatives, reflecting the history of interaction among these actors decades before the GEF entered the region.

However, GEF funding has helped most of these actors move beyond coordination and planning toward the implementation of environmental initiatives on the ground. For example, in the absence of the GEF, UNDP's only regional engagement in marine and coastal issues in the region documented by literature sources is with ASEAN.[9] The analysis of donor funding further reveals that UNDP does not fund regional coastal or marine-related projects, but rather provides funding through the GEF's SGP. ADB, FAO, and SEAFDEC have more recently gained access to GEF funds in the region either as a GEF Agency (ADB and FAO) or as an executor of GEF projects (SEAFDEC). Only ASEAN and COBSEA have not directly received or managed GEF funds, but GEF initiatives have had some level of engagement with these organizations.

GEF support has helped link actors that generally work either outside the region or at the country level—such as the World Bank, the SCS Institute of Oceanology, the Plymouth Marine Laboratory, and the World Water Forum—to the SCS regional arena (figure 6.1). Through a social network analysis of responses from a survey of organizations on which actors were most important to their coastal and marine-related work, these four actors were shown to be completely cut off from the network without the connections that resulted from GEF-supported initiatives (figure 6.2). Further analysis of the reach of actors in the network with and without the GEF shows that some actors would have their reach reduced by as much as 44 percent in the absence of GEF initiatives. As there is no counterfactual, there is a possibility that these links could have been established through means other than those supported by the GEF. Nonetheless, the GEF's linking role was confirmed by a survey conducted as part of the evaluation as a

[9] This specific literature-based analysis focused on the function of organizations pertaining to environmental initiatives. Thus, some organizations—such as UNDP—that had a strong presence in the region but were not active in such initiatives might be seen as less central or as having less influence in the network.

FIGURE 6.1 **South China Sea Regional Network of Environmental Actors Including the GEF and Its Initiatives**



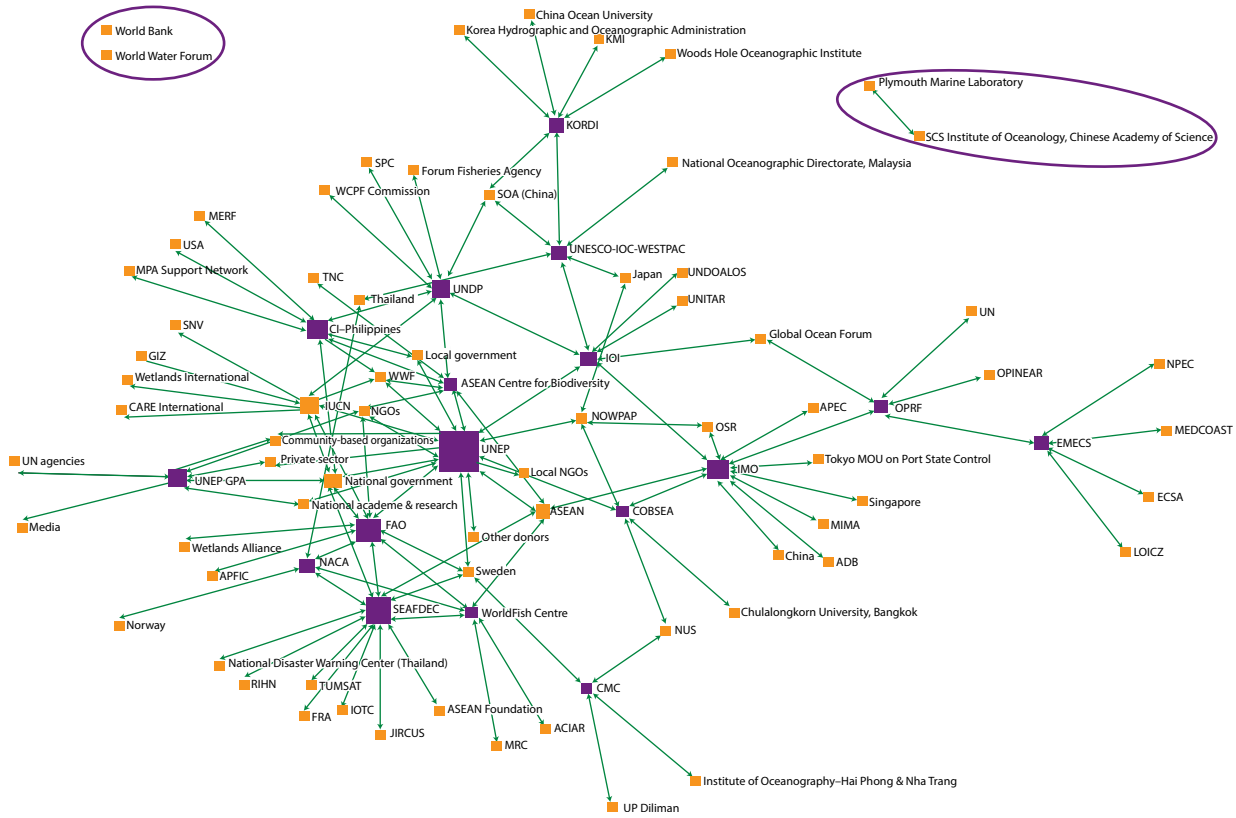
NOTE: Size of square represents relative influence using Bonacich power as a measure of centrality; purple squares represent actors whose absence would result in some groups being completely cut off from the network.

benefit to less prominent actors within the region. Some respondents viewed the GEF as a means of reaching a greater number of stakeholders that are part of their mandate to serve, and as a regional platform on which to establish partnerships.

The GEF has also provided opportunities for the regional participation of bilateral donors that generally provide significant funding only at a national scale. Specifically, Denmark and Japan are the largest bilateral donors in the SCS countries where they work, but do not play a large role in regional-scale international waters–related initiatives. Projects supported by the UNDP PEMSEA stream have been able to attract cofinancing from these countries. Bilateral donors that have supported a portfolio of regional work similar to the GEF's—such as Australia, Canada, Sweden, and the United States—have also become cofinancers of GEF initiatives (see annex 4A, table 17).

Despite its relatively short history in the region, the particular set of partners and types of initiatives that the GEF has chosen to work with give it a wide reach across almost the entire network of SCS actors—a characteristic similar to that of long-standing regional organizations. The "reach" of an actor in a network is the proportion of other actors to which it has access through its direct links or through the links of the actors to which it is connected (Hanneman and Riddle 2005). A social network analysis of the key regional actors in the SCS indicates that the GEF has only a modest number of direct links to other actors at the first degree of separation, primarily UN agencies, development banks, and regional coastal management

FIGURE 6.2 **South China Sea Regional Network of Actors Showing Disconnection of Nonregional Actors in the Absence of GEF Initiatives**



NOTE: Size of square represents relative influence using Bonacich power as a measure of centrality; purple squares represent actors whose absence would result in some groups being completely cut off from the network.

bodies. At the second degree of separation, this reach expands to 80 percent of the network—similar to UNEP's and greater than that of ADB, ASEAN, or IUCN. With this broad reach, the GEF has a strategic position in mainstreaming global environmental objectives in the regional agenda (table 6.3). While its position is not unique, nor is it as central as longer-established organizations, the GEF's comparative advantage is that it is able to link its regional efforts with initiatives and institutional actors at lower scales through its various funding mechanisms. Also, as a major donor in large marine ecosystems worldwide, the GEF has been providing access to lessons learned across regions and to other global institutional actors

TABLE 6.3 **Network Reach of Selected Major South China Sea Actors (%)**

Actor	Reach at 1° separation	Reach at 2° separation
ADB	24	73
ASEAN	27	67
COBSEA	16	53
FAO	16	53
GEF	24	80
IUCN	31	78
SEAFDEC	18	53
UNEP	27	80
UNDP	11	58

NOTE: Network reach is defined as the percentage of actors reached in the network.

for over a decade through IW:Learn, a web-based initiative.

6.4 Processes Facilitating Regional Collaboration and Trust

GEF support has provided increased opportunities for coordination and information exchange among key actors in the region, gradually helping to build trust; this has, in some cases, led to cooperation among countries on actions addressing transboundary environmental concerns.

Given the complex geopolitical dynamics in the SCS, any effort seeking progress in regional environmental governance will have results that are difficult to predict. Nonetheless, research on such complex systems provides evidence that better communication among actors and opportunities for interaction tend to foster trust and cooperative behavior (Brondizio, Ostrom, and Young 2009; Fidler and Johnson 1984). A way to measure the GEF's contribution toward regional environmental governance is to assess the extent to which GEF support is fostering better communication, and the extent to which there are indications of cooperative behavior among countries that can be linked to this support.

While cooperative behavior can only be attributed to the countries, the GEF's role has been to support conditions that are conducive to cooperative behavior. As discussed in the previous section, GEF initiatives such as PEMSEA and the SCS TDA-SAP project have provided many new opportunities for interaction across the region among countries, local governments, regional organizations, civil society (including academic and research institutions), and the private sector. These opportunities have allowed both government and nongovernment actors to identify common concerns and eventually work together.

The SCS TDA-SAP project, for example, supported regular meetings of national and regional working groups which brought scientists, legal practitioners, and mayors together around six specific areas of transboundary concern in the SCS. Many of these groups have been task oriented and have required that individuals from different institutions and countries work toward specific objectives over a period of time (Vo and Pernetta 2010). Similarly, the networks and the triennial EAS Congress that PEMSEA has supported provide staff from governments, regional organizations, and other stakeholders with opportunities to build relationships and learn from one another's experiences. The Mekong River Basin Water Utilization project was aimed at encouraging the participation of the upper riparian countries—China and Myanmar—in the MRC policy dialogue and in technical activities related to the project. Through this engagement, there has been some improvement in the cooperation between upstream and downstream countries through data and information sharing (IEG 2012). These initiatives have also made extensive use of the Internet to make GEF-funded knowledge products and lessons learned, such as guidelines and case studies, more available to a broader set of stakeholders.

GEF initiatives have provided new channels by which countries can participate in the regional arena, further decentralizing the network of regional actors in the SCS and increasing information exchange and opportunities for collaboration. The GEF has contributed to intergovernmental processes by supporting mechanisms for intersectoral discussion and priority setting. Through these initiatives, the types of actors in the regional network are further diversified and their functions duplicated, which adds to the resilience of a system (Newman and Dale 2005). The recurrent nature of interactions has helped establish relationships of trust among institutions and individuals, some of which over time have developed into action plans and cooperative arrangements among countries to address transboundary environmental concerns.

The evaluation identified three instances in which GEF support contributed directly to cooperation among countries to address transboundary environmental concerns that require a coordinated intergovernmental response.[10] The first is the Gulf of Thailand Joint Statement and Framework Programme for Joint Oil Spill Preparedness and Response, signed by Cambodia, Thailand, and Vietnam in 2006 with the support of the UNDP PEMSEA stream. It is the first arrangement for transboundary management of oil spills in the Gulf of Thailand. Previous attempts such as a regional oil spill response initiated by Japan in 1991 among ASEAN countries had not gained the support of countries until now. In the joint statement, the three participating countries commit to mutual support and assistance in oil spills in the Gulf of Thailand, and to a framework program that integrates implementation of the International Convention on Oil Pollution Preparedness, Response, and Cooperation; the 1971 Fund Convention; and the 1969 Civil Liability Convention as related to damage compensation. Progress made toward implementation of the framework includes a Gulf of Thailand web-based Information Sharing System (Thailand); a National Southern Oil Response Center (Vietnam); and a system for oil spill preparedness, response, and cooperation being developed by Cambodia.[11] This readiness and response system has also partnered with Oil Spill Response Limited (an oil industry–supported organization based in Singapore), the International Tanker Owners Pollution Federation, the IMO, and the U.S. National Oceanic and Atmospheric Administration.

The second instance of coordinated response is the Memorandum of Agreement between the provinces of Kampot, Cambodia, and Kien Giang, Vietnam, to protect transboundary seagrass beds—the first transboundary agreement of its kind in the SCS. This cooperation has consisted mainly of technical exchanges on knowledge and technology to protect the seagrass ecosystem. Since the closing of the project in 2008, exchanges between the two provinces have taken place every six months with the encouragement of the central governments and entirely financed with country funds. This is the first ongoing collaboration of the two countries in decades. The GEF has indirectly supported this improved management of the seabeds in Kampot by expanding the seagrass area under protection from 900 to 2,500 hectares. Besides funding through the UNEP SCS stream, it has also been supported through the UNDP SGP stream. The GEF provided timely support to the sites, building on previous initiatives and leading to additional support from other donors, such as CWDDC-Action Aid, the Danish International Development Agency (DANIDA), and FAO. This experience has generated much interest in other parts of Cambodia, although at the moment no funding seems forthcoming from other donors due to a shift in priorities.[12]

The third instance of a coordinated intergovernmental initiative to address transboundary environmental concerns is more significant, but perhaps less visible: the engagement of China and the coastal ASEAN countries in the elaboration of the SCS SAP. While China has been eager to maintain good relationships with its ASEAN neighbors, it has also put a high priority on its maritime claims over the SCS. Countries such as Indonesia and Malaysia place a similarly high value on

[10] See section 3.2 for a discussion of the different types of responses to transboundary environmental concerns.

[11] Regulation for the use of dispersants was still in the process of being approved in Cambodia as of September 2011.

[12] DANIDA, the most important funder for fishery and coastal issues in Cambodia in 2010, decided to shift its support to health issues.

maintaining good relationships with their neighbors, as well as a high premium on noninterference by other countries in their internal affairs.

One of the contributions of the SCS TDA-SAP project has been to work with countries to identify ways in which they can cooperate toward regional environmental goods. This was accomplished through joint formulation of a TDA that identified priority coastal and marine concerns in the SCS and their root causes, and of an SAP, which included agreed-upon actions to be undertaken in a coordinated manner by governments to address such concerns. The preparation stage of the project required long, drawn-out negotiations and delays in project preparation and implementation start-up.[13] Progress could be made only after there was agreement and understanding among all parties that the project would not address any topic or activity in disputed areas, and that the project would not seek the establishment of a convention of a legally binding framework.[14] The process was very slow, but an initial SAP was approved by the countries in 2002 for implementation by the project. A revised one was approved after much discussion in 2008; it notably identifies follow-up actions for management of transboundary fish stocks, as discussed in box 6.4.

[13] UNEP submitted its project development grant proposal to the GEF in 1996. The project coordinating unit was not established until February 2002.

[14] Chen (2005) provides a detailed description of the project negotiations.

BOX 6.4 Transboundary Fisheries Management through a Regional Fisheries Refugia System

Fisheries refugia integrate both fisheries management and ecosystem-based management by focusing on increasing fisheries yield through consideration of the ecological functions of habitats on which these fisheries depend. In contrast to MPAs which limit access to large areas of fishing grounds, fisheries refugia systems are comprised of specific pockets of habitat selected for, among other things, their high larval abundance or spawning populations rather than simply high fish abundance or habitat cover. Instead of restricting access, their focus is on sustainable use. They may apply management measures ranging from seasonal closure, exclusion of some fishing gear and methods, and seasonal restrictions on gear type. Small-scale fishers are not as restricted, realize direct fisheries benefits from management measures, and are therefore more likely to cooperate and even participate in the enforcement of these measures (UNEP 2007d).

High stakeholder acceptance was seen when a fisheries refugia system was tested in Phu Quoc, Vietnam, which was a coral reef and seagrass demonstration site of the SCS TDA-SAP project. The Philippines, Thailand, and FAO have mainstreamed the concept of fisheries refugia within their own fisheries programs. ASEAN and SEAFDEC adopted the guidelines formulated by the Regional Working Group on Fisheries in 2006 as part of the ASEAN-SEAFDEC Regional Guidelines for Responsible Fisheries in Southeast Asia for adoption in each member country. Subsequently, the fisheries refugia system was promoted as a tool in the Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region toward 2020 adopted by the ASEAN-SEAFDEC ministers in April 2012.

To be successful, a regional fisheries refugia system requires coordinated planning and sharing of information, as well as country commitment to ensure that activities will take place at specific sites across the SCS. As fisheries refugia do not include migratory paths of fish stocks, none are in areas under dispute. By improving the management of a regional resource, fisheries refugia are likely to improve local productivity and livelihoods (in some cases, income substitution options might also be required). Thus, a regional fisheries refugia system is an example of a management initiative that requires minimal intergovernmental coordination, provides direct local benefit, contributes to regional goods, and results in high transboundary impact.

6.5 Trade-offs between Country Priorities and Regional Concerns

GEF support has mostly been able to move the transboundary environmental agenda forward where there is alignment with country priorities, and more specifically where countries derive direct benefits. Much slower progress is being made on issues that address common goods or that require coordinated intergovernmental responses. An important factor underlying the extent of accomplishment is maritime border disagreements among countries.

A central long-standing objective in the GEF international waters focal area is to catalyze multistate cooperation to balance conflicting water uses in transboundary surface or groundwater basins. As discussed in an earlier chapter, country disagreements over maritime borders generally make it difficult to address transboundary concerns that require action beyond coastal areas or on concerns related to common goods. It is difficult to get participating countries to agree to conduct research and monitoring activities in the high seas and in the contested islands. As a consequence, there is very little information on the condition of coral reefs beyond coastal zones, or on the effects of discarded mud cuttings during oil drilling operations—a factor that is becoming increasingly important given the expansion of oil prospecting in the region. Even though there is very strong evidence that fish stocks are declining and that all countries would gain from more productive fisheries, participating countries have been wary of entering into multilateral regional arrangements or in supporting activities related to the management of transboundary fish stocks.

The GEF's approach to the constraints posed by disagreements on maritime borders—as manifested in its strategic programming and in the design of its projects—has been to facilitate consensus among the participating countries and support regional cooperation wherever possible. Most of the regional support provided by the GEF has been in the form of foundational activities (e.g., transboundary diagnosis, priority setting, knowledge generation). Environmental responses that have been supported by the GEF have taken place mostly at the country level, and on issues that do not require coordinated intergovernmental responses (see also Mee, Dublin, and Eberhard 2006). Moreover, countries have been mostly willing to participate in initiatives that bring clear country benefits.[15] ICM support, for example, has focused on pollution reduction in port cities. For the most part, these cities were starting to experience some of the detrimental effects of pollution, but were concurrently undergoing rapid economic growth, which made it economically feasible for them to address pollution. In several cases, there has also been a strong economic incentive for local governments to control or prevent pollution. In Xiamen, the showcase of GEF ICM–supported cities, the clean-up of the bay resulted in a sharp rise in property values and helped attract high-end soft industries to the city. For other coastal cities such as Danang, Sihanoukville, and Chonburi, a strong incentive to reduce pollution is to have clean beaches to support the growing tourism industry.

In the case of the World Bank IF sewage treatment plants, the GEF has, for the most part, been a minority partner of larger lending programs to improve water and sanitation that were agreed upon with the countries. The incremental value of GEF support was to help speed up the process of adoption, sometimes contributing to making the process more efficient through the introduction of new technology; technical assistance; and facilitating the sharing of lessons, approaches,

[15] Important exceptions include some instances of protection of endangered species (Xiamen). Section 3.2 includes a more detailed discussion of the different transboundary dimensions of coastal and marine concerns.

and learning across the region.[16] As discussed in chapter 3, land-based pollution in the SCS is transboundary largely in the sense that, when accumulated, it can have impacts of regional or global significance. For the most part, the countries that generate pollution are the same that face the most direct impact within their own territorial waters. Thus, there is a direct incentive for the country to resolve the issue when serious problems are manifested, and the needed responses do not require high degrees of cooperation or coordination among countries.

Initiatives supported by the GEF that are geared toward tackling concerns that require coordinated intergovernmental management of resources, or that address common goods (i.e., transboundary areas and resources), tend to progress much more slowly. The Mekong River Basin Water Utilization Project had as an objective a regional good—to support countries in reaching agreement on a set of water use rules and water quality criteria expected to improve management of the Mekong River and the Mekong Basin systems. A field-based evaluation of the project by the World Bank Independent Evaluation Group concluded that the project

> was based on the unrealistic premise that a fully scientific approach could replace case-by-case negotiations… None of the projects wanted to precommit to these criteria that would result in an automatic approval or rejection of a development proposal rather, parties to the Agreement wanted to run the [decision support] model supported by the project the other way: by looking at a specific development proposal and then using a variety of model outputs to decide whether or not they liked the proposal (IEG 2012).

In effect, countries preferred to use the decision support framework developed by the project as a tool to assess the extent to which any given project proposal would affect their interests. Officials interviewed in Thailand and Vietnam reported that they find the decision support framework reliable for modeling water flows, and that they are using it for assessments in several basins in their respective country.[17]

During the first project of the UNDP PEMSEA stream (MPP-EAS), there were attempts to have coordinated regional and transboundary initiatives, such as a regional information management and monitoring system composed of a network of pollution monitoring sites, and cooperation among the countries bordering the Malacca Straits to collectively address marine pollution and safety problems caused by shipping activity. None of these efforts progressed significantly beyond the first project due to political factors. From the beginning, PEMSEA has taken a deliberate approach to "tackle activities that will promote environmental improvement and harmony in the region" and "with due consideration to the [geopolitical] sensitivity in the South China Sea."[18] Thus, the SDS-SEA includes in its objectives the management of transboundary areas, areas of transboundary significance, and transboundary risks and threats, but does not explicitly address these concerns in its implementation plan. It has instead focused on the promotion of standard approaches and technologies throughout the region (e.g.,

[16] The issue of incremental value of IF activities is addressed on the basis of information obtained from sampled sites in table 8.2.

[17] A gap identified by the World Bank Independent Evaluation Group is that while the decision support framework adequately models water flows, it does not include a model to capture levels of sedimentation, which are critical for fisheries in the Tonle Sap, the flooding of rice fields, and offshore fisheries in the Mekong Delta (IEG 2012).

[18] Formal response (received via email) to draft evaluation report by Chua Thia-Eng, EAS Partnership Council Chair, September 21, 2012.

ICM, PSHEM), extensive exchanges on lessons learned through various venues (e.g., the EAS Congress, the PNLG), and the agreement to act on common priorities that contribute to addressing transboundary environmental concerns, without countries needing to coordinate their actions. This approach has been effective in making progress toward shared SDS-SEA targets, as even municipalities and provinces are able to implement actions without cooperation from or coordination with their respective national governments.

The focus of the SCS TDA-SAP project from the beginning was the management of transboundary areas (e.g., seagrass beds) and transboundary resources (i.e., fisheries). This was the rationale for using a TDA to prioritize the concerns to be addressed. Due to the geopolitical sensitivity and the consequent difficulty in achieving consensus among countries, the SCS SAP similarly does not specify any actions that require a high level of intergovernmental coordination. Actions in targeted habitat sites are aimed to collectively improve total habitat cover in the SCS, thereby increasing the sum of benefits derived from the ecological services provided by these habitats. Protection and rehabilitation using an ecosystem-based approach may also have transboundary consequences, as these habitats may provide food and shelter either to migratory species or to species that are important to the region as a whole, even though the individual genetic and ecological populations may be wholly within national boundaries.

One of the most important concerns identified by the TDA is depletion of fisheries in the SCS. Consequently, transboundary fisheries were an important point in the discussion contributing to the delayed preparation and start-up of the SCS TDA-SAP project. An outcome of the negotiations was to limit the fisheries activities of the project to the Gulf of Thailand. Also, two countries (China and Malaysia) chose not to participate in the fisheries or coral reef habitat components of the project. The project's terminal evaluation reports that the lack of Chinese and Malaysian participation in the fisheries component affected the project's ability to address sustainable management of transboundary fish stocks in the SCS and Gulf of Thailand.

Instead of demonstrating the approach in each participating country, the focus of activities undertaken as part of the project was to prepare the basis for the establishment of a regional fisheries refugia system. The Regional Working Group on Fisheries formulated guidelines for the establishment of a fisheries refugia system as a tool for managing fish stocks of transboundary importance in the Gulf of Thailand. This effort included identification of specific areas of significance to the life cycle of these fish stocks in time and space, and the identification of plans to safeguard spawning and nursery grounds. One regional and four national plans for fisheries refugia systems were developed. To prioritize areas important for the protection and management of transboundary fish stocks, 52 locations that were known to be important spawning and nursery habitats were assessed. Of these, 14 were identified for priority action; 9 other sites were identified for action in a second tier of priority.

The proposal for a regional fisheries refugia system in the SCS is particularly significant. It provides a framework to identify feasible country- and local-scale responses in time and space to improve transboundary fish stocks in the SCS, which no other multilateral planning instrument or agreement has dealt with previously. While fisheries refugia require coordination and information exchange among countries, once sites are identified and guidelines for management agreed upon, the system's actual implementation can be done in each country independently, as noted in box 6.4. The participating countries of the Regional Plan of

Action to Promote Responsible Fishing Practices Including Combating Illegal, Unreported, and Unregulated Fishing have discussed developing the concept of fisheries refugia in the Gulf of Thailand through further research, to be facilitated by SEAFDEC with funding from the GEF. As indicated in a 2009 Regional Plan of Action Subregional Meeting report, bilateral agreements are seen as the appropriate instrument for transboundary fisheries management (SEAFDEC 2009). A GEF project proposal to implement the regional fisheries refugia system through the UNDP SGP stream of funding as part of a larger SAP implementation initiative is now being prepared.

7. Coordination within the GEF Partnership

7.1 Coherence of GEF Support

Minimal communication and collaboration among complementary GEF initiatives in the international waters programmatic approach have resulted in lost opportunities for the GEF to make more contributions in the region.

A programmatic approach has been an important feature of GEF international waters support since the publication of GEF Operational Programs 8 and 9 (respectively, the Waterbody Based Operational Program and the Integrated Land and Water Multiple Focal Area Operational Program) in 1996. This approach has allowed the GEF to tackle multiple dimensions that need to be addressed over an extended period of time. Such dimensions have included the need for better understanding of the interactions of diverse natural systems within a broad geographical area, the engagement of multiple countries and stakeholders at various scales, and—stemming from these—the long and unpredictable timelines within which results take place. GEF Agency cooperation and partnership were identified as a critical assumption of the GEF's programmatic approach to international waters outlined in Operational Programs 8 and 9. Thus, since 1996, and very deliberately by 2000, GEF international waters projects were designed and approved with the expectation that mutual interaction and consultation would take place, so as to ensure coherence among projects in the region. The intention was to enhance the likelihood of collaboration beyond GEF support, and the possible amalgamation of projects into a future regionally comprehensive umbrella (Duda 2001). That GEF projects in the region were intended to work together is further reinforced in the design of projects, as noted in the project document of the SCS TDA-SAP Project:

> Co-ordination with the work of the Mekong River, World Bank/GEF project will be assured through convening of joint expert group meetings, and through participation of experts from each project in meetings of the other as appropriate. Similar arrangements will be made with the UNDP/IMO/GEF, East Asian Seas Project (Talaue-McManus 2000).

Despite this clear intent from GEF support and the opportunities for complementarity and coordination, funding streams in the SCS—except the SGP—have developed with little interaction with one another, each establishing its own mechanisms, processes, identity, and links with country and regional stakeholders. For example, the UNDP PEMSEA and UNEP SCS streams, working in isolation from one another, each developed an impressive regional architecture that included its own councils of high-level government representatives in the form of project steering committees and its own networks of scientists, local government heads, and legal experts. Both funding streams have also made wide use of meetings or

congresses as a means to help build relationships among individuals and organizations across the region, but they have mostly done it independently from one another.[1]

Environmental concerns common to the two streams were also addressed independently. From a pollution focus in 1993, the UNDP PEMSEA stream in 1999 moved into a sustainable development focus that includes coastal habitat management at ICM sites; the SCS TDA-SAP project has also attempted to address pollution-related issues at a local scale since it was approved in 2000. While environmental concerns such as pollution and habitats are more effectively addressed in an integrated manner, neither stream made use of the other's comparative advantages, and instead moved toward building new expertise within its respective initiatives.

With little communication over the years, the lack of coordination and collaboration sometimes took on a competitive dynamic that resulted in lost opportunities. During field visits for this evaluation, project staff working for one stream accompanied the evaluation team to a demonstration site of the other stream that was some 50 kilometers away, and remarked how this experience would have been very valuable for their project. There is also a tendency not to acknowledge or build on the work of the other stream when it would otherwise have seemed appropriate. For example, from a review of the SDS-SEA implementation plan adopted in July 2012, there are no clear steps on how the SCS SAP will be implemented through the larger framework of the SDS-SEA.

Both funding streams have developed different constituencies and support structures in the countries, some of which do not always work in the same direction. While one stream would establish its working relationships with one ministry, the other stream on occasion established working relationships with another ministry that might have a jurisdictional overlap with the first. This has resulted in situations where a particular national agency supports projects of the stream with which it is affiliated, but will oppose projects proposed by the other stream (Chen 2005). Despite more than 15 years of GEF support, poor interaction and a low level of collaboration among the GEF's funding streams have affected GEF performance and the potential for impact in the countries and in the region, resulting in multiple lost opportunities and inefficiencies.

7.2 Strategic Partnerships

While the GEF has attempted to improve coordination among initiatives through more strategic partnerships, differences in operational approaches and processes among GEF Agencies have led to initiatives being implemented without fully drawing on Agencies' comparative advantages.

The GEF Secretariat has tried to address coordination challenges in several ways, including by supporting strategic partnerships among Agencies. This effort was first tried in the Danube–Black Sea large marine ecosystem and was introduced in 2005 in the EAS. The main objective of the Strategic Partnership for Sustainable Development of the Seas of East Asia is to catalyze and scale up investment in land-based pollution reduction in coastal areas in East Asia. The partnership is a GEF-supported collaboration of the World Bank, UNDP, and PEMSEA; it includes a financing component and a regional component. The World Bank/GEF Partnership Investment Fund for Pollution Reduction in the Large Marine Ecosystems of East Asia (GEF IDs 2454/3025) is the financing component and is meant to be the primary financing arm of the land-based pollution

[1] The evaluation identified one instance of collaboration between PEMSEA and the SCS TDA-SAP project during the planning of the EAS Congress in 2006.

reduction activities proposed in the SDS-SEA. The fund's key expected contributions are the removal of barriers to investment in pollution control, demonstration of innovative technologies and techniques, and establishment of sustainable financing mechanisms for pollution control. The fund consists of $80 million of GEF financing over a period of 10 years,[2] plus an estimated $800 million to $1 billion in financing through the World Bank, international donors, and private sector investment.

The regional component of the strategic partnership is the SDS-SEA project. The project document lists one of its major outcomes as

> a strategic partnership for the Sustainable Development of the Seas of East Asia, functioning as a mechanism for GEF, the World Bank, the UNDP and other international and regional partners to incorporate and coordinate their strategic action plans, programs and projects under the framework of the SDS-SEA… (GEF and UNDP 2006).

The GEF allocated $720,000 to this project outcome. PEMSEA was to identify the required improvements in environmental infrastructure and services at ICM sites throughout the region; facilitate a policy and investment climate that promotes private sector participation; engage interested private companies in investment projects; and enable access to affordable and replicable financing mechanisms and best practices by collaborating with the World Bank, other international financial institutions, national governments, donors, and the financial industry on the fund's development.

[2] The fund was to be approved in three tranches over 10 years, subject to the availability of funds and the fulfillment of reporting and processing requirements. The GEF Council approves each tranche, and the GEF Chief Executive Officer approves each project for fund support on a rolling basis.

The World Bank document on the Partnership Investment Fund Brief (World Bank 2005) indicated that the SDS-SEA and investment fund projects

> implemented in parallel but with close coordination, would provide a mechanism for GEF, the World Bank, and UNDP to mainstream the objectives of the SDS-SEA into their regular programs, thus promoting greater sustainability and political commitment to the effort. Each would use its comparative advantages to strategically assist the countries in reaching their objectives.

The document also committed the World Bank to work closely with the regional component and for the fund's management team to coordinate on a regular basis with the PEMSEA Resource Facility through meetings and consultations.

The World Bank was made responsible for reporting results to the GEF and PEMSEA on an annual basis. As a member of the GEF Strategic Partnership for Pollution Reduction in the Seas of East Asia, the World Bank signed a memorandum of understanding with PEMSEA in November 2009 to become a sponsoring organization for implementation of the SDS-SEA through demonstrations of technology to control land-based pollution. PEMSEA and the World Bank also committed to annually review the progress of partnership projects, and to periodically evaluate the effectiveness of their work collaboration.

The GEF Evaluation Office found one record of a World Bank annual report on the investment fund dated January 2010. Apart from the participation of project staff from the World Bank IF stream in past EAS Congresses, there was little evidence found of coordination and communication during project implementation between the two components of the partnership in meeting their mutual objectives. The Office found no evidence of regular workshops

with the participation of PEMSEA, the World Bank, and UNDP to review progress of all partnership projects, or of any evaluations of the partnership's effectiveness.[3] In an interview, a representive of the World Bank disclosed to the Evaluation Office that, given its country orientation, it is not well set up to deal with regional initiatives, but indicated that PEMSEA could have been more proactive. PEMSEA, on the other hand, indicated that while the World Bank wanted to move ahead in implementation to keep to its schedule, PEMSEA felt that more time was necessary to conduct stakeholder consultations, achieve buy-in, and ensure that technology recipients had the financial and administrative capacities to sustain the introduced technologies. Thus, even in this case where the GEF financed the costs of communication, coordination, and collaboration within the GEF partnership, these did not take place, or occurred to a much lesser extent than expected.[4]

The EAS Stocktaking Meeting for the Strategic Partnership took place in October 2010; the Evaluation Office attended as an observer. During the meeting, one country representative voiced concerns with regard to the coordination of GEF support in the region. No discussion took place on the lack of coordination within the strategic partnership. The chair's summary of the meeting addresses issues pertaining to the coordination and cooperation of organizations across the EAS in general, concluding that "the coordination and synergies among projects and programmes at the regional and national levels is weak" (PEMSEA 2011a). The report highlights the need for increased GEF programmatic investments in the EAS region, specifically on how

> GEF agencies now need to work with countries to develop the regional and national projects using a programmatic approach for submission to GEF in order to support the regional implementation of SDS-SEA (final phase), the Yellow Sea Large Marine Ecosystem Project SAP and the SCSLME [large marine ecosystem] SAP as well as to scale up country-based actions along the lines of the identified thematic priorities.

PEMSEA was identified as the most well-positioned regional organization at present to take on a coordinating function, not just for GEF projects but for all regional organizations involved in the EAS. This rationale was used as an impetus to request further GEF support to the region.

In November 2011, the Program Framework Document for Scaling Up Partnership Investment for Sustainable Development of the Large Marine Ecosystems of East Asia and Their Coasts (GEF ID 4635) was presented to the GEF Council in the amount of $47 million. This includes $1 million for a knowledge management project to be executed by PEMSEA. The scale-up project once again promises regular liaison and meetings between the World Bank and PEMSEA, and highlights the complementarity of each institution's comparative advantages. In parallel, UNDP is preparing a proposal for the last phase of GEF support to PEMSEA (GEF ID 4936) for $10.8 million. This project is to provide enhanced support to PEMSEA

[3] There is a record of a meeting held in the Philippines in 2008 by the World Bank, UNDP, PEMSEA, and the GEF Secretariat to design a management framework to facilitate interaction (annex D, p. 40, of the Program Framework Document for Scaling Up Partnership Investment for Sustainable Development of the Large Marine Ecosystems of East Asia and Their Coasts [GEF ID 4635]).

[4] PEMSEA reported that, recently, coordination between it and the World Bank has improved and provided as evidence their development in late 2011 of a Program Framework Document for Scaling Up Partnership Investment for Sustainable Development of the Large Marine Ecosystems of East Asia and Their Coasts (GEF ID 4635). The World Bank reported that it has frequent and constructive communications with PEMSEA that facilitate country and regional dialogue on both sides.

for an expanded coordination role in the region, particularly with regard to other GEF projects.[5] The project is part of a larger program for the integrated implementation of the SDS-SEA and the Yellow Sea SAP, which is up for approval by the GEF Council in November 2012. No mention is made in either document of lessons learned from the previous phase with regard to coordination or interagency communication, or of how this area of risk would be managed.

Differences between the World Bank and PEMSEA lie in distinctive, complementary competencies, which make for a high collaboration potential but also highlight differences that need to be resolved. Business cycles, business needs, and country counterparts for the World Bank and PEMSEA differ. PEMSEA works at the municipal level and seeks to draw funding to implement ICM activities among its constituent municipalities. PEMSEA is committed to ICM, which is a process that both takes time and yields multiple benefits. The World Bank, on the other hand, works mostly with national ministries, such as those dealing with finance and public works. The World Bank structures its lending programs, which can involve hundreds of millions of dollars, on the basis of priorities set at the national level. It then taps GEF grants for specific purposes that contribute to these priorities, such as financing the additional costs for testing new systems or technologies. Unlike UNDP or UNEP projects, where the GEF tends to be the majority funder, the GEF grant in a World Bank project normally covers a very small portion of the total investment.

[5] PEMSEA has begun to do this through the membership of the UNDP-implemented Yellow Sea Large Marine Ecosystem Project TDA-SAP (GEF ID 790) and the UNDP SGP in the PEMSEA EAS Partnership Council since 2006.

Differences in clients also play a role. PEMSEA is well positioned to work with municipalities and provinces, and has established long-term relationships with these. The World Bank needs to interact with its national counterparts when choosing, for example, the specific municipality in which wastewater treatment plants are to be constructed. It is well equipped to deal with country operations and private sector investments, but not to interact with regional processes.

An example of where these distinctive competencies could have resulted in a synergistic collaboration involves interactions with the private sector. In sites such as Bataan in the Philippines, PEMSEA successfully facilitated a partnership between the private sector and the provincial government. Eighteen companies came together to form the Bataan Coastal Care Foundation as a corporate social responsibility facility that funds 50 percent of the province's coastal zone management projects. PEMSEA was able to capitalize on its strength of building partnerships with various sectors. The case was different in the development of PPP projects, where private sector investment in infrastructure projects is the main objective. PEMSEA has years of experience in organizing roundtables for potential investors and connecting them with local governments. However, it does not have the experience the World Bank has in assessing the financial feasibility of an investment and in ensuring that an infrastructure project is completed. In PEMSEA's medium-size PPP initiative in Puerto Galera, the Philippines, the World Bank was not involved at all. Instead, a project funded by the U.S. Agency for International Development on sustainable coastal tourism that was being implemented at the site was the main partner in the endeavor. An agreement was successfully signed between a private investor and the municipal government through PEMSEA's facilitation, but the project could not be implemented as scheduled due to factors the feasibility study had not identified. These factors

included stakeholder acceptability, which became an obstacle to acquiring access and rights to the project site; and lack of funds from the government, which had been slated to come from tourist fees.

7.3 Low Level of Coordination: Factors and Implications

Lack of incentives and accountability for coordination among GEF Agencies has led to a low level of coordination within the GEF partnership. This, in addition to complex regional factors, has contributed to increased transaction costs to countries and competition for funding among regional initiatives.

GEF support has contributed to increased communication among the various regional organizations and to cooperative engagements among countries. The three main streams of funding financed under the international waters focal area have also resulted in robust initiatives, all of which have made important contributions to the resolution of transboundary environmental concerns. However, these initiatives working in isolation from one another have undercut the potential for the GEF to offer the comprehensive solutions needed to address the challenging transboundary concerns in the region.

A complex set of factors accruing over the last 20 years has contributed to this situation. Border disagreements among countries have placed limits on the type of support the GEF can provide and issues it can address. Country priorities have been a major factor underlying the kinds of transboundary environmental responses that may be supported by GEF projects. Early events contributed to paths that, over time, resulted in increasingly divergent—and in some ways overlapping—initiatives. Given the increasing demand for GEF international waters funds and the limited resources available, GEF-supported initiatives now compete for the resources that the GEF is able or willing to allocate to the SCS.

Structural factors within the GEF partnership have also played a role. The dynamics of project implementation by GEF Agencies are greatly influenced by each Agency's business needs, cycles, and clients. Since they have equal standing in the GEF partnership, none of the Agencies has the authority or incentive to convene others for collaboration on similar initiatives. In the past, the International Waters Task Force convened by the GEF Secretariat allowed for some coordination in the partnership (GEF EO 2005). With the loss of prominence of focal area task forces since GEF-4, the modest coordinating functions of the International Waters Task Force have been further reduced. In recent years, the GEF has been experimenting with programmatic approaches such as the Coral Triangle Initiative, which seeks to tap the competencies of several Agencies. The GEF has tried to ensure coordination by assigning a lead Agency to coordinate joint implementation of projects, but these lead Agencies report that they find it difficult to engage other Agencies, as cycles, reporting requirements, and priorities differ. While the GEF Secretariat is keenly aware of Agency collaboration as an important ingredient for success, the lack of such coordination and collaboration has carried no consequences.

A distinct exception among GEF-supported initiatives is the UNDP SGP funding stream, which has consistently coordinated and collaborated with other actors in the GEF partnership. The SGP needs to draw its funds from the different focal area allocations. Because of this, it has a strong incentive to support the objective of full-size projects carried out by GEF Agencies by implementing local-scale interventions of these projects. The SGP has long-standing collaborations with the UNDP PEMSEA and the UNEP SCS streams through their respective demonstration sites (box 7.1).

BOX 7.1 **The GEF Small Grants Programme: Successful Partnerships across GEF Funding Streams**

The GEF SGP implemented by UNDP is a corporate program that provides funds to small, community-based projects, thus differing substantially from the other SCS funding streams. Notably, the SGP is the only funding stream that has successfully implemented initiatives in the SCS in coordination with other GEF funding streams.

The SGP signed a joint communiqué with PEMSEA in 2003 to strengthen the role of local community organizations in SDS-SEA implementation. The SGP also became a PEMSEA noncountry partner in 2006. The partnership has primarily involved technical support in ICM implementation at the community level at PEMSEA's existing ICM sites, as well as information exchange through such events as the EAS Congress. Six small projects have been completed in Cambodia, the Philippines, Thailand, and Vietnam, while five more are currently being implemented. About eight additional projects have been identified for implementation in Indonesia and Lao PDR, as well as in the other countries. Regional activities have consisted mainly of meetings, a website, and the EAS Congress, with funding from PEMSEA going toward supporting travel and participation costs of site representatives. As of September 2012, a total of $142,665 had been provided to the SGP PEMSEA initiative as counterpart funding from PEMSEA and the project management offices of the sites.

In 2008, the SGP signed a legally binding agreement with the SCS TDA-SAP project to jointly fund projects for SAP implementation. Much emphasis has been given to capacity building and information dissemination—not just among communities, but also among national coordinators and NGO representatives through forums. Capacity building was aimed at mainstreaming regional priorities identified in the SAP at these lower scales. As of 2011, 31 SGP projects in six SCS countries had been supported through this partnership, 16 of which were supported through $600,000 in funds from the SCS TDA-SAP project. A regional knowledge exchange component was added later to consolidate and disseminate regional lessons in international venues. Currently, there are discussions to implement the fisheries refugia component of the SCS SAP through several SGP projects.

There are several important implications of the ways in which GEF support has affected country outlooks toward regional mechanisms. The growing number of regional organizations—several of which are not fully financed—is a concern that was voiced by some country representatives interviewed for this evaluation, and was also mentioned in other assessments of regional environmental organizations pertaining to the EAS (e.g., Kato and Takashahi 2001; MFF 2009).

The lack of coordination among the GEF's otherwise complementary main financing streams has contributed to higher transaction costs for some of the countries, requiring governments to spread their qualified staff thin, as reported to the Evaluation Office. GEF support has also contributed to yet more regional initiatives that have gone uncoordinated and that, to be sustained, require high levels of financial and political support from countries.

8. Supporting the Country Enabling Environment for Addressing Transboundary Concerns

8.1 National Context

Given the high sociopolitical and environmental diversity of the countries in the SCS, actions appropriate to each country's unique characteristics are needed at the national and local scales to contribute toward addressing transboundary concerns at the regional scale.

The SCS (including the Gulf of Thailand) is surrounded by Brunei Darussalam, Cambodia, China, Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam. Parts of Lao PDR and Myanmar also drain into the SCS. Of these countries, Brunei Darussalam and Singapore are not eligible for GEF grants. Although Lao PDR and Myanmar have participated in a few international waters–relevant GEF projects that have some incidence on the SCS, none of these projects had activities targeted at the local and national scales. The focus of this discussion is therefore on the seven countries that surround the SCS and have received GEF support for activities implemented in these countries.

The seven countries covered by the evaluation differ in terms of political economy and institutions. The region is socially and culturally complex. The population size ranges from 14 million (Cambodia) to 1.338 billion (China) (see annex 5, table 25). Political systems range from multiparty democracies in the Philippines and Thailand to a single-party socialistic political system in Vietnam and China. Cambodia, Malaysia, and Thailand are constitutional monarchies and have democratic parliaments; Indonesia and the Philippines are presidential republics. Although national governments occupy a central position in almost all decision-making processes, the countries have varying degrees of government decentralization, with some highly centralized and others at various stages of decentralization (Badenoch 2002; Siry 2007).

The countries also vary considerably in terms of their environmental characteristics. China and, to a lesser extent, Indonesia have a relatively large land area. Although Indonesia has the longest coastline, only a small percentage of it is contiguous to the SCS. In contrast, the entire coastlines of Cambodia and Vietnam are contiguous to the SCS. Indonesia and the Philippines have sizable areas of mangrove forest and coral reef (see annex 5, table 26).

The countries have varying degrees of economic activity in different sectors that are dependent on or affect the overall environmental status of the SCS, such as fisheries, conversion of coastal land, offshore mining, and maritime traffic (see annex 5, table 26). China leads the other countries in terms of fisheries and aquaculture production. Indonesia is reported to have the largest number of oil and gas rigs in the SCS region; Malaysia and Thailand also have substantial numbers. China contributes

significantly more organic water pollution than the other countries, although only a part of this emission is incident on the SCS. Container port throughput may be considered an indicator of the sea traffic originating in and being handled by a country. Chinese ports handle much higher amounts of cargo than the ports of other countries in the SCS (as well as the rest of the world). Overall, Malaysia seems to be the most advanced in terms of development indicators. Cambodia still lags behind on most indicators, despite relatively rapid growth in this regard over the past decade (see annex 5, table 25).

Environmental concerns were integrated into the public administration systems of several countries by the early 1990s, especially China, the Philippines, and Thailand. This integration was influenced by the Rio process and its aftermath, which espouses a development model that links social, economic, and environmental issues. Consequently, environmental ministries were established in several countries in the region at about the same period. Some countries also began to test environmentally sound development approaches. In China, for example, several coastal cities have pursued rapid economic growth strategies while committing to protect the environment. In the city of Hangzhou, the West Lake Ecological District has been charged since 1992 to ensure air and water quality while pursuing rapid economic growth. This city, like several other coastal cities in China, now houses thriving high-value manufacturing industries that produce little pollution (Dodson 2012). Thailand in particular had a notable civil society effort to include the environment in development in the 1980s, resulting in government commitment to environmental conservation in the 1991–96 National Plan (Harashima 2000). The Philippines began rather early with environmental mainstreaming of its environmental impact system in the 1970s. In 1992, following the Rio Earth Summit, the Philippines formed a national multistakeholder body to integrate economic, social, and environmental objectives known as the Philippine Council for Sustainable Development (Antonio, Bass, and Gasgonia 2012).

Since precolonial times, traditional governance systems such as *paglima laot* in Indonesia, traditional village rules in Vietnam, and traditional fishing rights of the *barangay* in the Philippines have functioned to regulate access to coastal resources in the SCS. But while traditional or community-based management systems have a long history in the region, these systems have been weakened or have disappeared in most places under the centralized management systems enforced by colonial administrations and, at independence, by the emergent new states. Centralized systems have been further reinforced by increasing encroachment of outsiders, market forces, and technological modernization (Pomeroy 1996; Pomeroy and Carlos 1997). Centralized management systems abound with laws, rules, and regulations, creating administrative structures that have been sectorally fragmented and that have generally been ineffective in regulating the use of coastal resources, which are diverse and scattered across the territory.

Since the 1980s, there has been a trend in the region to adopt decentralized policies to deliver services through provincial and local governments. The delivery of critical services in some countries now accounts for a significant fraction of total public expenditure. Reform processes are under way in almost every country, and demands for a system whose services reach the grassroots effectively are on the rise. In this context, ICM and comanagement approaches—which the GEF has been supporting—have gained traction in the region. Where more comprehensive decentralization approaches have been attempted, as in China, Indonesia, and the Philippines, they have generally functioned better. In China, for example,

the objective since the late 1980s was to transition from a centrally planned economy to a more market-oriented system and decentralized administration. Special economic zones were established, mainly in coastal regions, and have thrived (Lau 2005). In China and the Philippines, local fiscal systems have been institutionalized. Workers have been transferred from central ministries to local governments without significant disruptions; while challenges remain, local authorities have taken up their service delivery functions reasonably effectively. In these countries, decentralization has been accompanied with a tendency for the local devolution of management of natural resources. In Indonesia, Thailand, and Vietnam, while functions and services have been decentralized, control over fiscal resources has remained more centralized (Guess 2005; Lewis 2005; Tonami and Mori 2007). In Cambodia, Malaysia, and Vietnam, decentralization has produced some gains in service delivery at the local level, but there has been slower progress in terms of transferring decision-making powers and fiscal resources (Nooj 2008; Scott 2006). In Malaysia in particular, administrative and specifically fiscal resources remain highly controlled by the central government (Jalil et al. 2008; Phang 2008). In Cambodia and Malaysia, there is also insufficient legal recognition of the rights of local communities to manage natural resources (Nasuchon and Charles 2010; Siry 2006).

Challenges remain, such as the intensification of competition and conflict over resources (both among neighboring groups and with outsiders); low compliance and weak enforcement of current regulations; insufficient technical capacity to carry out environmental management; slow or partial decentralization with unfunded mandates; persistent legal, jurisdictional, and administrative overlaps and ambiguities; and institutional gaps at both the local and national levels (Pomeroy et al. 2007). Moreover, while decentralization follows the subsidiarity principle that was the mode of environmental resource management in many precolonial cultures, the present greater interconnectedness of local communities and global processes has created environmental challenges that cannot be addressed at local scales—therefore making decentralization an important but insufficient mode of governance when dealing with transboundary environmental concerns.

8.2 GEF Support at the National Scale

The total support provided by the GEF to address international waters–related transboundary concerns in the SCS is estimated to be about $115 million. Of this, an estimated $81 million provides support for activities that address international waters–related transboundary concerns at the national and local scales (see annex 2G, table 7). China has received more than double the amount of GEF grants to any other country in the region for international waters–relevant activities incident on the SCS at the national and local scales (table 8.1).

Almost all GEF projects in the SCS support the implementation of technologies and approaches and the increase of technical skills at the national and local levels.

Twenty-two GEF-supported projects included activities incident on the SCS, and targeted results at the national and local scales. The targeted scale of implementation of these projects varied and included national, provincial, or local initiatives or sometimes activities at the scale of a water body, such as a bay, involving several local governments and national agencies. An analysis of the activities of these projects shows that all included activities related to the testing of implementation strategies. Twenty projects (91 percent) included activities aimed at building institutional capacities, primarily involving the development of policy, legal, and regulatory frameworks as well as the establishment

TABLE 8.1 **GEF Funding for Activities Incident on the South China Sea and Targeted at the National and Local Scales**

Country	National components of regional projects[a]		National projects		SGP grants		Total GEF funding (million $)
	Funding (million $)	Number of projects	Funding (million $)	Number of projects	Funding (million $)	Number of projects	
Cambodia	2.64	3	3.60	1	0.05	2	6.29
China	5.13	5	27.47	5	0.09	2	32.69
Indonesia	2.08	4	1.15	2	0.04	2	3.27
Malaysia	0.00	0	1.60	1	0.34	8	1.94
Philippines	3.64	4	11.01	3	0.53	15	15.18
Thailand	6.44	5	0.00	0	1.44	111	7.88
Vietnam	5.59	5	7.75	4	0.37	10	13.71
Total	25.52	6	52.58	16	2.86	150	80.96

a. Projects in which multiple countries have participated; funding is estimated, and the details for these will not sum to the totals.

of permanent government structures and arrangements to continue implementation of GEF initiatives. Most projects specifically targeted awareness raising (77 percent) and the building of technical skills (95 percent). A smaller proportion of projects included activities that aimed to produce new knowledge (e.g., through primary research, 23 percent); or establish implementing mechanisms and bodies (36 percent), including financial mechanisms for the implementation and sustainability of demonstrated approaches (32 percent). Only a little more than half of the projects had activities contributing toward environmental monitoring and evaluation, and information sharing and access.

Fifty-seven percent of GEF funding for activities targeted at the national scale is implemented through projects from three funding streams–UNDP PEMSEA, UNEP SCS, and World Bank IF. The remainder is through 11 projects targeted at the national and local scales, or with components targeted at these scales, that are not linked to any of the three streams. Given the low level of support provided through the SGP, the evaluation does not deal extensively with activities targeted at the local or national scale implemented through this program.

The projects undertaken as part of the World Bank IF stream tend to have a relatively stronger emphasis on activities targeted at the national and local scales. Much of the GEF funding through the IF was utilized to undertake activities related to pollution reduction such as support for wastewater treatment plants, support to farmers to adopt livestock waste management practices, and support to build institutional capacities and share information that will help in scaling up the promoted approaches at the national level. In comparison, the UNEP SCS stream has given greater attention to transboundary concerns by developing national capacity for science-based planning and implementing actions to address regional transboundary concerns at the demonstration site level, while supporting avenues for information exchange and capacity development among the countries. The UNDP PEMSEA stream focuses on the regional and local scales, supporting governance processes at demonstration sites, but also providing significant attention to regional information exchange and mechanisms for collaboration. At the national

scale, it supports the mainstreaming of ICM toward widespread replication. The projects and activities at the national and local scales that are not linked with any stream are generally supported by other focal areas.

8.3 GEF Support at the Local Scale

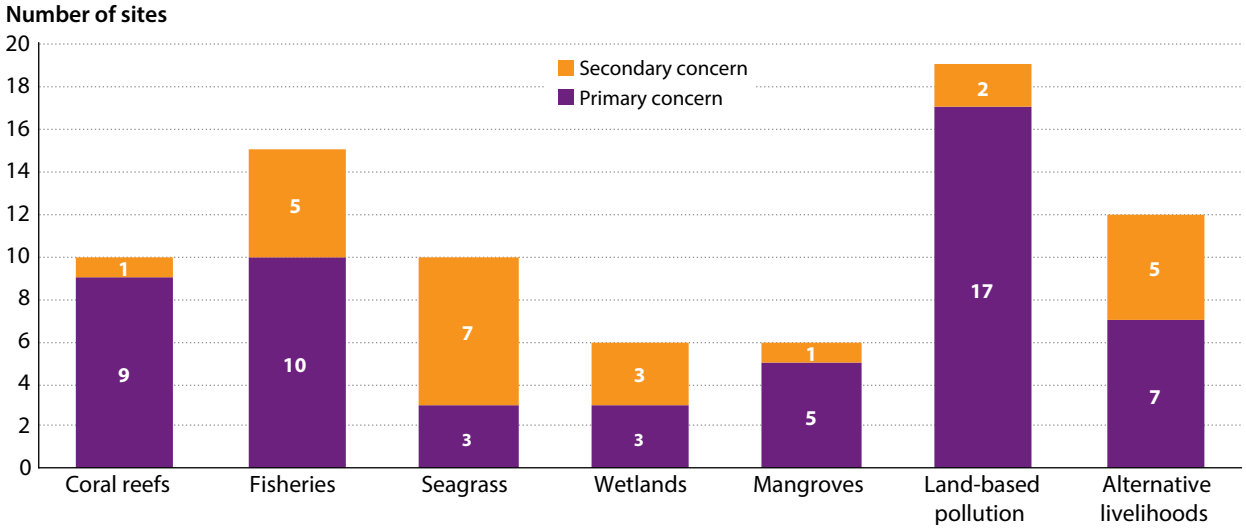
Most demonstrations at the local scale supported the development and implementation of management measures. Generally, the GEF has provided support to demonstrate approaches in sites where related initiatives were already being supported by government or local stakeholders. In most cases, the demonstrations would thus still have occurred, but at a slower pace.

Of the total GEF funding for the SCS through the national components of regional projects and through national projects ($81 million), an estimated $68 million (84 percent) has been provided for demonstrations.[1] As discussed in chapter 2, in the four countries that were selected for case study, 27 sites of 15 projects were sampled for field verification of progress to impact (see annex 2C). Of these, six sites had yet to complete implementation of the demonstrations. Some sites have received support through multiple projects. For example, Xiamen, China, Batangas, the Philippines, Chonburi, Thailand, and Danang, Vietnam, have received GEF support through at least two projects.[2] The environmental concerns addressed at these sites pertain to coral reefs, fisheries, seagrass, wetlands, mangroves, land-based pollution, and alternative livelihoods (figure 8.1). Most sites addressed several environmental concerns simultaneously. In 70 percent of the sampled demonstration sites, the GEF has supported implementation of management and administrative measures to address given environmental concerns; for 48 percent, it facilitated the

[1] The 27 sites that were sampled involved GEF funding of $36 million. In all, there were 49 demonstration sites. Extrapolating the figure for 27 sites to 49 sites, the estimated total GEF funding would be about $65.3 million. Assuming that all GEF funding through the SGP is for local demonstrations, the total rises to $68 million.

[2] See table 11.1 for the project(s) associated with each site.

FIGURE 8.1 **Key Environmental Concerns Addressed at Sampled Demonstration Sites**



NOTE: $n = 27$.

development, implementation, and/or adoption of legal and policy instruments.

Generally, GEF-funded activities are aimed at building upon work already undertaken by other actors. In very few instances has the GEF supported activities that test entirely new technologies or interventions. The GEF's role in this regard has been geared more to the support of technology transfer. Of the 27 sampled sites, only 3 (11 percent) did not have initiatives in place prior to the receipt of GEF support. However, two of those three (Boluo County, China, and Ha Tay, Vietnam) were sites in the Livestock Waste Management project, which was initiated as a result of a larger three-country FAO study.

Many prior interventions at the demonstration sites were through governments, especially in China. In Vietnam, interventions primarily involved bilateral donors, complemented by development banks and NGOs. NGO intervention was most prominent among Philippine sites. Sites in China generally had the least number of types of stakeholders involved in prior initiatives.

In 52 percent of the sites, the GEF supported comanagement of natural resources; in 22 percent, GEF support promoted management of natural resources by local communities. For example, the GEF supported local community–led conservation of mangroves in Trat, Thailand, and community-based management of coral reefs in Koh Chang, Thailand, and Masinloc, the Philippines.

It is expected that GEF support for activities would be based on incremental reasoning—i.e., the GEF is expected to provide funding only to meet the incremental costs of the generation of global environmental benefits. In the case of international waters, incremental costs are meant to help address transboundary concerns (concerns that cut across country borders) and generate regional common goods. The evaluation assessed the extent to which the activities undertaken at the demonstration sites would have taken place without GEF support.[3] For this assessment, a business-as-usual scenario was constructed, and the demonstration sites were classified into several overlapping categories (table 8.2). The analysis shows that, except in a few instances, GEF support does add value to the business-as-usual scenario. In most instances, the GEF is able to add value by facilitating implementation of activities before the business-as-usual scenario. In 26 percent of instances, the funded activities would not have taken place had GEF funding not materialized. In 30 percent of instances—all of which are in China—it was determined that, although

[3] This assessment was conducted by triangulating information obtained during field interviews with different stakeholders and on the basis of evaluators' direct observations and other evidence.

TABLE 8.2 **Assessment of GEF Support at the Local Level**

In the absence of GEF support…	Number of sites
Demonstration site activities would have taken place without any change	2
Activities would have taken place but in a very different form	8
Activities would have taken place but with considerable time delay	15
Activities would not have taken place	7
Unable to assess	2

NOTE: The number of observations for the response categories do not total 27 because the categories overlap.

the activities would have taken place, their form would have been very different from what has been possible with GEF support. For example, the activity would not have given as much attention to environmental considerations, or it would not have introduced a new technology. There is also evidence that since the 1990s, several of the coastal cities in China have incorporated pollution control and other environmental considerations into their economic growth strategies (Dodson 2012).

8.4 Foundational Contributions at the National Scale

GEF projects have typically followed a comprehensive approach to identify and address gaps that need to be addressed as foundations to good environmental management. GEF foundational contributions typically include knowledge generation and information sharing, strengthening of institutions at the local and national scales, and legal and regulatory frameworks. These foundational contributions aim at creating an enabling environment that allows relevant stakeholders to identify suitable actions to address global environmental concerns and at providing these stakeholders with requisite skills to undertake these actions. Increased awareness, knowledge, and skills, along with stronger governance structures and frameworks at the national and local scales, are expected to lead to changes in behavior among both decision makers and local populations—thus improving the enforcement of and compliance with measures that produce global environmental benefits.

The GEF has promoted actions addressing transboundary environmental concerns by supporting processes leading to the development of national legislation and the ratification of international conventions.

Most of the activities undertaken as part of the SCS TDA-SAP project for knowledge generation and information sharing were aimed at the preparation of a regional TDA-SAP. As part of this effort, national agencies in the seven GEF countries in the SCS compiled all available data on coral reefs, fisheries, seagrass beds, coastal wetlands, mangroves, and land-based pollution in their respective countries. This information was presented through national reports and made accessible through the project website. For some countries, this was the first compilation of such data at the national level.

The comparability of national data sets has facilitated the identification of both regional and national priorities for action on transboundary concerns. National habitat management plans, which included plans for the establishment of national habitat databases, were developed to be incorporated into the country's larger planning processes and to provide inputs to the regional SAP. Some of the national action plans have already been mainstreamed in Cambodia, China, Indonesia, and Thailand. National environmental legislation—particularly that related to coastal habitat protection—was reviewed to determine what actions needed to be taken at the country level to contribute to regional priorities.

The SCS TDA-SAP project also supported seven national interministerial committees and seven national technical working groups. Several workshops and trainings were organized at the regional and national levels to facilitate the spread of expertise from national institutions to individuals in other institutions and countries that needed capacity development in those areas. After the end of the project, with the disappearance of the project coordination unit, the support for structures established at the national level has declined, and the members of the committees no longer meet and confer on a regular basis. Nonetheless, the links formed have remained, and collaboration sometimes takes place informally.

One of the main objectives of the MPP-EAS was to help countries fulfill their commitments to international marine pollution conventions. National environmental legislation, especially that concerning coastal and marine pollution and private sector participation in environmental infrastructure projects, was assessed. The project provided a model Framework for National Legislation on Marine Pollution to facilitate implementation of these conventions. Working closely with the Philippines, in particular, the project helped the national government review and prepare for requirements to implement the International Convention for the Prevention of Pollution from Ships (MARPOL). The Philippines was consequently able to ratify the convention. The number of ratifications by the project's 11 participating countries almost doubled by 1997 from the project's start in 1994. While this increase was mostly driven by country commitments and the momentum generated by the Rio process, the project did contribute to the ratification process in many countries.

In Thailand, the SDS-SEA project has provided training to the officials of the Port of Bangkok on port health, safety, and environmental management. Improvement in officials' capacity helped Thailand meet IMO standards. In the Philippines, a demonstration of noncombustion technology for the destruction of polychlorinated biphenyls (PCBs) in Bataan contributed to Memorandum Circular 2009-007, Code of Practice for PCBs, issued by the national government.

As part of the medium-size PPP project, research was done on the gaps and constraints in public and private sector capacities for environmental infrastructure investments in five SCS countries. The national legislation, programs, and policies influencing private sector participation in such investments were reviewed for the Philippines and Vietnam. Other projects supported through the UNDP PEMSEA stream have also contributed to the process that helped facilitate the passage of laws or programs adopting ICM as a national approach in China, Indonesia, the Philippines, and Vietnam.

The Coral Reef Rehabilitation and Management Program (GEF ID 116/1829) in Indonesia—though for the most part not implemented within the SCS—has contributed to the creation of new agencies and of the Ministry for Marine Affairs and Fisheries, which is specifically responsible for managing the country's coral reef resources. Draft legislation, legal papers, and national policy and strategy statements developed through the project served as inputs to the promulgation of a ministerial decree and revision of national laws. Table 8.3 lists key contributions facilitated through GEF support at the national scale.

8.5 Foundational Contributions at the Local Scale

Where GEF-supported activities aimed to raise awareness, local government officials and communities have seen improved compliance with environmental regulations and more environmentally conscious behavior.

Awareness-raising campaigns initiated by GEF demonstrations have been reported to be instrumental in changing behavior at the local level. Of the 27 demonstration sites that were covered through field verification, 25 (93 percent) included activities aimed at raising awareness. Local stakeholders and government officials generally recognize awareness raising as among the most important contributions the GEF has made in advancing the environmental agenda. In some sites, such as Phu Quoc and Con Dao in Vietnam, local fishers and park officials linked greater awareness to a major reduction in the use of destructive fishing methods such as blasting and of poisons.

GEF support has also helped raise awareness among provincial officials in Phu Quoc as to the

TABLE 8.3 **Key Contributions of GEF-Supported Initiatives at the National Scale**

Contribution	GEF initiative
Knowledge generation	• Research on PPPs • Reviews of national legislation • Model framework for legislation supporting international conventions • National habitat and land-based pollution reports
Skills building	• Internships • Technical training • Staff exchanges • Study tours
Information sharing and access	• Introduction of national scientist networks/technical working groups • National ICM task forces
	Institutional capacity
Support to policy and legislation	• China—Sea Use Management Law • Indonesia – Presidential decree adopting ICM for the management of Jakarta Bay – Ministerial decree concerning general guidelines for coral reef management – Revised Fisheries Act – National fisheries program incorporating fisheries refugia system – Coastal and Marine Resources Management Act • Philippines – Ratification of International Convention for the Prevention of Pollution from Ships – Comprehensive national fisheries industry development plan incorporating fisheries refugia system – Executive order adopting ICM as national approach for sustainable development of coastal and marine areas – Memorandum Circular 2009-007, Code of Practice for PCBs • Thailand—Compliance with IMO standards • Vietnam – National Program on ICM for North Central Region and Central Coastal Provinces – Law on Marine Resources and Environment (still to be passed) – Decree on management of marine resources and protection of the marine environment
Support to government structures and arrangements	• Introduction of interministerial committees • Indonesia—Ministry for Marine Affairs and Fisheries and Directorate General for Small Coasts and Islands • Thailand—Subcommittee on Coastal and Marine Resources Management under the National Environment Board • Vietnam—Vietnam Administration of Seas and Islands
	Implementation strategies
Technologies and approaches	• National action plans • Spatial distribution and nutrient management plans for livestock waste • ICM • PSHEM • PPP

SOURCE: Terminal evaluations, terminal evaluation reviews, and project implementation reports.

importance of coastal conservation. During the field verification visit, local officials reported that this awareness was an important factor in the approval of the MPA, the passing of environmental regulations for the island, and budget allocations for environmental protection. Phu Quoc has served as an example for demonstration sites in other countries, and has hosted GEF-supported study tours promoting awareness and learning among local government officials and other sectors in Cambodia, the Philippines, and Thailand.

In the Management of Shantou Intertidal Wetland project, campaigns launched by the demonstration have changed attitudes of local farmers and the local government. As a result, farmers no longer sell eggs of endangered birds and are more proactive in providing aid to injured birds. The local government decided to reverse its decision to open part of the wetland for the construction of a tunnel. In the Shankou-Weizhou Island demonstration, the use of existing social networks by the reserve administration reduced the animosity of the local people toward mangrove protection initiatives. While there used to be many violations in the reserve's core area, the locals now help protect the reserve. Awareness campaigns and activities for schoolchildren in Fangchenggang also targeted local community members. These activities are reported to have been effective in increasing the participation of local community members in enforcing mangrove conservation regulations and in helping them to adopt more eco-friendly practices.

Knowledge of coral reef management and sustainable use became widespread in Koh Chang, with tourist operators becoming more aware of eco-friendly tourist behavior, enabling them to better monitor tourists. Capacity building was noted as the greatest achievement at this site; and the information, education, and communication materials developed by the project are still in use. The local population in Chonburi has become more aware of existing management regulations, which is the first step toward improved compliance.

Officials of the State Oceanic Administration of China maintain that GEF-supported conservation activities undertaken in the area have led the local government to place more importance on environmental protection. They report that with greater access to information, people's level of awareness has increased. In the past, people felt that the marine resources were limitless; they now recognize that these resources are a relatively scarce commodity and need to be better managed. Additionally, they are more vocal and more willing to hold local government authorities accountable. For example, officials noted that thousands of local citizens in Xiamen, through three years of street protests, text messages, and blogging, forced local government officials to "postpone" construction of a proposed petrochemical factory. Citizen actions against environmental threats in other major cities in China have since used similar means (Dagong 2007; Wong 2008). Officials in Bangkok also pointed out that the SCS TDA-SAP project made important contributions to raising awareness of the general population through media campaigns that reached beyond demonstration localities. Several ICM sites, such as Danang in Vietnam and Chonburi in Thailand, also promoted events such as beach clean-ups to raise awareness and engage the public in environmental protection activities.

GEF-supported demonstrations have resulted in the creation or strengthening of coastal management structures within local government systems, and have not only increased the skills of local staff through training but also their capacities for implementing other projects.

Demonstrations supported through the UNDP PEMSEA stream have facilitated the establishment of multistakeholder committees within their respective local government systems, such as the

Xiamen Marine Management and Coordination Committee and the Batangas Bay Region Environmental Protection Council. These structures facilitate cooperation and coordination not only among government agencies, but also with the private sector and other stakeholder groups. Similarly, projects of the UNEP SCS stream established intersectoral management boards composed of representatives from all agencies concerned with maritime affairs. This multisectoral approach is reported to have been effective in leveraging extra resources for conservation activities in the demonstration sites from government departments that were usually not involved in such activities. In Fangchenggang, the municipal government has adopted this intersectoral management structure as the standard arrangement for future coastal zone management–related projects. In most of the demonstration sites visited—including both those that were still receiving GEF support and those that no longer received GEF support—these intersectoral management boards were still operating.

Activities to strengthen local institutions, such as village committees, village cluster committees, local fishers, and other user groups, have also been undertaken. In Fangchenggang, GEF-supported capacity-building activities included seminars for village community members and the establishment of a local community-based NGO focused on mangrove conservation.

Projects supported through the World Bank IF stream have tended to be very targeted, focused on a few government departments that are significant from a pollution management and control perspective. There are exceptions, however. The Pearl River Delta Urban Environment project has established intramunicipality coordination committees for participating districts in the Foshan and Guangzhou municipalities so that it could facilitate cooperation for sharing wastewater treatment infrastructure.

Of the 27 demonstration sites, 21 undertook activities focused on building the skills of local communities and government officials. These skill-building activities included training, workshops, exposure visits, and the inclusion of subjects related to coastal and marine management in courses offered by educational institutions. At several sites, such training has been effective in inculcating new skills. For example, training on technologies related to livestock waste management provided to local farmers and technicians in Boluo County, China, Hay Tay, Vietnam, and Ratchaburi, Thailand, helped in the speedy adoption of these technologies. The focus of this project has been on building individual capacities as well as institutional capacities. The UNDP PEMSEA stream has given considerable attention to training local officials on issues related to ICM and on innovative tools such as risk management, SOC, IIMS, and coastal use zoning. Much attention has been given to building the capacities of the respective business entities that will manage the shared wastewater treatment infrastructure in Foshan and Guangzhou.

Involvement in a GEF project in itself was perceived by many government agencies as instrumental in building their capacities. In Vietnam, improved knowledge of government officials on ICM has been reported as a key factor in the approval of the national program on ICM for 14 coastal provinces. In the Philippines, exposure visits, workshops, and training are reported to have been effective in building the skills of government officials in Batangas.

In Sanya and Xiamen, China, local government officials emphasized the importance of GEF projects in helping them adopt and use GIS technologies. In these sites, the demonstrated utility of such technologies in planning and monitoring has helped increase its use by government agencies. In Guangdong, China, where the Pearl River

Delta Urban Environment project (in Guangzhou and Foshan) and demonstrations for the Livestock Waste Management projects (in Boluo County) were implemented, government officials held that a major advantage of participating in the GEF was that government agencies had to step up their business practices to meet the fiduciary standards of the World Bank, the GEF Implementing Agency.

In Phu Quoc, Vietnam, government officials reported that the SCS TDA-SAP project approach of executing funds through the local government helped build district and provincial officials' capacities for budget management, proposal and report writing, and meeting organization. This skills improvement has allowed some of the officials to move to more prominent positions in the public administration system. Improvement of their business practices has increased the absorptive capacity of these government agencies, which are now able to attract funds for development activities from various government and nongovernment sources.

Partner institutions have played an important role in building institutional capacities. For example, through the UNDP-implemented Biodiversity Management in the Coastal Area of China's South Sea project (GEF ID 1128), the GEF was able to bring the U.S. National Oceanic and Atmospheric Administration on board as a technical assistance partner. Experts from the U.S. agency visited their Chinese counterparts from the Third Institute of Oceanography, Xiamen, to provide training to local government officials on the use of GIS in coastal management. The agency also sponsored study tours and helped the Third Institute acquire and operationalize Arc-GIS packages free of cost.

Many of the training and information centers established as part of GEF projects are hosted by local universities and research centers. In Vietnam, the World Bank–implemented Hon Mun MPA Pilot Project (GEF ID 4) built on the knowledge base created by Vietnamese scientific institutions in collaboration with WWF. The project collaborated with the Institute of Oceanography of Vietnam to gather information on habitat status, species richness, community structure, resource use, and socioeconomic conditions in the area. This updated information was used as a basis for zoning and development for the management plan of Nha Trang Bay, the first formal MPA in Vietnam.

In 11 of 13 sites where GEF-supported activities aimed to influence legal and regulatory frameworks, local laws were passed to continue the demonstrations or apply lessons learned.

Several GEF-funded activities aim at addressing gaps in legal and regulatory frameworks at the local scale. The focus is on promoting broader adoption of environmentally friendly practices and behaviors. Improvements in the legal and regulatory environment may not necessarily translate into compliance; nonetheless, they do indicate progress, as enforcers are given additional instruments to encourage compliance.

The manner in which GEF activities address legal, policy, and regulatory frameworks differs based on the extent to which the changes are initiated by the particular governments, the scope of change, and the activities covered. In some instances, the GEF has supported activities aimed at identifying gaps in the legal, policy, and regulatory framework at all scales, and at preparing targeted advisory products to help the respective authorities take corrective measures. In other instances, governments at the local, provincial, or national level have made changes in light of the influence of GEF-supported demonstration activities.

In 13 sites, GEF-supported activities contributed to the development of legal and regulatory instruments (see annex 6). Vietnam stands out in this regard, as a greater proportion of its demonstration sites have focused on this aspect.

In 11 sites, GEF-supported activities included the preparation of an advisory product to facilitate adoption of appropriate legal, policy, and/or regulatory instruments by the government (see annex 6). Preparation of these advisory products was often undertaken in close consultation and collaboration with the relevant government departments and agencies. In 9 of 11 sites, the proposals made in these advisory products had been adopted by the respective local governments. Sites where proposals were adopted include Xiamen, Hepu, and Boluo County, China; Bolinao, the Philippines; and Hon Mun, Danang, Phu Quoc, Con Dao, and Ha Tay, Vietnam. In Hon Mun, the focus was on the development of aquaculture-related regulations. In Phu Quoc and Kampot, Cambodia, the focus was on developing a policy and cooperation framework for the protected seagrass area between Vietnam and Cambodia. In Bolinao, the Philippines, the focus was on seagrass conservation in the reserve area.

The two exceptions where the advisory product proposals had not yet been accepted were Fangchenggang, China, and Koh Chang, Thailand. In Fangchenggang, the advisory products focused on identifying gaps and inconsistencies in local and national regulations on mangrove conservation, and developing proposals for amendments at the local level. Although the proposed amendments to existing legislation and regulations had been incorporated in the local government's agenda, at the time field verification was carried out, they had yet to be adopted. In Koh Chang, a baseline study on carrying capacity and user fees was conducted as an input to regulations for the island, but no laws or regulations have as yet resulted from this.

In three demonstration sites, the perceived efficacy of promoted technologies and approaches—along with the effects of other factors and actors—led to changes in the legal, policy, and regulatory framework, even though these had not been targeted. In Masinloc, the Philippines, GEF activities are reported to have contributed to ordinances being passed by the Bani village government and to the approval of a coastal resource management code by the municipal council in 2008. In Sanya, China, although the demonstration focused on developing a financial plan for the management of the Sanya coral reef reserve rather than on explicitly influencing the legal, policy, and regulatory framework, the Hainan provincial government nonetheless revised the regulations on coral reef conservation in 2009, reportedly due to the experience with the demonstration.

Among the nine sites where influencing the local legal, policy, and regulatory framework was among the objectives of the demonstration, the scope of changes achieved was in some cases greater than had been targeted. In Xiamen, China, the municipal government passed a series of laws that introduced an integrated law enforcement and sea use permit and fees system; limited ship speeds; prohibited underwater explosions, recreational boating, and surfing in a large proportion of the West Sea to conserve white dolphin habitat; controlled marine pollution; and regulated sea area use. In Hepu, China, where prior to GEF-supported demonstrations, seagrass conservation had not received much attention, the management board established as part of the demonstration was effective in persuading the Beihai city government to enact local legislation in 2007 to protect seagrass. It also obtained approval from the provincial government to adjust the boundary of the existing National Dugong Reserve to cover more seagrass beds.

GEF support has led to improved enforcement of environmental regulations mainly where there was community participation, high incentives for local stakeholders, and sufficient administrative capacity.

Compliance with laws and regulations is important; without it, improvements through legal, policy, and regulatory measures may not translate

into environmental stress reduction. The level of compliance is affected by public awareness and the perceived reasonableness of the regulation; incentives or perceived benefits to resource users; and penalties, enforcement capacity, and other tactical decisions that may be made by the agents responsible for enforcement. Progress in law enforcement and compliance by local people as a result of GEF interventions was reported in at least 14 demonstration sites. These sites were mostly concerned with habitat protection and sustainable fisheries. Better compliance was generally a result of both improved enforcement, and increased awareness and engagement of local resource users. To strengthen enforcement measures, the GEF has provided support in several demonstration sites for developing the capacities of the agencies responsible for enforcement of laws and regulations. This capacity development includes support both for training and for surveillance equipment such as boats, binoculars, and radio sets. The GEF has also undertaken activities to enhance livelihoods and provide incentives to local communities to support the enforcement of regulations and conservation-related norms.

In demonstration sites such as Xiamen and Bolinao, high levels of awareness, enforcement, and compliance were reported. Likely due to its access to financial resources as an urban center, and the high incentive for sustainable development, Xiamen was found to have high enforcement capacities. In Bolinao, the local government and community, which stand to share the benefits of protection, have demonstrated high levels of commitment to conserve the seagrass reserve. The number of illegal fishers reported inside the Masinloc marine sanctuary was reduced from 22 in 2006 to 14 in 2008. The municipal government more than tripled the budget allocation for coastal resource management between 2008 and 2009, which includes enforcement expenses and incentives for fish wardens.

In Hepu, the Beihai city government departments and organizations—including the China Marine Surveillance SCS, the police, the Oceanic Bureau, the Fisheries Bureau, and the Shatian district government—conducted several enforcement drives to remove illegal mariculture farm and facilities from the demonstration site area. Destructive oyster culture practices were also reduced, and local fishers now enforce the protected area boundaries. Blast fishing was reported to have been reduced in Sanya due to better enforcement by management staff. In Shankou-Weizhou and Shantou, local community members no longer hunt endangered birds. In Fangchenggang, in 2010, the village community reported 40 separate violations of mangrove reserve utilization regulations. In 15 instances, a formal report was filed; in 2 instances, the offenders were fined about $1,500 each. As mentioned earlier, community participation in enforcement of regulations in many sites is a result of awareness-raising activities. In Kampot, Cambodia, and Trat, Thailand, improvements in compliance were largely related to community involvement in the management of mangroves and seagrass beds, respectively, as part of livelihood strategies.

In Con Dao, Hon Mun, and Phu Quoc, Vietnam, levels of enforcement and compliance differed based on the incentives derived by stakeholders as well as enforcement capacities. In all three sites, it was reported that destructive fishing (blasting and use of poison) was reduced dramatically, partly due to better enforcement and awareness-raising campaigns. In Hon Mun, enforcement of regulations pertaining to seagrass conservation was low, given the low dependence of local communities on the seagrass beds; those pertaining to fisheries, wastewater discharge, and aquaculture were better enforced. Coral collection was also partially reduced through regulations passed by the provincial authority. In Phu Quoc, there were mixed reports on dugong killings—while officials

indicated only accidental killings, instances of dugong meat being sold in the market were also reported.[4] In Con Dao, while patrolling has improved with the participation of local fishers, extraction of benthic (sea floor) organisms by other local small-scale fishers continues, as enforcement is logistically difficult.

The number of illegal trawls and pushnets within 3 kilometers of the shoreline in Chonburi, Thailand, was reduced from 129 in 2005 to 55 in 2007. However, the persistence of bottom trawlers fishing in restricted areas along the coastline was reported in all sites in Cambodia, Thailand, and Vietnam, even though the use of this type of fishing gear close to the shore has been banned in most countries due to its destructive effects on benthic organisms. In Koh Chang, Thailand, a massive infusion of central government funds for tourist development in the island was not accompanied with a strengthening of local capacity to enforce regulations as a result of unregulated tourist growth. As a consequence, during the life of the project, severe pollution pockets developed around the island, even though enforcement activities by the park authority and local fishers against illegal fishing increased.

In Boluo County, China, and Ha Tay, Vietnam, where livestock waste management–related demonstrations had been implemented, moderate to low levels of enforcement of the adopted regulations were seen. In Boluo County, the reportedly moderate level of enforcement was essentially a strategic operational decision on the part of the local administration to allow local farmers time to build capacity and comply with regulations. In the near future, as the number of farmers who comply, and are able to comply, with the regulations increases, enforcement is also expected to improve. In Ha Tay, on the other hand, low enforcement and compliance are primarily due to a lack of enforcement capacity. This situation is unlikely to change unless changes are made in the enforcement arrangements as well.

[4] While officials indicated that this meat was most likely not dugong, the report indicates that a demand for this meat persists.

9. Impact at the Local Scale

As expected, only a small reduction in environmental stress was found to result from the demonstrations, due to the very large scale of the environmental pressures that need to be addressed. Even though the changes at the demonstration site level are linked to changes in the transboundary water body, broader adoption of promoted approaches and technologies would be required to effect changes at the larger scale.

The demonstration sites supported through GEF activities were identified based on the intensity of the environmental concern and the likelihood that activities implemented at the site would lead to environmental stress reduction.[1] If any occurrence of stress reduction is to be linked or attributed to the GEF intervention, that intervention must first have been successfully implemented (see section 2.2 on conditions needed for contribution analysis). Of the 27 sites covered through field verification, 20 had completed demonstrations, or were at a stage where environmental stress reduction could be expected. The prerequisite that intended outputs be fully or almost fully delivered for further progress toward impact in an intervention's causal chain was not met in the remaining seven sites, six of which are still under implementation due to delays,[2] and one of which has been completed but has not produced key outputs that were expected to result in stress reduction.

As each site typically addressed multiple environmental concerns, the evaluation found that in these 20 sites, a total of 40 cases of stress reduction needed to be monitored (table 9.1). Of these 40 cases, before and after implementation data were available for only 26 (65 percent) to determine if stress reduction had occurred. Stress reduction may also have occurred in other sites, but due to the lack of available and relevant environmental monitoring data, these changes could not be assessed by the evaluation. Annex 7, table 29, presents a summary of the environmental concerns addressed, and the cases where environmental stress reduction was measured.

Twenty-one cases where before and after data were available reported a reduction in environmental stress; almost half of these related to habitat and biodiversity concerns. Only five of the sampled demonstration sites implemented activities that addressed a transboundary dimension. These were generally related to habitats that spanned the boundaries of at least two countries and migratory species that depended on local habitats in different countries. Stress reduction for specific migratory species such as sea turtles, dugong, white egrets, and white Chinese dolphins were targeted at some sites.

[1] In most cases, transboundary impact was not a criterion in a project's selection of demonstration sites.

[2] Delays in execution of planned activities were generally due to problems in procurement of consultants, equipment, and government or other stakeholder permits.

TABLE 9.1 **Number of Cases of Reported Environmental Stress Reduction in Visited Demonstration Sites**

Environmental concern	Sites expected to have stress reduction	Sites with comparative data available[a]	Sites with measured stress reduction	Sites with only anecdotal reports of stress reduction
Habitat and biodiversity	17	12	10	4
Fisheries	12	6	4	5
Pollution	11	8	7	0
Total	40	26	21	9

a. Sites for which data were collected at least once before and after the demonstration was implemented.

In cases where stress reduction was not systematically measured, anecdotal accounts of stress reduction were obtained for four cases of habitat and biodiversity–related initiatives, and five cases addressing fisheries. These anecdotal accounts generally pertained to the reduction of destructive fishing practices (e.g., blast fishing, trawling) and mangrove cutting by local community members. More anecdotal information than actual measures of improvement was obtained for fisheries-related parameters due to the lack of monitoring systems in place for this concern. For biodiversity-related parameters, a higher number of white Chinese dolphins and white egrets were spotted in Xiamen, China, after the implementation of the first demonstration, and a higher number of nesting turtles was reported in Con Dao, Vietnam, based on several years of monitoring data. Only measured stress reductions are discussed in depth in this chapter.

To better understand how stress reduction has taken place and how it has changed the biophysical conditions of the marine and coastal ecosystem, the key targeted environmental concerns such as mangroves, coral reefs, seagrass, and land-based pollution have been assessed in greater detail. Where reliable information on stress reduction on other sites was available, those sites have also been included for specific analyses. Remote sensing images, information from publications by independent research or academic institutions, and government reports have also been used in the assessment where appropriate and available. Results of observations have been interpreted in the light of recent scientific literature available when pertinent.

Despite successful implementation of the demonstrations, some of the targeted environmental concerns persist in a number of sites because of larger-scale factors that the demonstrations failed to and/or could not address. These sites have generally used habitat protection as the main approach, which does not cover factors stemming from the broader context in which the concern being targeted exists.

For example, in Con Dao, Hon Mun, and Phu Quoc, Vietnam, regulations apply only within the protected area. While fishers from within the targeted municipalities tended to comply with the new regulations, it was more difficult to ensure compliance from large-scale commercial fishers coming from outside the area. A similar situation was found in Kampot and Sihanoukville, Cambodia, and in Trat, Thailand, where local fishers tended to follow regulations, but trawlers from outside the area continued to fish in shallow waters against regulations. Overexploitation therefore continues in the adjacent waters beyond these areas of jurisdiction. Similarly, in Hepu, China, despite local protection measures, sightings of migratory dugong have continued to decline over the long term. Reefs that have been well protected from exploitation in Koh Chang, Thailand, continue to be degraded due to water

pollution stemming from the rapid growth of the tourism industry in the area. In Trat and Phu Quoc, oceanographic and climate-related drivers such as coastal erosion and coral bleaching limit the growth of mangroves and corals, respectively. Experiences at these sites demonstrate that other approaches have to be introduced at the scale of these drivers for these initiatives to result in global environmental benefits.

On the other hand, sites dealing with land-based pollution generally resulted in stress reduction, as these demonstrations directly introduced technologies at points where pollution was being produced. Changes in overall pollution levels of the water bodies being targeted, however, are unknown. In Manila Bay, the Philippines, and Chonburi, Thailand, for example—both of which sites have used the ICM approach through government agencies at different scales—water quality continues to be a concern because the pollution sources are located far beyond the coastal area. Manila Bay has a watershed area of 18,000 square kilometers and a population of more than 25 million. Chonburi, while having no major rivers in the province, receives freshwater inputs from Bang Pakong River, which has a watershed area of 17,000 square kilometers. In addition to facilitating coordination among local agencies, appropriate technologies need to be introduced at a wider scale to reverse this deterioration. For example, in Manila Bay, the focus of intervention is on the Laguna Lake–Pasig River watershed, which is a major source of pollution to the bay.

9.1 Mangroves

In all demonstration sites except one in Cambodia, mangrove cover was seen to increase even before GEF support began. While the increase in mangrove cover may not be directly attributed to GEF support, the GEF has provided incremental value by sustaining the momentum of mangrove-related initiatives and, in some cases, facilitating their expansion.

Of the sites that were sampled for field verification, activities that aimed at rehabilitation (through planting) and protection of mangroves were undertaken in six sites.[3] Information was also obtained for GEF-supported mangrove management activities in Peam Krasop, Cambodia, which was not covered through field verification. The usual intervention that has been implemented at the sites is planting of seedlings of various locally suited mangrove species, along with better enforcement of rules related to mangrove management, protection, and utilization.

Information on changes in mangrove cover is based on analysis of remote sensing data, and information gathered through field visits and interviews of local stakeholders. Annex 7, table 32, presents a summary of these seven sites. Where available, the table presents data from the analysis of remote sensing images. Where remote sensing images were not available, the analysis is based on information gathered through interviews and review of official records.

All seven countries covered by this impact evaluation had experienced a sustained decrease in mangrove cover during the period 1980–2005 (FAO 2007). Six of the seven demonstration sites where mangrove conservation was addressed showed a net increase in mangrove cover. Although China has the smallest area of mangrove cover of the seven countries, it has a greater share in GEF activities in the SCS that are geared toward conserving mangroves.

Experiences differ from site to site. The mangrove reserve in Fangchenggang, China, experienced a long-term trend of degradation due to conversion of mangroves to shrimp ponds, collection of marine benthos within the mangrove forests, grazing of buffaloes on mangrove seedlings,

[3] See table 11.1 for the project(s) associated with each site.

and erosion. The GEF-supported approach implemented in the area focused on strengthening capacity for mangrove administration. The approach encouraged local participation in management, protection and eco-friendly utilization of the resource base; and cross-sectoral planning and management. These measures substantially addressed the threats within the reserve. Remote sensing analysis shows that from 2005 to 2009, a period during which the demonstration was implemented, there was an increase of 38 hectares in mangrove cover in the area (see annex 7, figure 9). The local reserve officials—who were interviewed by the evaluation team in mid-2011—reported that as per their records, there has been an increase of 150 hectares in mangrove cover since the demonstration began in 2003. About 70 percent of this increase was attributed to natural regeneration due to better protection; 30 percent was due to the planting undertaken in the area.

In Xiamen, China, planting of mangroves is part of a comprehensive urban planning approach followed by the municipal government. The pressure was in the form of competing land use for urban construction activities. The municipal government identified and delineated areas suitable for mangroves. It also identified alternative sites for construction activities. Due to planting efforts that have taken place at regular intervals, the mangrove plantation area has increased from no mangroves at the start of GEF-supported activities at the site in 1993 to 14 hectares in 2005, to 27 hectares in 2011 (see annex 7, table 32).

In Shantou, China, mangrove rehabilitation was undertaken as part of an integrated approach to wetland conservation in the area. The executing agency reported that it has been able to ensure greater involvement of local communities in conservation work through deployment of local volunteers; this has allowed it to bridge the language barrier, as the local communities do not speak Mandarin. In all, 200 hectares of mangrove trees have been planted.

The focus of the demonstration in the Shankou-Weizhou site was to improve protection efforts in the Shankou national mangrove reserve and to replant mangroves in the abandoned shrimp farms. To improve the protection effort, closer cooperation of the local communities was sought. A village conservation group with a membership of more than 200 villagers from the communities around the Shankou mangrove reserve was established to help enforce rules and regulations for mangrove conservation. Consequently, there is better control over transgressions such as grazing and illicit felling of trees. In addition, 60 hectares of abandoned shrimp farms have been reconverted to mangrove forest.

In Trat, Thailand, the local communities had started protecting mangroves since the 1990s as part of a grassroots initiative. The instrumental value of GEF support was to help expand the initiative of the local communities by contributing to dispute resolution among competing villages through an SGP grant that followed the SCS TDA-SAP project. Mangrove cover has continued to improve in the area, as indicated through remote sensing. While GEF-supported activities may lay little claim to the improvement in mangrove cover in Trat, its support to activities that sustain improvement and facilitate further expansion into other areas are acknowledged by the local stakeholders.

In Chonburi, Thailand, mangrove area was being converted for other uses including agriculture, shrimp aquaculture, and land reclamation for port and industrial complexes. Since the 1970s, the mangrove area had declined considerably. Beginning in 1999, within the ICM framework, the GEF has supported replantation of locally prevalent mangrove species in a total of 49 hectares in five

sites that were protected by the municipality. Analysis of remote sensing images for the site indicates a marginal increase of 4 hectares from 1999 to 2009. A field visit in September 2011 showed that a large portion of the replanted area had died off, which may explain the large discrepancy between what was planted and what was detected through remote sensing.

Peam Krasop National Park, Cambodia, is the only site where a decrease in mangrove cover was recorded since the time the GEF began supporting mangrove protection efforts in the area. In addition to supporting mangrove management activities there in 2003 through the SCS TDA-SAP project, the GEF is supporting further mangrove-related activities at the site through an SGP grant. Of the seven sites, Peam Krasop has the largest mangrove area and is the only site that has seen steadily decreasing mangrove cover since the 1990s, before GEF-supported activities were initiated. The same trend is seen at the national level (FAO 2007). Spalding, Kainuma, and Collins (2010) have cited the cessation of political conflict in the early 1990s as having caused population growth and exploitation of mangrove resources in Cambodia. Based on remote sensing analysis, Peam Krasop is estimated to have had 11,524 hectares of mangrove cover in 1990. This declined to 11,421 hectares in 1999 and to 11,230 hectares in 2005, around the time GEF support started. In 2009, the mangrove cover had dropped further to 10,086 hectares. Remote sensing images and field interviews show that mangrove areas have likely been cleared for charcoal production, and subsequently converted to agricultural purposes (see annex 7, figure 10). The continued decline in mangrove cover shows that, at least up to 2009, GEF-supported activities were not sufficiently effective in reducing the pressures on this resource base. The information gathered through interviews with local stakeholders indicates that the Cambodian government has recently begun reforesting the area and has strengthened its enforcement measures, especially against charcoal production and in-migration. It is too early to conclude whether these efforts, which build on GEF-supported activities, have been effective in reversing the decline in mangrove cover.

All of the sites assessed through remote sensing analysis showed that, except for Cambodia, mangrove cover had been increasing prior to GEF support (table 9.2). Note that, in the countries visited, even though mangrove cover continues to decrease, the annual rate of decline at the national scale has slowed by more than 1 percent since 2000 in China and Vietnam, with this change occurring as early as the 1990s in Thailand. This finding is consistent with observations by Spalding, Kainuma, and Collins (2010) of trends in the Southeast Asian region: that economic activities resulted in a widespread decrease in mangrove cover in the 1970s, and that policies to protect and replant mangroves began to be established in individual countries in the 1990s. Thus, while some improvement in management has been seen

TABLE 9.2 **Changes in Mangrove Cover Observed over Time through Remote Sensing Analysis in GEF Demonstration Sites (hectares)**

Country	Site	1990s	1999/2000	2005/2006	2009/present	Net change
China	Fangchenggang	1,046.3	1,435.2	1,486.8	1,525	38.25
Thailand	Chonburi	409	521	—	525	4.05
Thailand	Trat	7,206	7,780	8,790	8,885	95.04
Cambodia	Peam Krasop	11,524	11,421	11,230	10,086	–1,144

NOTE: — = no remote sensing images available. □ = start of GEF intervention.

in specific countries in the last decade or so, the GEF has chosen to support sites that were already seeing increases in mangrove cover, sustaining the momentum of existing successful initiatives and allowing them to be replicated or scaled up.

9.2 Coral Reefs

Coral cover is increasing or being maintained in GEF-supported MPAs. Despite this, fish abundance continues to decline in some sites likely due to weak enforcement and environmental pressures that are not being addressed, or that are being addressed at an inadequate scale by the GEF-supported approaches.

Of the 27 demonstration sites that were sampled, 10 sites addressed concerns related to coral reefs (see annex 7, table 30). Of these 10 sites, coral reef management was a primary concern at 9; at the remaining site, it was a secondary concern. The usual approach taken in GEF-supported coral reef management sites is to regulate access to and utilization of coral reef beds through MPAs, with the aim of protecting fish stocks from harvesting activities, and the coral reef habitat itself from destructive human activities. In Sanya, China, in addition to MPAs, reef rehabilitation was also undertaken through transplantation of 4,000 coral fragments in a 1-hectare area, with a 95 percent survival rate reported.

Monitoring activities are being undertaken in all these sites. However, monitoring data sufficient to establish trends in reef status over at least a five-year period were accessible to the evaluation team for only five sites: Batangas and Masinloc, the Philippines; and Con Dao, Hon Mun, and Phu Quoc, Vietnam. Even though monitoring methods and variables differ across and within these sites, the data do give a sense of the changes that are taking place in the area covered by management efforts. A lack of controls for any of these sites makes it difficult to attribute changes to GEF-supported activities.

Hard coral cover either increased or was maintained in all demonstration sites (table 9.3). Compared to the baseline, there was also a marked increase in the sightings of nesting sea turtles in Con Dao, which is largely attributable to a WWF project to protect nesting sites that started years before GEF support began. Batangas showed improvement in hard coral cover both inside and outside the protected area; in Masinloc, the status was maintained both inside and outside the protected area. This may indicate either increased awareness among users resulting in improved management even outside the MPA, or—more likely—that factors other than protection, such as fewer natural calamities, have allowed coral in the area to grow without large-scale disturbances. For

TABLE 9.3 **Coral Reef–Related Trends Observed in Demonstration Sites Based on at Least Five Years of Monitoring Data**

	Coral cover		Fish abundance		Benthic organism abundance	
Site	**Inside MPA**	**Outside MPA**	**Inside MPA**	**Outside MPA**	**Inside MPA**	**Outside MPA**
Batangas (Mabini and Tingloy)	↑	↑	↑	Lower than inside or none	—	—
Masinloc	0	0	↑	↑	—	—
Con Dao	↑	—	↓	—	↓	—
Hon Mun	↑	↓	0	—	Low	—
Phu Quoc	0	—	↓	—	—	—

NOTE: — = data not available; ↑ = increasing; ↓ = decreasing; 0 = no change.

the Hon Mun MPA, while there was an increase in coral cover in the strict protection zone, the coral cover declined outside the MPA, clearly showing the impact on coral growth of complete removal of human disturbances. In the area within the Hon Mun MPA that was not strictly protected, coral cover was found not to be increasing but was maintained.

Despite the overall positive trend inside the MPAs, periodic declines in coral cover were noted in areas that were affected by siltation, coastal construction, port operations, El Niño–Southern Oscillation events, and typhoons. Stress on reefs was found to continue in Batangas from tourism activities and in Con Dao from overfishing.

Fish abundance was found to be generally increasing or unchanging for areas inside MPAs in three of the five sites. Masinloc showed increasing fish abundance both inside and outside the MPA—again indicating the effects of environmental or ecological factors, such as the spillover of fish larvae and adults, rather than the results of protection measures. In Hon Mun, although fish abundance was maintained, these were mostly small fish, indicating the effects of overfishing. Only Batangas has data showing lower fish abundance outside the MPA compared to inside.

Fish and giant clam abundance, especially of larger species, decreased in the Con Dao and Phu Quoc MPAs despite the protection measures, and despite having maintained or increasing coral cover. This result may mean that enforcement of fishing regulations has reduced the use of reef-destructive fishing methods, but that overfishing through other means still continues. Another likely explanation is that even though part of the fishing grounds are under protection within the MPA, the natural refugia of fish (i.e., spawning and nursery grounds) may be subject to both overfishing and habitat destruction pressures. If fish are disturbed at key stages in their life cycle, this would inevitably result in lower fish populations.

Not enough data were available for benthic fauna (mollusks and other bottom dwellers) in other sites to make any conclusions about trends. However, crown-of-thorns starfish, a coral predator, was found to have disappeared from the MPA in Hon Mun. No data were available for outside the MPAs.

These results are not unique to GEF-supported sites. In Vietnam, for example, other donors have also supported coral reef conservation through MPAs. Improvement of coral reef status in these sites has been modest as well. While evidence indicates that MPA initiatives have positive results for hard coral, scientific research shows that declining fish populations may soon be followed by coral reef decline (Pandolfi et al. 2005). Thus, to better assess the state of coral reefs, more attention needs to be given to indicators tracking fish and benthic organisms.

It should be noted that coral cover in Southeast Asian countries generally decreased by about 16 percent to 25 percent for the period 1994–2004 (Bruno and Selig 2007; UNEP 2007b). Landings of small, reef-associated fish in the SCS have also been declining (Sea Around Us Project 2011). The positive trends in the sites are clearly a departure from this overall regional trend, and may be an effect of the management initiatives. They may also be the result of the demonstration sites already having higher resilience than most reefs, having been selected for project intervention early on and, in many cases, repeatedly over the years. This may explain why these reefs were able to maintain or even increase their cover and fish abundance while the rest of the reefs in the region declined.

Reports on the demonstration show that, despite having protection measures, coral cover and fish abundance will still decline when exposed to land-based sources of pollution and natural catastrophic

events (e.g., bleaching, typhoons). These are factors that neither MPAs nor reef rehabilitation in isolation are designed to address (due to the limited scale and function of these interventions), yet can potentially be more widespread and damaging in impact than overfishing (Edinger et al. 1998; Fabricius 2005). However, even overfishing and tourism impacts do not seem to have been adequately addressed by any of the GEF-supported approaches for reef management. In the end, the size of the MPA and the compatibility of site selection criteria with the identified conservation objectives are key factors that determine the effectiveness of these approaches in reducing environmental stress (Mora et al. 2006).

9.3 Seagrass Beds

While there are insufficient long-term data to determine changes in seagrass area, anecdotal information indicates an improvement due to better enforcement of regulations. GEF support has contributed to this by helping develop relevant legal and regulatory measures, improve management practices, and increase public awareness on seagrass conservation issues.

Seagrass beds are important as spawning and nursery grounds for some fish populations and other marine organisms, and as feeding grounds for many species, such as the endangered dugong and sea turtle. Several demonstration sites address conservation of seagrass beds and associated species as their primary or secondary objective. This section presents findings from the five sites where seagrass conservation activities were supported as a primary objective through GEF funding. This includes three demonstration sites that were sampled and covered through field verification, and Kampot, Cambodia, which had not been sampled originally but was also field verified.[4] East Bintan in Indonesia was covered through desk review of the available documents. Sites addressing seagrass concerns as a secondary objective were not covered in this analysis. All five sites have been supported within the framework of the UNEP SCS funding stream. One of the sites, Hepu, China, has also received some support through a UNDP-implemented GEF project focused on biodiversity conservation.

The seagrass beds in these sites face threats from dredging, trawling, construction, water pollution, fish farming on seagrass beds, and digging and other siltation-inducing activities in the coastal areas, among others. In some of the sites, poaching of associated species such as dugong and sea turtles is also a concern.

Annex 7, table 31, provides a summary of the activities undertaken in the demonstration sites for seagrass conservation and the results of these activities. Although there are variations, the general approach adopted at these demonstration sites has been somewhat similar. The GEF has supported the establishment of a cross-sectoral management structure to facilitate coordination and collaboration among the government departments and agencies that may have overlapping or closely connected jurisdiction over the seagrass area. As mentioned earlier, GEF-supported activities have helped in the establishment of a transboundary management agreement between Kampot and Phu Quoc, which have seagrass beds straddling the boundaries of Cambodia and Vietnam. The GEF has also promoted collaboration between the local authorities and communities in establishing and enforcing rules and regulations for management and utilization of the protected seagrass area, and has provided support to meet their training needs. In some sites, the GEF has financed targeted rehabilitation of seagrass beds on an experimental basis (e.g., Phu Quoc).

[4] In Kampot, seagrass conservation activities involved the establishment of concrete boundary markers for the protected area, which also functioned as a nursery for fish.

Another area that has received attention is awareness raising among local stakeholders on the importance of seagrass conservation. The GEF has also provided support to facilitate regular monitoring of the environmental status of the protected seagrass area. In East Bintan and Bolinao, an increase in public awareness due to demonstration activities has been established through baseline and follow-up surveys, undertaken within the framework of the GEF-supported demonstration.

A major accomplishment in most of the sites is the effectiveness of the demonstration activities in encouraging local authorities to pass local regulations to support the conservation of seagrass beds (see annex 7, table 31). During the period that GEF-supported activities were under implementation, or the period immediately after, locally applicable regulations were passed in Phu Quoc, Hepu, Bolinao, and East Bintan. Passage of these regulations is a result of a collaborative effort in which local actors played a key role. GEF support also played an important role in expediting and informing the legislative process.

Although better enforcement of regulations has been reported at all sites, the level of success achieved in reducing violations varies, and much of the evidence is anecdotal in nature. In Hepu, the Beihai city government departments and organizations—including the China Marine Surveillance SCS, the police, the Hepu Oceanic Bureau, the Hepu Fisheries Bureau, and the Shatian district government—conducted several enforcement drives to remove illegal mariculture farm and facilities from the Hepu demonstration site area. The local fishers prevent outsiders from entering the protected seagrass and dugong conservation areas. In Phu Quoc, use of blast fishing—a destructive fishing practice—has been reduced. The communities of Bolinao, Kampot, and East Bintan are also involved in enforcing the rules and regulations by patrolling, tracking, and warning violators. In Kampot, concrete poles with signboards were installed in the protected area to both demarcate and provide protection from trawling.

Despite improvements in enforcement of some of the regulations, there are several other concerns regarding which there has been little progress. In Bolinao, concerns related to encroachment in the seagrass reserve and destructive fishing practices are still ongoing. In Hepu, although violations inside the reserve have decreased, outside the reserve human activities such as mud flat culture, enclosed aquaculture, mollusk collection, and trawling continue to be threats. For Phu Quoc and Kampot, it is not clear whether poaching of dugong and sea turtles has stopped. It has been reported that occasionally the meat of dugong and sea turtles is available in the local market. Local authorities claim that poaching of these animals has stopped and that the meat in the local market is that of other animals being sold as dugong and sea turtles because they fetch a premium. In Kampot, the existing national regulations permit only short-term concessions of up to three years for the management of seagrass sites. The short duration of the concession is a disincentive for communities, as they may not be able to realize adequate benefits from their conservation efforts in the short term.

Assessing changes in the environmental status of the protected seagrass areas poses challenges due to a lack of long-term monitoring data. This lack is mostly because demonstrations involving seagrass management are relatively new. The level and type of information available on the four sampled sites differ.

In East Bintan, remote sensing data on changes in the protected site analyzed as part of the demonstration activity are available for 2006, 2008, and 2009. The effective seagrass bed area was 2,586 hectares in 2006; it increased to 2,599

hectares in 2008 but marginally declined to 2,597 hectares in 2009. Although the overall result is positive, the data are not sufficient to draw any conclusions.

For Bolinao, anecdotal reports indicate an improvement in the status of seagrass in the protected area. Data sets maintained by Seagrassnet show improvement in Bolinao seagrass cover from 2008 to 2009.[5] However, geographical coordinates of the area protected through the GEF demonstration and those used by Seagrassnet to assess change are not congruent, and annual fluctuations in coverage make inferences difficult.

For Phu Quoc, average seagrass cover is reported to have declined from more than 46 percent in 2004 to more than 33 percent in 2010. An associated indicator on fish density in the seagrass area shows an increase from more than 250 to 650 individuals per 100 square meters, due to an increase in the number of small fish.[6]

In Hepu, anecdotal evidence indicates an improvement in the environmental status of the seagrass area. According to the staff of the National Dugong Reserve at Hepu, a rare species of seagrass, *Halophila minor*, was reported for the first time in the reserve. The staff views this finding as indicative of an improvement in the status of the seagrass cover. The staff also reports that the frequency of dugong sightings in the area has continued to decline.

Thus, while there are some signs of improvement in the seagrass area protected and anecdotal reports so indicate, the evidence base is not yet sufficiently strong to allow for any conclusions to be drawn.

9.4 Land-Based Sources of Pollution

GEF-supported demonstrations related to reduction of land-based sources of pollution have generally resulted in stress reduction and, in some cases, improved water quality. At one site, organic pollution continued to increase due to large-scale drivers that the introduced technologies and approaches could not address.

Of the 27 demonstration sites subjected to field verification, 19 implemented activities aimed at addressing land-based sources of pollution. At 17 sites, land-based sources of pollution were addressed as a primary environmental concern, while at 2 they were addressed as a secondary concern. This section focuses on 9 of the 17 sites covered through field verification where addressing land-based sources of pollution was a primary concern. The discussion excludes eight sites where pollution control technology was still under construction or had not been constructed as of January 2012. Of the 17 sites, 7 were supported through the World Bank IF stream, 6 through the UNDP PEMSEA stream, 1 through the UNEP SCS stream, and the remaining 3 through three different projects (see annex 7, table 33).

Of the seven demonstration sites supported through the World Bank IF stream, four involved a wastewater treatment plant. In these four cases, almost all of the cost of construction of treatment plants—which constituted an overwhelming majority of the total project outlay—was met through cofinancing. The GEF financing was primarily focused on funding an innovation on conventional wastewater treatment technologies, such as chemical-based wastewater treatment in Quy Nhon and joint sewage and septage treatment in Metro Manila. These sites are meant to test

[5] Seagrassnet.

[6] Increased abundance of smaller fish may indicate a decrease in the abundance of larger predator fish.

the effectiveness of these innovations for further replication and scaling-up by governments and the private sector.

Other GEF-supported costs pertained to training, institutional development, and development of policies and regulations. Although GEF funds were also used to purchase equipment, this constituted only a small proportion of construction costs and often was intended to establish pollution monitoring systems.

The remaining three demonstration sites supported through the World Bank IF aimed at the treatment of pig farm waste. These demonstration sites were supported as part of the Livestock Waste Management project. At these sites, GEF financing was not only used to provide for training, institutional development, and development of policies and regulations, it was also used to provide incentives for farmers to adopt new technologies to treat livestock waste.

The sites supported through the UNDP PEMSEA stream focused on capacity building and development of legislation, policies, and regulations. At these sites, considerable attention was given to supporting intersectoral urban planning to address land-based sources of pollution. However, little or no GEF financing was provided for the creation of physical infrastructure or the purchase of equipment. Generally, these demonstration sites involved addressing urban wastewater pollution within the ICM framework, complemented by wastewater infrastructure projects supported through the World Bank IF stream.

In demonstration sites that were not supported through either the World Bank IF or UNDP PEMSEA streams, the type of GEF involvement differs. In Sanya, where new technologies were introduced to expand and create new wastewater treatment infrastructure, GEF financing was used to prepare an action plan to provide specific inputs to the municipal government on undertaking wastewater treatment activities. In a cluster of demonstration sites supported through the ADB-implemented ICRMP, a light approach was taken—similar to that in Sanya—that involved the establishment of a monitoring system, preparation of integrated coastal resource management plans, and conduct of seminars for local judges on pollution-related legal issues. In Bataan, a site in the Global Programme to Demonstrate the Viability and Removal of Barriers That Impede Adoption and Successful Implementation of Available, Non-Combustion Technologies for Destroying Persistent Organic Pollutants (GEF ID 2329), a noncombustion plant for destroying persistent organic pollutants was to be constructed. Here, GEF funding constituted a major part of the financing required for the total outlay, and was central to the activities undertaken. All construction work was expected to be completed by October 2012, after which the facility could be commissioned and operated to demonstrate the treatment of 1,500 metric tons of PCBs.

The differences in the level of GEF involvement and support have implications in determining the extent of stress reduction that may be attributed to this support. While a case for greater attribution may be made for stress reduction reported in the livestock waste management demonstrations, in several other sites GEF contributions need to be seen primarily within the context of the initiatives of other actors.

Environmental stress reduction in this context can be taken to mean pollution reduction through either an increase in the volume of waste treated or a decrease in the volume of waste produced. Improved environmental status is seen in better water quality, which is measured through several different parameters such as biological oxygen demand, nitrogen, and dissolved oxygen, among

others (see annex 7, table 34). Environmental stress reduction was observed in seven of the sites.

Five of the seven demonstration sites where pollution reduction or improved water quality was observed are those that drain into water bodies found to be hypoxic or eutrophic either periodically or during specific episodes in the last 20 years. Only three sites have shown positive changes for more than one parameter, indicating an overall improvement in water quality. These are Xiamen, China, Batangas Bay, the Philippines, and Ha Tay, Vietnam.

In Manila Bay, coliform levels have greatly decreased at some monitoring stations and increased in others, but remain high. Biological oxygen demand levels continue to increase. This site has experienced hypoxic episodes since 1980, and continues to be subjected to larger-scale drivers such as economic and population growth in the megacity draining into the bay—factors that are beyond the scope of the demonstration. The national government is currently making significant investments in cooperation with the private sector and development agencies toward reducing pollution levels and improving water quality to a level mandated by the Supreme Court of the Philippines. One form of investment is through the construction of wastewater treatment plants by 2016. In the case of Danang, although the city received national and regional awards in 2011 for its commendable environmental management practices, no monitoring or evaluation data were made available to the evaluation team to enable assessment of changes in water quality.[7]

While the lack of available monitoring data makes it difficult to ascertain if changes in water quality are statistically significant or merely due to diurnal, seasonal, and other factors, measures of pollution reduction tend to be more reliable. Of the eight sites that aimed to increase the volume of waste treated, three reported an actual increase. Two of the three sites that aimed to decrease the volume of waste saw progress on this parameter. The units of measurement used vary; therefore, the extent of GEF-supported pollution reduction across sites cannot be aggregated.

Other indicators of reduced pollution were an improvement in the smell at pig farms and a reduction in incidents of red eye disease among farmers in all three visited demonstration sites of the Livestock Waste Management project in China, Thailand, and Vietnam. In Ha Tay, one pollution reduction indicator was that the wastewater could be used for aquaculture. Wastewater released into rice paddies no longer killed the plants. In Guangdong, China, a proxy indicator for a reduction in the volume of waste is the number of standing pig populations covered by two levels of waste management practices introduced by the project.

Data from the World Bank show that biological oxygen demand in China, Indonesia, Malaysia, Thailand, and Vietnam has been increasing in the last decade, and even since the 1990s.[8] The findings of this analysis indicate that GEF-supported ICM and agricultural waste management approaches are effective in reducing pollution and improving water quality, likely due in part to their longer implementation period, ranging from 4 to 18 years. Sites using other approaches, particularly those using infrastructure for pollution reduction, have all seen delays in construction, and therefore cannot be expected to show results at present.

[7] This information was later reported to be available in Danang's SOC report, but it was not made available to the Evaluation Office during the field visit, through PEMSEA staff, or on the PEMSEA website.

[8] World Bank, World Development Indicators.

10. Addressing Social and Economic Dimensions

A growing body of scientific literature has shown that ecosystems are inextricably linked to socioeconomic systems, forming complex social-ecological systems (Anderies, Janssen, and Ostrom 2004; Galaz et al. 2006; Liu et al. 2007; Ostrom 2009). The implication of these studies for GEF support is that attention to social and economic dimensions is essential to achieving lasting progress toward global environmental benefits. This chapter reviews the extent to which the GEF has incorporated socioeconomic considerations as an integral part of the activities it supports, and the extent to which GEF support has contributed to socioeconomic conditions that are supportive of or detract from the generation of environmental benefits.

In cases where integration of social and ecological considerations has been successful, GEF-supported demonstrations have increased socioeconomic benefits, and by so doing have advanced environmental objectives. In most cases, however, GEF-supported demonstrations have required trade-offs between environmental objectives and socioeconomic needs. Environmental management initiatives often involve the allocation of environmental resources among different users and/or the regulation of access to these resources, such as through zoning or the establishment of protected areas. This circumstance has implications as to which stakeholders gain and lose benefits from the resources. GEF-supported demonstrations usually introduce changes in resource access and use, shifting the distribution of benefits or requiring the relocation of households and livelihoods, thus leaving some stakeholders at a disadvantage. In these cases, measures to mitigate losses and costs or to manage risks are necessary for a demonstration to address both environmental and socioeconomic objectives.

10.1 Benefits

In cases where GEF-supported initiatives improved environmental conditions in multiple-use areas, livelihoods and other aspects of human welfare also improved for local stakeholders.

Reports of more livelihood options, higher income, and improved environment were found in 8 of the 27 sites sampled; this was directly linked with the effective implementation of GEF-supported demonstrations. In Guangdong, China, Ratchaburi, Thailand, and Ha Tay, Vietnam, a positive effect was seen in local community health after new pollution control technology was introduced. Incidents of red eye disease were reduced at all sites, and air quality was improved through the reduction or elimination of the foul smell from pig waste. In Guangdong and Ha Tay, the livestock waste management technology introduced involved the production of electricity from waste through biogas, which reduced costs for farmers. In Guangdong, this also reduced the need to cut trees for fuel, which in turn resulted in residents—especially women—having more time available to earn income from other sources.

GEF support has indirectly contributed to economic benefits in ICM sites (e.g., Xiamen, China, Batangas, the Philippines, Sriracha in Chonburi, Thailand, and Sihanoukville, Cambodia), as better environmental management through GEF support has been a factor in the increase in property values, cleaner beaches, and the growth of the tourism industry. The new livelihood opportunities resulting from improved environmental conditions have helped these cities promote citizen commitment to environmental protection.[1] Similarly, sustained commitment has been seen among fishers in Bolinao, the Philippines, due to an increase in fish abundance and size resulting from better protected seagrass beds. Anecdotal information on increase in income was reported at this site, and three other municipalities have indicated plans to replicate this model of seagrass protection.

Five of the 27 sampled demonstration sites reported instances of reduced conflict and increased cooperation resulting from GEF-supported demonstrations. In Foshan and Guangzhou, China, the demonstrations facilitated cooperation between the municipal and district governments, and among district governments. According to the project's implementation completion report, "both interventions showed savings in capital expenditures and land acquisition compared with the alternative of having each district build its own system" (World Bank 2012). In Foshan, in particular, the environmental bureaus of the different districts now meet more regularly to discuss issues. They have established a system whereby, whenever disagreements arise, the municipal government facilitates consensus and sets agreements in writing to avoid future conflict. This action has created favorable conditions to help the bureaus more effectively operate the innovative shared wastewater treatment system that is being constructed through GEF support.

In Trat, Thailand, where mangrove reforestation initiatives began more than a decade before GEF support, conflicts among communities on crab harvesting emerged, as some communities with degraded mangroves harvested crabs in areas with recovered mangroves, which had higher productivity. GEF support (including an SGP grant) facilitated the expansion of managed mangrove areas, the formation of a network of crab harvesting communities, and the establishment of rules for crab harvesting that were beneficial to all. These measures have led to collaboration among communities, income from the increase in crabs, and—consequently—a stronger commitment to mangrove protection.

In Xiamen and Batangas, conflicts over the use of coastal waters were resolved through the introduction of multistakeholder management councils and appropriate zoning of coastal areas. In Xiamen, the local government stopped violence among fisheries, shipping, and aquaculture stakeholders by designating appropriate areas for specific uses. In the Philippines, the Batangas Bay Region Environmental Protection Council and the network of MPAs spearheaded by the provincial government serve as forums for conflict resolution among stakeholders, especially between tourist operators and traditional fishers.

10.2 Mitigation

Where traditional livelihoods had been disrupted because of habitat protection, successful ecotourism- and fisheries-related sources of alternative income promoted environmental protection behaviors within recipient communities.

Mostly to mitigate loss of income from reduced access to or use of resources, 10 of the 27 sampled

[1] A separate case study found that from 1992 to 2002, ICM in Xiamen led to a more than 40 percent increase in annual socioeconomic benefit from its marine sectors (Peng et al. 2006).

sites supported community-based livelihoods as part of the demonstrations. These demonstrations were generally supported through funding streams that had a focus on habitat protection—i.e., UNEP SCS and projects financed through the biodiversity focal area. The typical alternative livelihoods supported in these sites were related to ecotourism (four sites) and aquaculture/fisheries (four sites). None of the sites had comparative data available to measure socioeconomic change; therefore, only anecdotal information is reported here.

In China's Shankou-Weizhou Island, where mangrove rehabilitation and protection were the main interventions, boat owners in the community were trained as qualified mangrove tour guides. These boat owners have now switched from their old boats to new low-noise boats to minimize disturbance of the mangrove ecosystem. Relatedly, another source of income is the selling of goods under the community's own local brand associated with the mangroves they protect. These include eggs from ducks raised in the beaches near the mangroves. These eggs command double the price of normal eggs in the provincial markets. Another salable good is the mangrove-branded mineral water, which is also popular in the province. These became alternative sources of income for those who used to make a living from harvesting mangroves and protected birds. Some locals were also paid to replant mangroves in abandoned shrimp ponds. While there used to be many violations in the core area of the reserve, the locals now help protect the reserve. This change in behavior has been a result not only of the new sources of income, but more importantly of the high level of awareness created within the communities, and the relationships of trust established with them by the local government through the demonstration.

In Con Dao and Hon Mun, Vietnam, and Koh Chang, Thailand, when fishing grounds were reduced through the establishment of MPAs, the GEF-supported demonstrations sought to build capacity of local fishers as tour operators as an ecotourism-related livelihood.

The demonstration in Con Dao sought to provide alternative livelihoods through a revolving loan fund. Carrageenan (seaweed) farming was initiated first, but was unsuccessful because the project chose the wrong location, making the seaweed vulnerable to disease and leading to large financial losses. Other options were explored, among them the conversion of fishing boats for tourism purposes. The strategy has been to gradually increase the number of boat conversions as tourism increases on the island. Twenty fishing boats have been converted so far, benefiting 16 households since 2010; 10 more boats applied for conversion in 2011. Each boat costs D 30 million (about $1,500), payable within 12 months at 6 percent annual interest.

Local fishing also remains important in providing food for the local population and tourists. This introduced livelihood has reduced the use of destructive fishing by local fishers. As noted in chapter 9, however, Con Dao is having difficulty in controlling the commercial trawling and harvesting of benthic (bottom-dwelling) organisms—an enterprise with which local fishers are also likely to be involved. Given these caveats, the overall strategy is likely to reduce some of the pressure on coral reefs, as the permanent local population of fishers on the island remains low. So far, this low fisher population has been possible because of the restrictions placed by the government on migration to the island. The island is also far from the mainland and is held in high esteem in Vietnam due to its historical significance.

As a consequence of the establishment of a protected area in Hon Mun, conflicts arose between the MPA management staff and local fishing communities, and tour and hotel operators.

Such conflicts may have been prevented had appropriate stakeholder consultations and engagement been included as part of the demonstration. These conflicts have been mitigated with the establishment of a fund to support local livelihood activities. The fund has provided loans to more than 200 households. Livelihoods include conversion of boats from fishing to tourist operations (such as glass-bottom boats), start-up of small businesses, handmade crafts, etc. The current value of the fund is D 750 million (about $37,500). Loan recipients pay 0.65 percent interest per month, or 7.8 percent per year. It was reported that the fund is maintaining its value. The alternative livelihood has reduced fishing pressure inside the protected area. But, as mentioned in chapter 9, evidence indicates that overfishing outside the protected area continues to affect the reef's integrity.

In Koh Chang, the local socioeconomic benefits intended by GEF support were not realized. Consequently, there has been little change in the behavior of fishing communities. Training was given to fishers, and brochures were distributed to advertise their services as guides to tourists. However, the fishing villages were actually far from the tourist areas (and from the reefs), which made them less competitive against established tour operators. In addition, the tourism industry in Koh Chang is dominated by nonlocal companies that bring their own guides; these guides have an advantage over local fishers, who do not meet the foreign language requirements of the companies. The extensive livelihood support provided by the demonstration raised the expectations of local fishers, but ultimately no alternative income was realized.

Aquaculture or fisheries and fisheries-related activities were the types of livelihood supported in Masinloc and Bolinao, the Philippines, Phu Quoc, Vietnam, and Shantou, China, which had demonstrations related to habitat protection and rehabilitation. In these sites, the introduced livelihood only aimed to reduce environmental pressure by providing another source of income that may not have increased incentives for environmental protection, but at the very least did not harm the environment.

The demonstration in Masinloc supported sea cucumber farming, but the design turned out to be inappropriate. The unsuccessful sea cucumber ranching was modified after the project ended, and was eventually sustained. As an environmental benefit, this may have reduced fishing pressure on wild sea cucumbers in the area, although this was not verified. Processing and marketing the sea cucumbers is now the focus at the site.

In Phu Quoc, the demonstration introduced artificial reefs for some fishers. This was a desired solution for them as it prevented commercial fish trawlers from fishing in the area, which reduced the destruction of coral reefs and seagrass habitats. At the same time, the artificial reefs function as a fish aggregating device. While this is generally not an ecologically appropriate approach, with the appropriate regulations in place, it does concentrate local fish catch and make fishing more efficient.

In the Bolinao demonstration, vacuum-sealing technology was introduced to enhance the existing fish-drying livelihood. Its introduction, however, doubled the price of the goods, which made them locally unmarketable. As in Koh Chang, training and technology were provided, but expectations of higher income were not met. In addition, not all who wanted to participate in the alternative livelihood were able to do so, due to limited funds allocated for training and technology.

Silvo-aquaculture was introduced in Shantou covering at least 20 hectares of mangrove area, but no details are available on how community interaction took place. Sanya, China, reported

the "sustainable employment" of 600 community members but did not specify either industry or livelihood. The implementation of ICRMP in Masinloc has been delayed, and therefore no results can be expected yet in terms of socioeconomic improvements from this demonstration. Most of the livelihood projects proposed, however, have to do with fisheries-related activities (Empeño 2011).

In summary, 5 of the 10 sites that had a livelihood component reported that the livelihoods supported by the demonstrations are currently being sustained (Shankou-Weizhou, Con Dao, Hon Mun, Masinloc, Phu Quoc). Two sites reported that the livelihood had not been sustained (Bolinao and Koh Chang); in both cases, the feasibility of the enterprise given the needs of the specific markets had not been considered in the design of the supported livelihoods. Instead of creating a positive or neutral impact, these interventions may instead have resulted in a negative environmental outlook among stakeholders. From the information available for the three other sites (including for the ICRMP demonstration in Masinloc), it was difficult to ascertain the status of the livelihood, or how the socioeconomic aspects of the demonstration affected local people's behavior toward the environment.

10.3 Costs and Risks

In the process of achieving global environmental objectives, some demonstrations have posed risks to the welfare of local stakeholders. In some cases, executing agencies have clearly taken measures to address these concerns. However, the appropriate systems to identify and mitigate socioeconomic risks were reported to not always be in place; as a result, not all measures taken may have been adequate in preventing negative unintended impacts.

Change in land or sea use as part of coastal area zoning often requires the displacement of stakeholders from their place of residence or livelihood, as seen in five sites. In Metro Manila and Qui Nhon, Vietnam, some households had to be relocated to make way for the construction of wastewater treatment plants. Compensation was agreed upon and resettlement provided. Ten households adjacent to the wastewater treatment plant being constructed in Qui Nhon that have not been relocated claimed that the plant creates a flooding risk to their residences. The complaint had been reported in the previous supervision report and, at the time of the field visit, the World Bank had begun an internal review process to assess the merits of the claim. A short-term contingency plan was also under development. The World Bank recently reported that related compensation has been made to those households in a satisfactory manner.

As shown in these demonstrations, processes to mitigate risks and ensure that stakeholder concerns were addressed in a fair and timely manner were set in motion as a result of the World Bank's well-developed safeguard policies. The GEF has adopted these policies as a starting point in crafting its own environmental and social safeguard standards, which now require GEF Agencies to

> …ensure that involuntary resettlement is avoided or minimized. Where this is not feasible, the Agency is required to ensure displaced persons are assisted in improving or at least restoring their livelihoods and standards of living in real terms relative to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher… (GEF 2012).

Projects approved prior to 2011 are not required to meet the GEF safeguard standards. However, the assessment of the extent to which GEF support has taken the appropriate measures to prevent or address risks to the local population is relevant for this impact evaluation. In Sanya, floating restaurants were relocated to protect the mangrove and

coral habitats, but no information was available on whether these were compensated. Coastal zoning in Danang, Vietnam, has led to large hotels being built along the coastline, limiting public access to the beach, especially for local fishers who used to live in the area. PEMSEA reported that stakeholder consultation and compensation took place, and that displaced fishers were provided improved housing in an area zoned for fishing. Similarly, in Xiamen, aquaculture farmers and developers had to be relocated to protect mangroves and to construct a shipyard. Compensation was given to affected parties after some negotiation, a three-year phaseout period was allowed for the aquaculture farmers to relocate and adopt alternative livelihoods, and alternative sites for development were provided.

The State Oceanic Administration of China has provided information that, due to the alternative livelihood opportunities given to aquaculture farmers, only a few chose to continue their aquaculture activities in the relocation area, and that no negative social complications have been reported either by those farmers or by the people at the relocation site. However, as the demand for aquaculture continues to increase in the country, the development of new aquaculture farms elsewhere to compensate for those eliminated in Xiamen poses the risk of increasing the ecological and health costs for stakeholders beyond the geographical scope of the demonstration site. This is an example of a negative socioeconomic impact that can emerge from implementing a demonstration in one site without addressing the problem at a larger scale (GEF EO 2005; Lau 2005; Mee 2010).

Both Xiamen and Danang are supported through the UNDP PEMSEA funding stream, which has reported that it typically follows the respective country's policies in dealing with relocation and resettlement issues that arise in the course of coastal zoning and ICM program implementation. While some countries' practices might meet international standards, those of others do not. The evaluation could only ascertain the risks but not the actual impact on the affected population of such resettlement practices. The impact of zoning and relocation activities may be an improvement in environmental status—and consequently an overall improvement in health, safety, and livelihoods for most local stakeholders, as seen in Xiamen. However, resettlement issues that are not properly addressed may pose a risk to the GEF's reputation. UNDP is now implementing its new safeguards policy which should be triggered by similar initiatives in the future.

Similar risks are seen in sites where insufficient stakeholder engagement was performed. While this inadequate communication has greater implications for the broader adoption of demonstrated approaches, it may also create distrust and disaffection among stakeholders and toward other GEF-supported initiatives. For example, in Puerto Galera, the Philippines, where the PPP approach was introduced as a sustainable financial mechanism for a wastewater treatment facility, much effort was put into gaining the cooperation of the private sector to invest in the proposed project. However, after the contract had been finalized with the local government, the facility could not be built, as the feasibility study had not considered consent to be necessary from affected stakeholders who turned out not to be amenable to the proposed site for the facility. This is a risk to the relationships built not only with the local land and business owners and other stakeholders, but especially with the private sector that had already invested time and money in the partnership.

In order to achieve global environmental objectives, 3 of the 27 demonstrations have had to increase direct financial costs for local stakeholders. All three promote innovative pollution control technology. While these do not pose risks

to human welfare per se and are likely to result in a net reduction in ecological and human health costs, they do pose risks to the sustainability of the demonstrations if stakeholder incomes do not allow them to cover these costs. Noncombustion technology introduced in Bataan to destroy PCBs locally is more expensive by about $1 per kilogram than exporting the waste to combustion facilities in other countries, as has been the practice. While this increases direct costs for private companies, they are obliged by both national law and the Stockholm Convention to use the facility. One component of the GEF-supported demonstration aimed at gaining the cooperation of the private sector. However, 119 cooperative electrical companies that hold 66 percent of the PCB stockpile may not be able to afford this cost.

Wastewater treatment plants still being constructed in Metro Manila and Qui Nhon are expected to result in an increase in user fees for households. Public consultations were done to address this in Manila. In Vietnam, there is a proposal for the government to subsidize most of the costs initially, gradually increasing the user fees over time.

11. Broader Adoption: Mechanisms and Factors Affecting Progress to Impact

Through demonstration sites, the GEF pilots mostly known approaches and technologies in a new context. The objective is to convincingly demonstrate and adapt approaches or technologies so that they work and are well suited to the given context. GEF-supported demonstrations and other initiatives at higher scales also usually generate knowledge or lessons intended to contribute to policies, institutions, and other components of sound governance. These outcomes are expected to lead to the adoption of promoted approaches and technologies in more sites to reduce environmental stress and improve environmental status over a larger area.

Building on work carried out during OPS4, the evaluation focused on three processes or mechanisms by which broader adoption may occur. The first is **mainstreaming**, which involves elements of GEF-supported approaches being incorporated in laws, policies, regulations, programs, and other stakeholder initiatives that are usually already part of their regular program or mandate. The second is **replication**, whereby the GEF-supported approach or technology is adopted in other localities at a comparable administrative or ecological scale. The third is **scaling-up**, whereby a similar initiative is implemented in a larger geographic area, often including new aspects or concerns. These new concerns may be political, administrative, or ecological in nature. Scaling-up assists in addressing concerns that cannot be resolved at lower scales and in spreading the promoted interventions to contiguous areas.

These three processes of broader adoption may be at work at the same time for a given demonstration and may take place at different scales. Often, one process may have to occur for another to take place, such as incorporation of a successful municipal-level approach into national law (mainstreaming) before local government implementation in their own municipalities (replication), after which local governments may coordinate to jointly manage the various factors affecting a water body rather than develop regulations in isolation only for areas under their respective jurisdictions (scaling-up).

The GEF has frequently provided support for activities such as training, exposure visits, development of sustainability and replication strategies, conferences, and knowledge products with an eye to accelerating broader adoption.

Not all successful demonstration activities lead to broader adoption. Supporting the findings of OPS4, this evaluation found four key intervening factors that affect the extent of broader adoption:

- Attributes of the approach, technology, or other innovation introduced though GEF support, including compatibility with existing systems, perceived advantages over alternatives, etc.

- Attributes of the adopting stakeholders, including the extent to which required institutional capacities are in place to implement the approach
- Availability of financial resources
- Appropriate legal or regulatory framework

In other instances, although the demonstration activity might not—or not yet—have been successful in establishing the effectiveness of the approaches, the emerging lessons might already be adopted.

Of the 27 sampled demonstration sites, 20 were completed or were at a stage at which indications of broader adoption could be identified. Eighteen of these 20 sites reported some form of broader adoption, albeit with large differences in the extent of this adoption. In all, 13 cases of mainstreaming, 14 of replication, and 10 of scaling-up were reported (table 11.1). The greatest number of cases of broader adoption was found at sites demonstrating the ICM approach, supported through the UNDP PEMSEA stream. This finding is to be expected, as GEF support to this stream has been the longest running, and the demonstrations were designed with replication as a primary objective. In the case of the UNEP SCS stream, there were some cases of broader adoption, but they tended not to be as advanced, since the duration of GEF support had been shorter. Except for sites demonstrating livestock waste management, demonstrations supported through the World Bank IF stream generally did not report cases of broader adoption, as the promoted technologies were still under construction.

In Manila Bay, the process of mainstreaming occurred through the implementation of the approach at a scale below the national scale, where it was first introduced. To accomplish this, the lower-scale management units at the provincial/municipal levels have mainstreamed the approach from the national level through their own implementing mechanisms appropriate to their respective scales, instead of simply implementing it under the national administrative framework. Some cases of successful mainstreaming reported in GEF-supported sites are highlighted in box 11.1.

The most far-reaching broader adoption so far is the ICM approach, which was first demonstrated in Xiamen and Batangas Bay beginning in 1994 (Chua 2008). From these two sites, six national ICM demonstration sites were supported by the GEF in six countries; as of 2012, an additional 26 parallel sites in the EAS have elected to replicate the ICM model using their own local and national government resources, with training support provided through the UNDP PEMSEA stream. In the two original ICM demonstration sites, GEF-supported follow-up projects through the UNDP PEMSEA stream have played a key role in facilitating broader adoption.

11.1 Broader Adoption at the Local and National Scales

Broader adoption is more likely to take place through several different processes when four key conditions are in place: incentives to commit based on the attributes of the introduced technology or approach, institutional capacities of the adopting governments, available financial resources, and appropriate policy frameworks.

The ICM approach was initiated in Xiamen as part of the MPP-EAS project. The activities undertaken in Xiamen as part of this project aimed to support the city's process of transformation onto a sustainable development path, and to serve as a demonstration of the application of the ICM model for the region. The framework of the demonstration included training on ICM for professionals from China and other neighboring countries (Hong and Xue 2006). After the effectiveness of the ICM

TABLE 11.1 **Broader Adoption Reported in Sampled Demonstration Sites**

Demonstration site	GEF project	Main-streaming	Repli-cation	Scaling-up	Funding stream
Hon Mun, Vietnam	Hon Mun Marine Protected Area Pilot	x	x		Other
Xiamen, China	Prevention and Management of Marine Pollution in the East Asian Seas/Building Partnerships for the Environmental Protection and Management of the East Asian Seas/East Asian Seas Region: Development and Implementation of Public Private Partnerships in Environmental Investments	x	x	x	UNDP PEMSEA
Batangas Bay, Philippines		x	x	x	
Danang, Vietnam	Building Partnerships for the Environmental Protection and Management of the East Asian Seas/ East Asian Seas Region: Development and Implementation of Public Private Partnerships in Environmental Investments	x	x	x	UNDP PEMSEA
Chonburi, Thailand		x	x	x	
Manila Bay, Philippines		x	x	x	
Trat, Thailand	Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand			x	UNEP SCS
Masinloc, Philippines			x		
Hepu, China		x		x	
Bolinao, Philippines			x		
Phu Quoc, Vietnam		x	x	x	
Con Dao, Vietnam	Biodiversity Conservation and Sustainable Use of the Marine Resources at Con Dao National Park		x		Other
Shankou-Weizhou Island, China	Biodiversity Management in the Coastal Area of China's South Sea	x	x		Other
Sanya, China		x		x	
Ratchaburi, Thailand	Livestock Waste Management in East Asia		x		World Bank IF
Ha Tay, Vietnam		x			
Guangdong, China			x	x	
Shantou, China	Participatory Planning and Implementation in the Management of Shantou Intertidal Wetland		x		UNEP SCS
Puerto Galera, Philippines	East Asian Seas Region: Development and Implementation of Public Private Partnerships in Environmental Investments	x			UNDP PEMSEA
Masinloc, Philippines	Integrated Coastal Resources Management Project	x			Other

model from a city planning and sustainable development and management perspective was established, the focus of subsequent GEF-supported activities in Xiamen has been on using it as an example to train institutions and individuals, and on facilitating replication in other areas.

This approach has indeed been adopted in many other cities within China, such as Lianyungang and Quingdao (Yellow Sea); Panjin, Leting, and Dongying (Bohai Sea); and Quangzhou, Yangjiang, Fangchenggang, Haikou, and Wencheng (SCS). Replication of ICM in these sites is supported by

BOX 11.1 **Mainstreaming Lessons from GEF-Supported Demonstrations**

In Shankou-Weizhou, China, the officials involved in implementing the Biodiversity Management in the Coastal Area of China's South Sea project reported that they were able to mainstream mangrove conservation into the political agenda of the provincial government by impressing upon the prime minister and vice governor the importance of mangrove conservation during a 2008 visit. As a result of the interest shown by top political leadership, a special fund for fundamental research was established by the province's Science and Technology Department in 2010. Experiences from the project are also reported to have called greater attention to sustainable development as a priority in China's 12th five-year plan. Similarly, on the basis of experiences gained in Sanya, a site under the same project demonstrating coral reef conservation approaches, the provincial government of Hainan revised regulations on coral reef conservation in 2009.

As part of the Hon Mun MPA Pilot Project, a management plan was prepared for the MPA, community-based participatory management approaches were promoted, and management involvement by the private sector was sought. The experience of Hon Mun, the first MPA in Vietnam, was especially relevant to other candidate areas in the country. A report documenting the experiences and lessons from Hon Mun was prepared to provide inputs into the development of a National System of MPAs in Vietnam, which was largely financed by DANIDA. The project also supported the participation of senior staff from other MPAs in training on MPA planning and development. This included a comprehensive training program in December 2005 with 35 MPA managers from Cambodia, China, and Vietnam participating. While the spread of MPAs in different areas of the region is a result of the convergence of several factors, the Hon Mun demonstration has been reported to have had a significant influence.

A major example of mainstreaming GEF-promoted approaches has been via the TDA-SAP process. A major output of the project was the SAP for the region, including several specific plans for each country. Several elements of the SAP have been adopted in the national strategies and programs of the SCS countries. Thailand has incorporated the prioritized actions specified in the 2008 SAP in its National Biodiversity SAP, which was formally approved by the government in January 2008. In China, arrangements for implementation of the prioritized actions were incorporated into the socioeconomic development plans of its central and provincial governments. Cambodia and Malaysia have adopted their respective national action plans. Some of the actions have also been adopted in Indonesia.

local governments and does not involve any GEF funding. Based on interviews with officials at the Oceans and Fisheries Bureau of Xiamen, the results at the sites where ICM has been replicated have varied considerably: most sites have yet to achieve the levels of effectiveness existing in Xiamen. Nonetheless, it is clear that in all these sites, the Xiamen experience has inspired local government buy-in to sustainable development wherein they provide adequate attention to environmental priorities such as reduction of marine pollution and conservation of coastal habitats.

While Xiamen experienced unusually high rates of economic growth over the last two decades, other cities in which ICM has been introduced have also grown quickly and have had a sound fiscal base with which to support ICM. ICM has allowed the municipalities to incorporate some elements of sustainable development and avoid greater costs that would be caused by environmental degradation down the line (Peng et al. 2006). The experience in Xiamen also helped support policy and legal frameworks, as ICM was mainstreamed though local ordinances and the national Sea Use Management Law. In 2004, Xiamen collaborated with two other major cities in Fujian Province to jointly promote economic development under the framework. And in July 2012, along with two cities in the Jiulong River Basin, Xiamen launched the Jiulong River-Xiamen Bay Ecosystem Management SAP, to scale up the coverage of its ICM program

to inland cities that were contributing to pollution in the bay.

ICM activities in Batangas Bay were initiated in parallel with those in Xiamen. The ICM approach piloted here was then replicated in Balayan Bay and adjacent bays in 2000 and in Tayabas Bay in 2005. Eventually, the ICM program was implemented to include the whole Batangas province, including upland areas. Building on the Xiamen and Batangas experiences, the ICM framework for addressing marine pollution was replicated in Manila Bay with support from the GEF, which has scaled it up to the entire watershed, and mainstreamed it to four provinces and three administrative regions along the bay through replication at these lower scales. Replication has been reported in another province in the country, Guimaras, which has already produced its own SOC report. As in Xiamen, the ICM approach was mainstreamed through local ordinances and a national policy for sustainable development of coastal and marine areas (Executive Order 533).[1]

The broader policy context in the Philippines also played an important role (Kurauchi et al. 2006; Siry 2007), with decentralization ongoing since the 1990s. These policies have been effective in transferring responsibility for environmental resource management to local governments; this has been accompanied by transfers of financial resources, as well as the ability of the local governments to generate resources through their own fiscal policies (Nasuchon and Charles 2010; Pomeroy et al. 2007). The bays in which ICM is being replicated have strong economies, including significant tourism industries. The ICRMP, which is presently under implementation, also intends to give further impetus to replication of the ICM approach in other areas; it is projected to implement elements of the ICM approach demonstrated in Batangas Bay to 80 more municipalities in the Philippines. While implementation of this project has seen delays, the GEF focal point for the Philippines reported that about 68 ICM plans have been developed and adopted by participating municipal governments in six provinces since 2010; and local government funds have been allocated to implement these plans for such activities as coastal law enforcement, MPA establishment, and solid waste management.

In both Xiamen and Batangas Bay, the process of broader adoption combined mainstreaming, replication, and scaling-up. These two cases have several characteristics in common. Both experiences demonstrated that the ICM approach was effective in the respective national context to better organize and plan growth, and to coordinate various sectors. The experiences also demonstrated that there are significant payoffs from giving early attention to environmental concerns in the process of economic development, before the consequences of pollution became irreversible or too expensive to remediate. Both countries have a robust decentralization policy framework which delegates management of natural resources and environmentally related services to local governments. In this sense, the ICM processes in Xiamen and Batangas Bay were aligned with country priorities—an important factor in their incorporation into national policy. The context was thus receptive to the lessons that ICM provided. Sufficient foundational capacities in local governments were also in place before they began to implement ICM. Economic growth was robust. Both Xiamen City and Batangas Province have been among the highest earning areas in their countries. In both places, the tourism and real estate industries have been important engines of growth. The new sites in which ICM is being replicated also have dynamic economies, albeit not to the same extent.

[1] In the Philippines, the executive order was a result of the initiatives of several coastal management projects.

Mainstreaming and scaling-up are most successful in areas that have the same receptive capacity as that of the demonstration site, most notably economic and governance capacities. In addition, scaling-up works best where administrative and geographical boundaries match those of the problem being addressed.

The broader adoption process of Xiamen and Batangas Bay can be contrasted with the experience in Danang, Vietnam. Before 2000, the ICM approach had not been implemented in that country. Inspired by the experiences in Xiamen and Batangas, the approach was replicated in Danang as part of the PEMSEA project. Like Xiamen and Batangas, Danang, a port city, also experienced an economic boom with particularly strong growth in its tourism and real estate industries. ICM has helped Danang to plan growth and to address early environmental concerns, and has been identified as an area for development by the Vietnamese government. The ICM experience in Danang—as well as experiences in other parts of the country supported by donors such as DANIDA and the U.S. National Oceanic and Atmospheric Administration—has facilitated the passage of national laws on marine resource management, and the 2008 establishment of the Vietnam Administration of Seas and Islands.

As part of the 2007 National Program on ICM for North Central Region and Central Coastal Provinces, ICM was replicated in three other Vietnamese provinces: Thua Thien Hue, Quang Nam, and Ba Ria–Vung Tau. Moreover, the lessons in Danang have been instrumental in spurring collaboration between PEMSEA and the government to expand ICM in six more provinces. Actual progress in broader ICM adoption has been slower than in Danang. While there is the will to adopt, the cities to which ICM is being expanded do not have the dynamism of Danang, nor access to as many fiscal resources. Decentralization policies in Vietnam, while delegating to the provinces responsibility for natural resource management, have not fully transferred the necessary financial resources to put this into action. Key decisions such as approval of environmental impact assessments are often still centralized. Existing capacities at the provincial level are another limiting factor. Plans for the establishment of a national ICM training center in Danang have been slowed by a lack of expected funding from the central government.

In Thailand, the ICM experience that began in the municipality of Sriracha in the province of Chonburi has gone in the direction of scaling-up and mainstreaming. Until the mid-1990s, the area was part of Thailand's Eastern Seaboard Development project, which aimed to develop provinces in the country's eastern seaboard into the second largest economic zone next to the Bangkok area (Ariga and Ejima 2000). GEF-supported demonstration activities through the UNDP PEMSEA stream started in Sriracha shortly after a new decentralization policy was passed, granting the local governments more responsibility in managing their natural resources. ICM activities initially focused on five local government units in the vicinity of the Sriracha Port. These units were selected primarily because of their history of collaboration, financial resources, and relatively strong institutions. They developed an ICM strategy in 2001, which was adopted in 2004. Scaling-up allowed the local government units to share wastewater treatment facilities and therefore collectively cut costs. Local government unit officials consider that the main impact of ICM is that economic growth in the Chonburi coast without it would have taken place without consideration of the environmental dimension.

In 2009, the ICM approach was extended to other coastal municipalities in Chonburi, which adopted the Chonburi coastal strategy. Seeking to address pollution in the bay from upstream sources, the coastal municipalities invited an additional 73 local

government units to include the province's upland areas. In November 2010, the Chonburi Oil Spill Contingency Plan was launched with the participation of all 99 municipalities in the province. Thus, from a core of five local government units that initially focused on pollution control, the program has expanded to cover the entire Chonburi watershed. The municipal local government units have adopted a three-year implementation plan for the coastal strategy and have mainstreamed this by integrating it into their respective investment plans.

While there have been important gains in ICM implementation in coastal local government units, its expansion to the rest of the province and to the country has faced several constraints. At the national level, government officials express the opinion that the ICM model applied in Sriracha has limited application in many other provinces in Thailand, where institutional, human, and financial capacities are weaker. Up to the end of 2011, Sriracha had provided some of the technical support and mentoring to coastal communities, with some resources provided by the provincial government. But the extent of mentoring and technical support needed to expand ICM to inland local government units is beyond what Sriracha and the other coastal local government units can provide.

Despite a common interest in adopting ICM, there are big differences between coastal and inland local government units. In Sriracha and its adjacent local government units, there are strong initial human, institutional, and financial capacities. Upland local government unit capacities lack the fiscal resources generated by the economic spillover of the Sriracha Port, the oil refineries, and the tourism industry. Environmental problems are also of a different nature and more difficult to address. The sources of pollution are most often from farm and livestock runoff scattered through the territory (nonpoint source pollution). Weak regulatory frameworks and enforcement capacity make these problems much more challenging. The incentives for upland adoption of ICM are also not as obvious for upland local government units. In the case of the coastal communities, the rapid growth of tourism and real estate values are important incentives for protecting the beaches. Scaling-up in Chonburi faces the classic upstream/downstream dilemma in which upland local government units will have to invest in activities that will largely benefit downstream municipalities. While there has been some talk of payment for environmental services, it is not clear how sufficient funds will be contributed downstream to provide needed incentives for change upstream.

Scaling-up is indeed necessary, however, to fully encompass the environmental or ecological boundaries of the environmental problem being addressed. Coordinated management is often worth the additional costs to keep an environmental problem from spilling over or transferring to another area beyond the demonstration site. For example, in Xiamen, coastal area zoning through ICM necessitated the displacement of aquaculture ponds to another water body in the vicinity. This has posed the risk of aquaculture pollution being transferred to other water bodies, as the demand for aquaculture continues to increase in China. As discussed above, Xiamen has, since 2004, scaled up ICM to include other water bodies near the city, as well as to two cities in the Jiulong River Basin, which has been a source of pollution in the bay.

The differences between the Xiamen and Chonburi experiences are that (1) scaling-up in Xiamen has taken place gradually over almost two decades, and (2) it has so far involved only comparatively progressive cities that can support the costs of implementing the approach and coordinating with the other cities. Scaling-up the unit of management in Batangas has been relatively easy as well,

given that the additional bays are all within the jurisdiction of the same high-income province, albeit composed of new municipalities. Because the GEF-supported demonstration was initially done with the province as the primary administrative unit, it had an inherent authority to convene other municipalities in order to scale up ICM to include all other water bodies in the province beyond Batangas Bay.

In Chonburi, on the other hand, the provincial government itself has not had as much of an implementing role. Sriracha has had to take on the leadership role of getting other municipalities in the province to adopt and scale up ICM, requiring the creation of new implementing structures both at the level of the additional municipalities and at the level of the clusters of municipalities. In Chonburi, the costs of coordinating regulations and activities across municipalities of very different economic and institutional capacities may be too high, needing significant political and financial support from the national government that are currently not present. GEF support through the UNDP PEMSEA stream is now being channeled toward building capacity of national and regional task forces and ICM learning centers that are envisioned to provide the necessary training and technical support in further scaling-up processes at existing ICM sites and in countries such as Vietnam. Chonburi, on the other hand, has planned to set up a provincewide ICM Learning Network to build capacity in municipalities that are new to ICM, for which a sustainable source of funding will have to be obtained if this is to provide support to 99 municipalities.

Replication is particularly effective where the approach or technology that is promoted meets a specific need and there is high incentive for adoption.

GEF support to the PSHEM Code is an example of an approach that addresses a very specific need, and which is in the process of replication across the region. Building on previous experiences, PEMSEA, in collaboration with IMO, developed the PSHEM Code to address the pollution risks in ports that are hotspots for pollution. The code provides port authorities and operators with a protocol that helps them assess and improve their operational procedures so as to minimize pollution-related risks. PEMSEA initially supported the development of the code in the port of Bangkok, building on initiatives funded by Sweden and Denmark, where it has now been put into practice for several years. Authorities in Bangkok reported that the code has reduced risks in the port. Reports of near-misses of vessels have been reduced considerably.

The PSHEM Code has been replicated in the ports of Laem Chabang, Thailand, and Tanjung Pelepas, Malaysia. The ports of Ho Chi Minh, Vietnam, Phnom Penh and Sihanoukville, Cambodia, Tanjung Priok and Tanjung Perak, Indonesia, Cagayan de Oro and Iloilo, the Philippines, and Dili, Timor-Leste, are planning to implement the code as a part of a project supported by the German Technical Cooperation (Deutsche Gesellschaft für Technische Zusammenarbeit, GTZ) and executed by PEMSEA. Ports derive important benefits from the code—they improve health and safety standards, giving them significant reputational benefits and making them more competitive. The evaluation could not assess the progress made in replication sites. Only the port of Sihanoukville was visited, where port authorities expressed concern that while they were close to finishing development of a PSHEM Code plan, they did not have the technical capacity or financial resources to implement the plan at present. During the field visit in Bangkok, government officials reported that replication in Laem Chabang was doing well.

Technologies specifically targeting the management of livestock waste, which were tested in

China, Thailand, and Vietnam, are also being replicated in several areas. In China, the national regulations that addressed farm waste were quite stringent but were not followed. To encourage livestock farm waste management in Boluo County, opinion leaders among the pig farm owners were brought on board with a greater level of incentives during the first phase of implementation of the demonstration. As the promoted technologies were being adopted by these opinion leaders, other potential adopters were being brought on board through exposure visits to farm trial sites and training. Because the project had helped some farmers in Boluo County comply with discharge standards, enforcement by the county officials was facilitated—and concurrently, other farmers were encouraged to change their practices to be in compliance. A replication strategy was prepared to guide expansion of the livestock waste management interventions in other counties of the Guangdong province. The replication strategy now forms a basis for a follow-up project that will cover the entire province; this project is expected to be primarily supported through a World Bank loan of $100 million. Other non-GEF-related factors have helped in making replication a priority for the provincial government. Efforts to improve water quality should be seen in the context of the commitment of Guangdong Province to supply clean drinking water to Hong Kong SAR, China.

The livestock waste management experience in China may be contrasted with experiences in Thailand and Vietnam. In Thailand, most of the pig farmers have large holdings and are politically very powerful. This makes both changing the legal framework and enforcement difficult. Further, the participating farmers are not as willing to open their farms to visitors for knowledge sharing. These factors limit the extent to which the promoted technologies and approaches may be replicated. These constraints notwithstanding, two projects that seek funding support through the Clean Development Mechanism have been designed in Thailand using the Livestock Waste Management Project demonstration in the country as a model.

In Vietnam, the project has also opted to use opinion leaders to promote the demonstrations. Many farmers and government officials have visited some of the farms. To facilitate training replication, an exposure visit and study tour on policy issues (to Poland) has been supported for local government officials. Despite high potential for replication, limited fiscal resources of the government pose a constraint. Consequently, the government is not able to provide sufficient incentives to farmers to facilitate speedy adoption of promoted technologies.

The promotion of champions has been key to achieving major gains in broader adoption. However, the risks of relying on champions, when not properly managed, have resulted in approaches not being integrated, a lack of introspection, and losses in the momentum and synergy of GEF-supported initiatives.

GEF-supported activities are sometimes designed and executed through a team that often includes enterprising government officials or local community leaders who serve as champions to significantly push a demonstrated approach forward. These champions usually already have a vision for effecting change through the approach, but may lack access to the necessary resources for implementation and scaling-up, or are by themselves unable to access support from higher authorities. Support through GEF projects provides them with access to these resources. As GEF support tends to draw considerable attention to an activity, these champions gain the opportunity to showcase the progress being made on the ground and to get noticed professionally. The evaluation found at least 10 instances where champions played a significant role in the 29 demonstration sites that were field verified (including Kampot and Sihanoukville in Cambodia).

The rise of the champions up the professional ladder has helped create a more receptive bureaucracy where environmental concerns become mainstreamed in the functioning of government agencies. In Phu Quoc, most members of the SCS TDA-SAP project management unit were promoted to provincial positions in the departments of the environment, science and technology, and natural resources. In these positions, they were much more able to contribute to further development of policy and influence environmental management in the province. In Cambodia, an intern of the PEMSEA project was promoted to a high position in the Environment Ministry, and from there has played a key role in the adoption of plans developed by various streams of GEF support.

Reliance on champions may also have drawbacks—a risk that needs to be carefully managed by identifying and developing alternative pathways from the start of the initiative. When initiatives are closely associated with a given individual, such as a politician, they run the risk of not being supported by the subsequent leadership which may have different priorities and constituencies (the Batangas province experienced such a change in governor). A vacuum left after a champion's departure might also lead to the initiative making much slower progress; this happened in the wake of the change of mayor in Sriracha. These transitions have typically required extensive efforts by GEF project staff to inform and convince new administrations of the merits of sustaining the initiatives.

The double-edged sword of relying on champions to carry an initiative forward is also seen at higher scales of GEF support. Certain of the core approaches that have been used in the GEF to define and tackle international waters concerns are related to the extent to which individuals have been able to champion these approaches. Two energetic visionary leaders played a crucial role in pioneering and sustaining two major streams of GEF funding in the SCS, but this became a key factor that contributed to competition and lack of coordination. Each started with robust, complementary schools of thought that the GEF has helped to implement, but in many cases, the unresolved personal differences became choke points in implementing the GEF's overall international waters strategy in the region. The GEF has been keenly aware of this situation but, lacking the mechanisms to address implementation processes across agencies, has let these interactions mostly go unmanaged for over 15 years. Furthermore, given their typically charismatic personalities, the GEF and its projects often become closely associated with the champions it supports. Any actions champions take may therefore be perceived by stakeholders as being undertaken by the GEF, which raises the possibility of a reputational risk when these actions are not aligned with GEF standards.

11.2 Broader Adoption at the Regional Scale

Broader adoption by countries of a viable regional mechanism providing specific core services is necessary to achieving global environmental benefits. PEMSEA's heavy dependence on GEF funding at present for the continuation of these services endangers the future of PEMSEA, as PEMSEA itself recognizes.

Given the transboundary focus of the concerns that the GEF seeks to address, further progress to impact for such concerns will depend to a great extent on having an effective and viable mechanism in place that provides the key services needed to facilitate joint initiatives, and to coordinate action among the countries and the various stakeholders. Most important, the mechanism must have access to sufficient financial resources to carry out these key services, and have the political support of participating countries for it to be effective.

Largely because of its strong project coordinating unit benefiting from continuous GEF financial support, PEMSEA has been operating much as a regional organization for nearly 20 years. It has developed into a robust organization that provides many services valued by the participating countries, including facilitating the exchange of experiences, providing technical support for the adoption of ICM at the local level and ICM policy formulation at the national level, developing the SDS-SEA, etc. Analysis of PEMSEA's sustainability is important because it is currently the only regional implementing mechanism supported by the GEF that is operational in the SCS.

An analysis of PEMSEA and regional intergovernmental bodies initiated by the UNEP Regional Seas Programme gives an idea of the core functions and costs of operating a regional mechanism.[2] Just as PEMSEA is the regional mechanism for implementing the SDS-SEA, the Regional Seas Programme intergovernmental bodies were created to develop and implement an instrument (i.e., a convention or action plan) that embodies the coastal and marine-related priority concerns agreed upon by their member countries. While decision making on priority actions and budget allocations is the sole responsibility of the intergovernmental body, a secretariat is usually formed to provide coordination support as part of the regional mechanism. Based on an analysis of the budgets of these regional mechanisms, the core operational functions usually handled by the secretariat are communication and coordination (e.g., meetings, reporting, networking with partners), project development and resource mobilization, and program and financial management.

Table 11.2 shows the differences in costs versus contributions for each regional mechanism. According to the available data, PEMSEA and COBSEA have the largest differences between country contributions and annual operating costs, as well as annual implementation costs. One distinguishing feature of PEMSEA is the larger scope of work of its secretariat, the PEMSEA Resource Facility. Apart from communication and coordination services and resource mobilization, other core secretariat functions are program management and supervision, defined as "guiding the development and implementation of policies and projects that strengthen PEMSEA and advance the objectives and outcomes of SDS-SEA implementation" (TWG 2011) and monitoring, evaluating, and reporting on the status of SDS-SEA implementation. Another function taken on by the PEMSEA secretariat that normally falls under resource mobilization is joint planning among partners and collaborators. These program management, resource mobilization, and monitoring functions as defined are not found for the other regional mechanisms.

PEMSEA is also very different from the other regional mechanisms in that it is not strictly governed by an intergovernmental body, but by a "partnership council" that includes representatives of nongovernmental entities, some of which are civil society organizations and GEF projects. Beyond being a meeting of governments, PEMSEA has acquired an independent legal personality that is neither an intergovernmental organization nor a nonprofit. PEMSEA's structure is thus more similar to a CGIAR center than to any of the existing regional mechanisms mentioned above. On the other hand, as the implementing mechanism of the SDS-SEA, it is very different in function from a

[2] UNEP Regional Seas Programme bodies tend to be the only regional mechanisms that deal with coastal and marine issues functioning in most large marine ecosystems across the globe at present, and are therefore the most comparable to PEMSEA (UNEP 2005a; White & Case LLP 2011). These particular regional mechanisms were selected for comparison due to their presence in large marine ecosystems that have been identified as most similar in their ecological and social characteristics to the SCS and Gulf of Thailand large marine ecosystems (Mahon et al. 2010).

TABLE 11.2 **Comparison of Budget Allocations for Some Regional Mechanisms of Core Secretariat Functions ($)**

Regional mechanism	Total expected annual country contribution	Total annual operating costs	Total annual implementation costs
COBSEA	171,600	400,000	—
NOWPAP	390,000	327,000	71,000
South Asian Seas Programme	145,000	135,100	—
PERSGA	2,689,000	1,984,000	2,985,000
PEMSEA	Voluntary (330,000[a])	675,000–760,000 (depending on salary levels)	668,000–899,000 (depending on salary levels)

NOTE: — = no budget specified; PERSGA = Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden.

a. Contributions from China, Japan, and the Republic of Korea toward regional services, as reported by PEMSEA in July 2012. This does not include the contribution of the Philippines in the form of PEMSEA's office building and related amenities, conservatively estimated at $42,000 per year.

CGIAR center and most similar to a Regional Seas Programme body.

Although it is clear that most countries value the services provided by PEMSEA, as shown by their continued membership in the EAS Partnership Council, not all countries have recognized PEMSEA as an international regional organization. While in 2009, eight countries signed an agreement recognizing PEMSEA as an international legal entity, three of the seven GEF-eligible countries bordering the SCS have yet to sign this agreement. Countries started their internal processes for recognition in December 2006, when they signed the Haikou Partnership Agreement. The need to ensure full participation in PEMSEA by all the countries in the region is an issue that PEMSEA is well aware of, as expressed by its executive committee chair in his opening remarks at PEMSEA's Ninth Executive Committee Meeting in October 2011 (PEMSEA 2011c). Malaysia has publicly expressed that it is not convinced of the need to create more regional organizations.[3] While four countries (China, Japan, the Republic of Korea, and the Philippines) have pledged voluntary contributions toward annual operating costs of PEMSEA,[4] all of the signing countries have indicated in the agreement that they will not commit to regular financial contributions or be financially liable for PEMSEA. Instead, they support the approach that each country should make voluntary contributions according to its means—which again makes PEMSEA different from other regional implementing mechanisms.

Geopolitical concerns are another factor hampering the extent of country support to PEMSEA, and pose a challenge that PEMSEA has so far ably navigated considering the tensions over maritime border disagreements in the region. According to PEMSEA's executive committee chair in an email response to the Evaluation Office, "the large geographical scope of [the] East Asian Seas

[3] This view was expressed by the delegate from Malaysia at the EAS Stocktaking Meeting in October 2010 (PEMSEA 2011a). Also, as of this writing, two countries (Malaysia and Thailand) have not signed the program framework document for the PEMSEA follow-up project.

[4] The Philippines has signed a 10-year agreement providing PEMSEA the use of a building and associated amenities. Timor-Leste also has contributed $100,000 per year, which is earmarked for activities undertaken on a cost-sharing basis by the PEMSEA Resource Facility and Timor-Leste.

has enabled PEMSEA to avoid the sensitive, nonenvironmental issues and focus on those that could be resolved in a collective manner."

PEMSEA at present remains highly dependent on GEF support to meet its operating costs. According to its 2009 budget, PEMSEA looked to the GEF to fund 61 percent of its operating costs and 62 percent of its implementation costs. In 2010, the GEF funded 86.5 percent of total operating and implementation costs, which involved a broad range of activities under the SDS-SEA project. PEMSEA is aware of the risks of dependence on a single major donor, and has developed a Financial Sustainability Framework Plan for strengthening PEMSEA through voluntary contributions and other financial mechanisms. The Evaluation Office was informed that a program framework document will be presented for approval in the November 2012 Council, which includes a project for $10.8 million to scale up implementation of the SDS-SEA in the next five years. One of the main objectives of this project is to support a five-year transition to PEMSEA's full financial sustainability.

Based on PEMSEA's Resource Facility Reengineering Plan and the SDS-SEA Regional Implementation Plan, it is apparent that, to support the scaling-up of SDS-SEA implementation, PEMSEA intends to expand its services by strengthening its Resource Facility. PEMSEA intends to implement these plans to create various funding sources and "sustainable streams of income," with the view of being financially sustainable by 2016. By the beginning of the next phase of GEF support in 2014, the PEMSEA Resource Facility Reengineering Plan and Financial Sustainability Plan specify that PEMSEA partners will be shouldering all costs associated with PEMSEA Resource Facility Core Group operations.[5] The Project Implementation Group, composed of staff that will provide the technical products and services that the PEMSEA Resource Facility currently delivers primarily through GEF support, is expected to be funded through full cost recovery arrangements with the countries and other partners that benefit from these products and services.

Considering the widespread consensus that the current global economic recovery is likely to be slow and lengthy, it is uncertain at present how the resource-intensive core coordination and technical support functions of the PEMSEA Resource Facility as currently defined can be supported over the long term. PEMSEA has indicated that some of its initiatives are now self-sustaining (e.g., the PNLG, EAS Congress, World Ocean Week, Twinning Network Secretariat), which does show that governments are willing to give money to support specific regional activities. PEMSEA countries also take turns in hosting EAS Partnership Council meetings, executive committee meetings, and the triennial EAS Congress. While these are voluntary contributions, they do support some of the operational costs of PEMSEA as a regional mechanism. Yet if the GEF continues to channel funds toward expanding the PEMSEA Resource Facility and increasing PEMSEA's services over the next five years, it faces the risk that when it phases out support, this expanded regional mechanism will face an abrupt financial shortfall and a difficult adjustment, if the required funding is beyond that which the member countries themselves or other donors are willing to support with their own resources.

[5] The PEMSEA Resource Facility Core Group is composed of six posts: executive director; executive assistant; secretariat coordinator; program support; head of finance, administration, and personnel; and head of planning and partnership development.

12. Impact Monitoring and Reporting

Past evaluations of GEF international waters support have pointed out that monitoring of stress reduction and environmental status would become increasingly important as projects moved from the foundational stage to demonstration and investment (Bewers and Uitto 2002). Evaluations have also voiced concern on the need to help countries establish long-term monitoring systems as critical to accountability, transparency, and sustainability (GEF EO 2005). Monitoring and evaluation for adaptive management involves four key functions: data collection, data compilation and analysis, use of information in environmental management and decision making, and reporting for accountability.

- **Data collection** refers to the periodic assessment of environmental parameters or indicators that together reflect the state of the environment. While studies may be conducted in a given area at such frequency as to generate data over an extended time period, data collection in a monitoring and evaluation context has the specific purpose of tracking environmental change, therefore necessitating consistency in assessment methods, parameters, and monitoring sites. To enable comparison of different data sets, systematic compilation of data and information collected from different sites, time periods, and parameters must be done in such a way that the data are securely stored and at the same time easily accessible to users for analysis or the generation of reports. Accessibility implies that the potential user can find data readily when seeking them out or needing to know via less intentional public information processes.
- **Analysis of data** is necessary to determine trends or unexpected changes that may need action by managers. Ultimately, evaluation is done to determine how much progress has been made in meeting management targets for environmental status, such as for water quality or habitat cover.
- **Use** is a crucial step, because this allows stakeholders to determine the progress that has been made against targeted environmental standards and adapt management actions or strategies to ensure that these targets will be met. To be useful, data need to be synthesized in a way that facilitates decision making and in a timely manner—i.e., at a frequency that will allow managers to adapt and take action before certain outcomes become irreversible.
- **Reporting** is meant to provide information on the state of environmental affairs to policy makers and the public. It also serves as a means to make public servants and other actors accountable for progress on commitments made or the effects of their decisions and actions on the environment. In this sense, while it is important that reporting is well grounded in data and reliable evidence, it is also important that it be done in ways that are meaningful to the broader range of stakeholders that it seeks to reach.

12.1 Data Collection

Of the 40 cases that could be expected to have monitoring activities at the time of field verification, 32 were found to be periodically collecting data, most of which were for habitat/biodiversity parameters. Only slightly less than half of the sites targeting each environmental concern had monitoring data available either during the field visits or in published reports. Other sites reported baseline and monitoring data as being collected but did not have data readily available, indicating that these are not being analyzed and used for management.

GEF support for monitoring and evaluation initiatives contributing to data collection has taken different forms in the three funding streams. The UNDP PEMSEA stream supported the development of integrated environmental monitoring plans in Xiamen, Batangas Bay, Chonburi, Sihanoukville, Manila Bay, and Danang, as well as other sites outside the SCS. Training, as well as equipment in some sites, was provided to achieve this. In many sites, monitoring was already being conducted by different government agencies prior to GEF support as part of their mandate, but data collection and analysis were not integrated for the area. The objective of the integrated environmental monitoring plans was to integrate monitoring activities to avoid duplication and reduce costs. Except for Chonburi, all sites were reported in the PEMSEA terminal evaluation to have had functional environmental monitoring programs by 2006. Baseline data at these sites were collected or compiled through risk assessment and environmental profile studies in preparation for drafting their respective coastal strategies. Given the site-focused nature of ICM, which serves as the framework for monitoring and evaluation initiatives in UNDP PEMSEA sites, a wide range of environmental concerns are usually monitored, depending on the objectives set out in a site's coastal strategy. Pollution is generally a primary concern at all sites.

The UNDP PEMSEA stream also initiated activities toward a Marine Pollution Monitoring and Information Management Network in 1996. This network aimed to establish a regional information management system and standard monitoring methodologies for all participating ICM sites. It was not successfully established.

The UNEP SCS stream provided training in environmental monitoring at all demonstration sites—some for community volunteers, some for existing government agencies. Baseline assessments were either conducted by existing management bodies at sites that were already under protection or initiated through the demonstration. UNEP sites typically monitor only habitat and fisheries, as the demonstrations tend to have habitat rehabilitation and regulated access as their approaches. Pollution is not monitored at most sites, as these approaches typically do not address this concern, even if it is present in the area.

The GEF has supported environmental data collection through the UNDP PEMSEA stream with at least $470,000 from 1994 to the present, of which $410,000 was allocated for the regional level in the MPP-EAS project, and at least $202,830 of which has been spent on ICM sites in the SCS. The GEF has supported mainly baseline data collection in preparation for creating management plans through the UNEP SCS stream with a total budget allocation of at least $388,960. The total known GEF support for demonstration sites in the SCS through these two streams is $591,790 (see annex 10A, table 37). The overall amount dedicated to data collection over a period of almost 20 years is relatively modest, as the GEF leaves it up to governments to collect data once monitoring capacities have been established.

Monitoring for the World Bank IF stream primarily tracks changes in water quality of wastewater effluent and in the water bodies nearest the source of pollution being addressed. The systems are generally set up to meet project targets, and therefore

do not report on other parameters from other assessments, such as those by mandated government agencies. This situation is to be expected, as World Bank IF demonstrations typically involve the introduction of pollution control technology and are concerned mainly with the amount of pollution reduced by this technology rather than the ambient water quality itself. Potential mechanisms are identified to ensure that monitoring occurs after the project. Some demonstrations support the establishment of permanent mechanisms, such as through laboratories and equipment dedicated to monitoring the introduced technology. Since most World Bank IF demonstrations are still under construction or have only just been completed, information is not available on whether these identified mechanisms are indeed effective.

Of the 27 sampled demonstration sites, 17 addressed multiple environmental concerns. Of the 10 that addressed only one concern, 9 were within the World Bank IF stream and addressed only pollution; 1 was a UNEP stream site, which addressed only habitat concerns. Sites within the UNDP PEMSEA stream generally addressed all three environmental concerns—pollution, habitat/biodiversity, and fisheries.

Each of the 27 sampled sites aimed to improve environmental status in relation to habitat and biodiversity, fisheries, land-based pollution, or a combination of these concerns. Given the multiple concerns at each site, there were a total of 40 cases where environmental monitoring was to be conducted (table 12.1). Sixteen of 17 cases that were expected to be monitoring habitat and biodiversity parameters were found to be doing so. In only nine cases were data available through publications or made accessible during field visits. Of the 12 cases where sites were expected to monitor improvements in fisheries, 8 were found to be collecting data, and for only 6 cases were the data available. Of the 11 cases of sites expected to monitor coastal pollution from land-based sources, 8 were collecting data, but only 4 had data available.

In the remainder of the sites, evidence of data collection activity was found, but no monitoring data were made available during the field visits or through publicly available reports. This circumstance was interpreted by the evaluation team to indicate that data are being collected but are not being analyzed and used for management either due to lack of data accessibility, lack of local capacity for data analysis, or both. In some cases, the data being collected by government agencies were not being periodically requested and used by the demonstrations, and therefore were not reported during the site visits.

Based on the total number of cases in all 27 sites addressing each specific concern, regardless of whether they had completed their demonstrations, 17 cases (94 percent) addressing habitat and biodiversity concerns collected baseline data before any intervention was introduced; at one site, Shantou, the evaluation could not determine whether this took place and for which parameters, although a university was executing the demonstration. Eight

TABLE 12.1 **Sites Addressing and Monitoring Specific Environmental Concerns**

Environmental concern	Sites where monitoring was to be conducted	Sites with periodic data collection	Sites with monitoring data available	Sites with baseline data
Habitat and biodiversity	17	16	9	17
Fisheries	12	8	6	8
Pollution	11	8	4	9
Total cases	40	32	19	34

cases addressing fisheries (57 percent) and nine addressing pollution (47 percent) collected baseline data on these specific concerns. In four cases addressing pollution, the evaluation was not able to determine if baseline data had been collected prior to the start of the demonstration.

The likelihood of baseline and monitoring data being collected appeared to depend largely on the level of institutional capacity at the demonstration sites and—to a much lesser extent—on the environmental concern being monitored or the approach taken by each GEF funding stream. In 13 sites, some form of data collection activity was clearly already under way before the GEF-supported demonstrations began. All of these sites had existing government agencies or research institutions that the evaluation team assessed as likely to continue monitoring functions even after GEF support ends. Sixteen of the 27 sampled sites showed indications of activity for both baseline and monitoring data collection for most or all of the concerns that they were addressing.

At six sites, baseline assessment and/or monitoring activities were initiated through GEF support; three involved habitat and biodiversity concerns (Xiamen on habitat and species, and Bolinao and Hepu on seagrass), and three involved pollution (Batangas Bay, Ha Tay, and Bataan). Batangas Bay has conducted regular monitoring of pollution since the mid-1990s, shortly after the first demonstration started; this indicates increased local capacity supported by the GEF. Funds were provided through UNDP PEMSEA for basic laboratory equipment in 1994. At present, lab operations are fully funded by the provincial government, as well as through revenue from other agencies and organizations in the area requesting the services. Water quality monitoring of rivers and coastal waters is currently done at least twice a month.

Although no data were made available, the GEF provided support for monitoring equipment and software in Foshan and Guangzhou (Guangdong Pearl River Delta) and in Qui Nhon (Coastal Cities Environment and Sanitation Project), projects that are still in the process of completing their pollution control infrastructure. In the case of Foshan and Guangzhou, GEF support is building the capacity of the Guangdong Provincial Environmental Protection Bureau in monitoring water quality and disseminating information in the wider Pearl River Delta region.

GEF support contributed to the development of a seagrass monitoring methodology and plan in Phu Quoc. A number of GEF-supported monitoring sites for coral reefs and environment quality in Nha Trang Bay were integrated in the monitoring network of the province after project completion. In some sites where multiple agencies were already conducting monitoring as part of their mandates—such as Xiamen and Manila Bay—the value added by GEF demonstrations was to support the integration of monitoring activities. For example, in Xiamen, an automatic online monitoring system has enabled the city to share its data with counterpart agencies in neighboring cities since 2009. GEF support was also credited for the development and approval by city authorities of a monitoring program in Danang.

Twenty-two of the 27 sampled sites had government-supported arrangements that were likely to continue the monitoring activities beyond GEF support. Continuity in data collection, analysis, and reporting is seen in countries where national research institutes have a strong presence. The regularity of data collection may vary, however, as these institutes are funded by bilateral donors on a project basis.

In all, 22 of the 27 sampled sites (81 percent) were found to have arranged for government-supported agencies or research institutes that have the mandate to conduct monitoring even beyond GEF support. Three of these have centers established specifically for the management of the site

(Fangchenggang, Hepu, Shankou-Weizhou). Five sites have universities monitoring environmental parameters. In the Philippines and Vietnam, data collection by research institutes and universities are dependent on project funding from bilateral and other donors. In Foshan, the project is engaging the private sector to take on water quality monitoring. At the PPP demonstration in Puerto Galera, no partnerships had been finalized to build any wastewater treatment plants by the end of the project, and so no monitoring arrangements were yet in place.

At four sites, it was unclear whether monitoring would be sustained, despite the presence of capable local and national government agencies. Three of these sites are demonstrations of the Livestock Waste Management project. Although government agencies normally monitor pollution parameters at these sites, it is not at the scale of the farm, at which the demonstrations took place. These sites were assessed as unlikely to continue monitoring activities beyond those done by the farmer beneficiaries in their respective farms. GEF-supported methodologies for data collection at the demonstrations were found to be too expensive, as well as inappropriate for the parameters being tracked.[1] In Shantou, the Evaluation Office could not obtain more detailed information as to whether the university executing the demonstration would continue monitoring after the project's close.

[1] The World Bank has indicated that the project-supported monitoring was designed only to verify the effectiveness of the new treatment system, and thus might be viewed as too costly by the participating farms. Regarding the appropriateness of the parameters measured, monitoring activities were said to have been discussed and agreed with project country environmental, agricultural, and health authorities.

12.2 Data Compilation and Analysis

There has been very limited adoption of the information management systems supported by the GEF. The technology and standardized tools introduced are not easy to adopt, partly because they are not well suited to local conditions. Lack of budget among local and national government agencies is a common obstacle in continuing monitoring and evaluation activities, even at the few sites where human resources are readily available. GEF-supported information management systems require high financial and technical assistance, most of which have not been sustained in the GEF's absence.

Systems for data compilation and analysis have been supported by the GEF mainly through the UNDP PEMSEA and UNEP SCS streams. UNDP PEMSEA has developed and promoted the adoption of an IIMS at the level of ICM sites, which range in scale from municipalities to provinces to bays. For its part, UNEP has initiated a regional GIS within its project website that integrates information for all demonstration sites.

INTEGRATED INFORMATION MANAGEMENT SYSTEM

The IIMS is a database that integrates information collected by different sectors and agencies to produce reports and maps that can be used for planning and decision making by local governments. It includes 10 environmental and social data categories that aim to facilitate the standardization of data formats across ICM sites. These categories now include data fields for the entire watershed rather than just the coastal area. The original intent was to eventually link the IIMS of all ICM sites. The IIMS was first introduced through the Malacca Straits hotspot demonstration site under the first UNDP PEMSEA project (MPP-EAS) between 1995 and 1999. This became a more formal component in 1999, introduced as part of the process of establishing each ICM site under the second UNDP PEMSEA project. During this

project, the IIMS software was further developed to allow the generation of tabular and graphical reports through a query system, linkage of the database with GIS and predictive models, local area and web-based networking, and support of river basin management and coastal use zoning. The IIMS was also translated into Chinese, Korean, and Vietnamese.

According to budget items in project documents, approximately $2.8 million has been allocated for the development and establishment of IIMS from 1994 to 2012, with at least $106,000 for equipment, training, and technical support to ICM sites in the SCS (see annex 10A, table 38). The Philippine government has shouldered some of the training costs in relation to the national scaling-up of ICM; cofinancing from other national and local governments was in kind.

Of the 11 demonstration and parallel sites where IIMS was originally established, only Manila Bay has successfully used the system for management applications such as environmental profiling, environmental risk assessment, coastal strategy development, coastal use zoning, environmental resource valuation, integrated environmental monitoring, oil spill contingency planning, and public awareness and education. To a lesser extent, data stored in the IIMS were used by Danang and Sihanoukville to produce their SOC reports.

The PEMSEA terminal evaluation reported in 2006 that "Chonburi, Sihanoukville, Nampho, Batangas, Bataan and Cavite only have databases. Bali, Danang, Klang and Bohai Sea have linked databases to GIS. Manila Bay has linked its database with both GIS and predictive models" (PEMSEA 2006). It also stated that local capacity remained a concern due to lack of experience with databases and/or computers, frequent gaps in training, and administrative marginalization when it came to budgets, among other things.

A case study on the Bataan experience published in 2009 further identifies the lack of a legal basis for the IIMS within the province resulting in limited or no budget allocated for staff and equipment, and in the reluctance of the various offices to share their data as a constraint in sustaining IIMS (PEMSEA 2009). Part of the IIMS establishment process is the development of sustainability plans by the user agencies, but no evidence has been found of the implementation of these plans. Information provided by PEMSEA in May 2012 on the status of IIMS implementation shows that trained staff leaving for either personal and/or administrative reasons is a factor at three of the five ICM sites in the SCS that has led to IIMS use not being sustained.

The Manila Bay IIMS covers three administrative regions that are part of the bay, serviced by multiple national government agencies involved in environmental monitoring and provincial governments such as Bataan and Cavite. The function of linking multiple agencies and sites through a web-based system was first tested here, but no evidence was found to show further progress in this direction at other sites or at the regional level, as intended. Data compilation in the Manila Bay IIMS stopped in 2006, but is now being updated as part of a Supreme Court order to clean up Manila Bay. Plans are now under way to integrate the databases of the three regions and two provinces, building on the original Manila Bay database for a unified Manila Bay IIMS. The Manila Bay Coordinating Office has developed a database for informal settlers, households, establishments, and river systems that is to be integrated into this IIMS. Staff retraining has been conducted at least twice since 2001 in preparation for scaling up the IIMS as the database platform for the national ICM program of the Philippines by the Coastal and Marine Management Office and River Basin Control Office. Eighteen priority coastal areas and river basins have been identified in the country for IIMS rollout. The Protected Areas and Wildlife

Bureau is also planning to establish IIMS in ICRMP sites in seven provinces, for which training was conducted in 2011.

In Danang, information from PEMSEA states that the IIMS is being updated quarterly, and that ICM staff are now training other sites in the use of the system. A site visit in June 2011 did not show evidence of use beyond 2005, however, although during that time a training workshop was conducted for representatives of seven provinces and the national government. In Sihanoukville, the staff member trained through a six-month internship had left; in the meantime, data are being stored in Microsoft Word and Excel since a budget for new staff to be hired and trained is not yet available. While a budget cut in 2005 affected the use of IIMS in Batangas Bay, plans are currently under way to establish a mechanism within the provincial government to coordinate data collection and compilation. In Chonburi, the IIMS was updated until the original staff trained in its use left the project in 2007. Staff that were subsequently trained were reassigned to other areas.

In May 2012, PEMSEA reported to the Evaluation Office that there were no problems with IIMS as a technological package, except for the temporary lack of ownership and direction within the Philippine Department of Environment over its use after the GEF-supported demonstration ended in Manila Bay in 2007. The available evidence indicates that, after nearly 15 years since the UNDP PEMSEA stream first explored the idea of a decision support and information management system in the Malacca Straits, only Manila Bay is currently using the IIMS—despite more than 160 participants having been trained from at least 15 sites across the region, and nearly $3 million in GEF support being allocated to this technology.[2] The technology does not appear to be easy to adopt, nor does it seem suited to the conditions of its primary users, the local governments. Slow or no adoption of such high-technology information management tools is a trend that has been seen in non-GEF projects in the region as well. For example, a regional database similar to the IIMS developed by a project funded by the Swedish International Development Agency in the SCS and two ASEAN projects funded by Australia and the European Commission that involved decision support systems, all of which were introduced in the mid- to late 1990s as tools for coastal management, are no longer being used despite high levels of investment in training and equipment (Chansang 2005).

WEB-BASED GEOGRAPHIC INFORMATION SYSTEM

One of the targeted outputs of the UNEP stream was a regional database for planning and management. This involved the development of comparable national data and information sets by each participating country, the publication of metadata catalogues, and the inclusion of plans for data management as a component of national management plans. By the end of the project, the database was realized in the form of a web-based GIS that was developed "to provide a facility for the sharing and collaborative development of geographical data and information relating to coral reefs, seagrass, mangroves, wetlands, fisheries, and land-based pollution in the South China Sea and Gulf of Thailand" (UNEP 2007a). A workshop for the network

[2] The number of sites and people trained were conservatively derived from project implementation reports; the dollar amount was derived from the MPP-EAS terminal report (p. 124), the PEMSEA project document (p. 17), and the SDS-SEA project document (p. 70). The IIMS budget allocation for the PEMSEA project alone was $2,082,000. PEMSEA reports that the cost of developing the IIMS and the Straits of Malacca Environmental Information System, including training and hardware from 1994 to 2007, was only on the order of $600,000.

of scientists involved in the SCS TDA-SAP project implemented through UNEP in 2002 aimed to standardize the formats for national maps and data to build on the GIS that had initially been created by the Southeast Asia Regional Center for System Analysis, Research, and Training. During the workshop, it was emphasized that scientists' updating of the data on the GIS as these updates became available was part of the respective countries' commitment when they signed the memorandums of understanding to be part of the project.

National data and information were collected and compiled from 2002 to 2008, and uploaded onto the website. The website is designed so that scientists can type in new data through an online form or send data directly to the GIS manager for uploading. As of August 2012, the only information accessible on the website is data characterizing each of the project's demonstration sites, as well as the more than 135 habitat sites identified during the project for future management support. Some entries are more detailed than others. For instance, some entries contain detailed data for each site, while others only have written descriptions of the site. The last update of this section of the website was in September 2008. As of 2008, the meta-database contained entries for 1,142 data sets, according to the UNEP SCS terminal evaluation for 2009. Later updates are highly unlikely as links for the registration of scientists and instructions for updating the data are nonfunctional. The email address on the web page that allows users to communicate with the GIS manager is also no longer functional.[3]

The goal of the project was that metadata gathered should be comparable. The metadata indicate, however, that the data are not highly comparable, because the original data collection at the national level was conducted through widely varying methodologies and time frames, according to the UNEP SCS 2009 terminal evaluation. Most of the sites allocated budgets to establish a local GIS or some form of database to compile at least baseline, if not monitoring, data. Total GEF support allocated for this component for six sites from 2004 to 2007 was $121,075 (see annex 10A, table 39). Three of the sites did not include a system for data compilation or information management as part of the demonstration.

It was noted in the terminal evaluation of the project that "…urgent measures should be taken to secure the long-term sustainability of the project website, which is an internationally recognized resource on marine and coastal conservation for the South China Sea region…" (UNEP 2009). However, at the end of project deliberations, the participants of the Regional Scientific and Technical Committee concluded that it was unlikely that the national organizations involved in the project would be willing to take over the maintenance of the website as that would require substantial financial resources (UNEP 2009). As the website was not one of the original targeted project outputs, the total budget allocated for it is unknown. Eventually, it was agreed that COBSEA would assume full responsibility for the maintenance and update of the project website, including of the regional database. After project completion, the project coordinating unit provided financial support through 2010 to support the anticipated website costs (e.g., hosting fees). One person was contracted by COBSEA for a period of 18 months to maintain the website, according to the 2009 terminal evaluation. Communication with UNEP Bangkok staff on April 28, 2011, indicated that one person hired by COBSEA was still in charge of the website at that time. However, no maintenance of the website seems to have taken place since project closing in September 2008.

[3] A test email sent on March 17, 2011, received an "unknown address" error.

12.3 Reporting and Use

While some form of reporting system was established in UNDP PEMSEA and UNEP SCS sites, this was primarily supported by the GEF and unlikely to be sustained without this support. Use and reporting of analyzed data continue to be limited and were documented in only 11 of the 20 completed demonstrations.

STATE OF THE COAST REPORTING SYSTEM

A distinct system for reporting on environmental status has been supported by the GEF through the UNDP PEMSEA funding stream in the form of SOC reports. The SOC reporting system is designed as a "systematic process for monitoring, evaluating and reporting progress, outputs and impacts" (PEMSEA 2011b) of ICM implementation, to serve as a basis for improving ICM plans. SOC reports put together information collected by different sectors and agencies to track changes relevant to a particular site's ICM strategy or plan. It identifies 160 indicators derived from PEMSEA's Sustainable Development in Coastal Areas Framework, covering both environmental and social aspects. The SOC reports are intended for use by local governments to determine which aspects are improving as a result of ICM initiatives, and which need what type of intervention. While one of the primary functions of reporting is to promote the accountability of local government and other environmental managers to the public for the effective use of public resources to produce environmental benefits, this function is not highlighted for the SOC reporting system.

The system was first tested in 2008 using the Batangas ICM site as a pilot, with the indicators reduced to 35 due to a lack of available data. As reported in the SDS-SEA project implementation report, as of June 2011, drafts for SOC reports had been produced for 10 more ICM sites (both demonstration and parallel) and initiated in 3 more. It was also reported that the system was being developed at more than 20 other ICM sites in the region. Training in the SOC reporting system was given to five countries and another parallel ICM site. An SOC guidebook was published in 2011 based on regional experience. Efforts began in 2009 to integrate the SOC indicators with the IIMS. In July 2011, the heads of the 26 member local governments of the PNLG committed to applying the SOC system in their respective municipality or province by 2015.

Based on project documents for the SDS-SEA project, at least $400,000 in GEF support has been allocated for the development and establishment of the SOC reporting system,[4] including report preparation and learning activities at the regional and national levels, with at least $67,500 spent on ICM sites in the SCS for training, technical support, publication (including translation) as of May 2012, according to information provided by PEMSEA (see annex 10A, table 40).

In 2006, experts from different countries agreed to present SOC reports to the EAS Partnership Council every three years at the EAS Congress. However, only the Batangas ICM site SOC report was presented in 2009. Eleven local governments were reported to have produced SOC reports for the 4th EAS Congress in July 2012. Only SOC report drafts for Chonburi and Sihanoukville and a published report for Guimaras had been obtained by the GEF Evaluation Office as of August 12, 2012.[5]

[4] This is based on local and international consultant fees in the SDS-SEA project document (p. 67). PEMSEA reports that only $262,000 was committed in the project document toward consultancy services in support of SOC development and implementation in the EAS region.

[5] The Evaluation Office was later informed the SOC reports for Chonburi, Thailand, Sihanoukville, Cambodia, Danang, Vietnam, Xiamen and Dongying,

PEMSEA reported in May 2012 that a major constraint in the adoption of the SOC reporting system is the willingness of local governments to adopt a new system that tracks and assesses progress in the management of an ICM program rather than just administrative aspects (e.g., budget and human resource commitments) as existing systems do. Once the local governments have agreed to adopt the system, they in many cases do not have the capacity to implement it, requiring PEMSEA to provide a high level of technical and financial support.

REPORTING TO MULTISTAKEHOLDER BODIES AND TO THE PUBLIC

Other forms of reporting have also been implemented. In Sihanoukville and Danang, some reporting is still tied to project management. In the Philippines, a specially created body called the Manila Bay Coordinating Office compiles and disseminates monitoring data on the bay from 14 national agencies. According to information from PEMSEA, the office has limited capacity to analyze the data and to prepare a comprehensive report. A World Bank–implemented GEF project is being proposed to strengthen the office's capacity.

The UNEP stream published data collected from demonstration sites in national reports. Because these were published in each country's national language, it was difficult to determine if they were monitoring data or simply providing environmental profiles of the sites. Furthermore, copies of the report were not available online, and often required GIS software to access. It is unlikely that reporting in the same format will be done again for monitoring activities without GEF support. Only Bolinao ($1,000) and Hepu ($1,000) clearly allocated funds for reporting data to local stakeholders; Koh Chang budgeted an amount that could not be determined.

In the Philippines, monitoring data collected from Bolinao and Masinloc were used to assess the effectiveness of the protected areas. They were also integrated in the national SOC report coordinated by the University of the Philippines Marine Science Institute and published every few years, the latest being funded by the U.S. Agency for International Development. In Vietnam, all data collected by the Institute of Oceanography from 2002 to 2007 for both GEF-supported (UNEP and biodiversity focal area) and non-GEF sites were analyzed and published as a reference for MPA managers and policy makers at the central and local levels (Tuan and Pernetta 2010).

Of the sites that showed indications of data collection taking place, in five ICM sites accountability reporting was occurring to multistakeholder policy-making bodies or to the public (table 12.2). While these accomplishments cannot be attributed to the GEF because they largely depend on the will of local governments, the awareness raised among decision makers and the information systems that the GEF helped set up have contributed to these processes. In some cases, the information provided has been directly linked to important policy decisions.

Monitoring data collected in Manila Bay and its major tributaries are used to develop recommendations and plans of action to improve the water quality of rivers draining into the bay. The data, compiled through the UNDP PEMSEA projects, was used by "concerned residents of Manila Bay" in a legal case that ended in 2008 to show that the bay failed to meet the water quality criteria for the

China, Sedong, Lao PDR, and Liquica and Manatutu, Timor-Leste, were disseminated in July 2012 at the EAS Congress. However, the Office was not given access to these reports despite earlier requests, nor are they available on the PEMSEA website, except for Dongying's, which is in Chinese.

TABLE 12.2 **Other Reporting Activities in Integrated Coastal Management Sites in the South China Sea**

ICM site	Reporting to multistakeholder bodies or the public
Sihanoukville	Integrated beach monitoring report
Danang	State of the Environment Report prepared by the Department of Natural Resources and Environment and submitted to the People's Committee on a regular basis
Xiamen	• Xiamen Marine Environment Quality Bulletin (e-version publicly available) • Text messages on monitoring results to fishers to reduce disasters (since 2007) • Automatic online monitoring shared with counterpart agencies in other cities (since 2009)
Batangas Bay	Provincial Government of Batangas Environment and Natural Resources Office reports to Batangas Environmental Protection Council
Manila Bay	Quarterly report submitted to Manila Bay Advisory Committee of Supreme Court by Manila Bay Coordinating Office

purposes for which it was intended—mariculture, fisheries, and tourism activities. The information has been used by the Supreme Court of the Philippines to compel the responsible national agencies to fulfill their mandate in improving water quality in Manila Bay to avoid facing administrative sanctions. The results have also been used by the Environmental Management Bureau to formulate recommendations for meeting the criteria suitable for multiple uses and the requirements of the Philippine Clean Water Act. The Manila Bay Coordinating Office consolidates and disseminates monitoring data on the bay from the Environmental Management Bureau, the Laguna Lake Development Authority, and the Pasig River Rehabilitation Commission. The office also consolidates and prepares quarterly implementation status reports on the operational plan of the Manila Bay Coastal Strategy from the 13 mandated national agencies for submission to the Supreme Court's Manila Bay Advisory Committee.

The province of Batangas has used monitoring data in formulating a strategy to dismantle aquaculture structures in Taal Lake to reduce the impacts of land-based pollution in coastal waters. Notably, Xiamen and, to a lesser extent, Sihanoukville have also put in place regular environmental reporting on several issues of interest to the general public. Information from a modern GIS-based platform with real-time monitoring of water quality in 57 stations across the Pearl River Delta that the GEF has helped support through the Guangdong Provincial Environmental Protection Bureau is being used to inform the bureau's environmental enforcement department of any possible anomaly or violation of discharge regulations. Data on the water quality class of the different sections of the river is published online and updated on a weekly basis, although the detailed water quality information is held internally by the bureau.

In some cases, monitoring data have been used directly for management intervention during project implementation. For example, following records of the outbreak of crown-of-thorns starfish in Nha Trang Bay in 2002, the MPA management board facilitated actions to reduce the population of the coral-eating starfish with the participation of local fishers and scuba diving clubs. In Phu Quoc, information on the decline of coral reef living resources are under consideration by policy makers who were involved in the provincial steering committee, to facilitate local regulations on coral reef conservation and planning for fisheries refugia. For the other sites, however, interviews during site visits revealed that data collected, even if compiled and reported, were generally found not to have been analyzed or used for management or accountability.

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