Improving the Performance of Protected Areas: An Assessment from across Southeast Asia

Strengthening local capacity in the economic analysis of environmental issues

The Economy and Environment Program for Southeast Asia (EEPSEA) was established in May 1993 to support training and research in environmental and resource economics across its 10 member countries (i.e., Cambodia, China, Indonesia, Lao PDR, Malaysia, Myanmar, Papua New Guinea, the Philippines, Thailand, and Vietnam.) It aims to strengthen local capacity for the economic analysis of environmental issues so that researchers can provide sound advice to policy makers.

EEPSEA Policy Briefs summarize the key results and lessons generated by EEPSEA-supported research projects, as presented in detail in *EEPSEA Research Reports*. *EEPSEA Policy Briefs* and *Research Reports* are available online at **www.eepsea.org**

Protected Areas (PA) are regions that are of particular natural, ecological, or cultural importance and in which the exploitation of natural resources is normally restricted by law. PAs are valuable because they provide significant areas of undisturbed habitat where wildlife can flourish. However, quite a number of PAs, particularly in Southeast Asia, are not planned or managed in a way that maximizes their contribution to biodiversity conservation.

In order to find out why this is the case and to develop policy recommendations for what should be done, a new EEPSEA study has looked at over 400 PAs in eight Southeast Asian countries. The study assessed the variety of internal and external pressures that PAs face, and analyzed how park managers acted to deal with these pressures. It also investigated whether PA managers have enough staff and resources to respond adequately. The study found that the response of PA managers to the challenges they face has fallen short. It also found that many PAs face significant funding and staffing shortfalls. The study therefore recommends that PA staff numbers and financial resources should be significantly increased.

A summary of EEPSEA Research Report No. 2015-RR13:
"Fiscal Gaps and Financing of Southeast Asia's Protected Areas: A Cross-Country Analysis,"
by Gem B. Castillo, Chan Somaly, Li Wenjun, Li Yanbo, Luthfi Fatah, Sivannakone Malivarn, Kian Foh Lee, Alexander D. Anda Jr., Prinyarat Laengcharoen, Pham Duc Chien, and Benoit Laplante. Comments should be sent to Dr. Gem B. Castillo, President, Resource and Environmental Economics Foundation of the Philippines, c/o REECS, Suite 405, The Tower at Emerald Square, J.P. Rizal cor. P. Tuazon Streets, Project 4, Quezon City, 1109 Philippines. Telephone: +632 438-8858; Fax: +632 995-0556; Email: gembcastillo24@gmail.com

PAs in Southeast Asia

In 2010, the Convention on Biological Diversity reported that there had been approximately 130,000 PAs covering nearly 13% of the world's terrestrial surface and over 6% of its territorial marine areas. There are a large number of PAs in Southeast Asia (SEA); however, despite this, the region lost a total of 555,587 square kilometers of forests from1980 to 2007. This strongly suggests that the PA system in this region is not very effective at protecting biodiversity.

The problems faced by PAs in SEA is mainly because a large proportion of the region's population continues to depend on timber, fuelwood, and other forest products for their livelihoods. These primary resources are often extracted from PAs. People in the region also convert forests (again often in PAs) for agricultural and industrial uses.

SEA countries face many challenges in terms of the implementation of PAs. For example, in Cambodia, where 23 PAs take up 18% of the country's total land area, PA management planning has been carried out, but implementation remains weak. Similarly, the Lao People's Democratic Republic has more than 10% of its land area devoted to PAs (more than recommended by the Convention on Biological Diversity), but these areas are beset with management problems, including forest degradation due to excessive exploitation.

Assessing over 400 PAs in eight countries

A sample of 402 PAs from Cambodia, China, Indonesia, Lao PDR, Malaysia, Philippines, Thailand, and Vietnam was surveyed in the study. The survey method was the same for all countries and followed a conceptual framework discussed

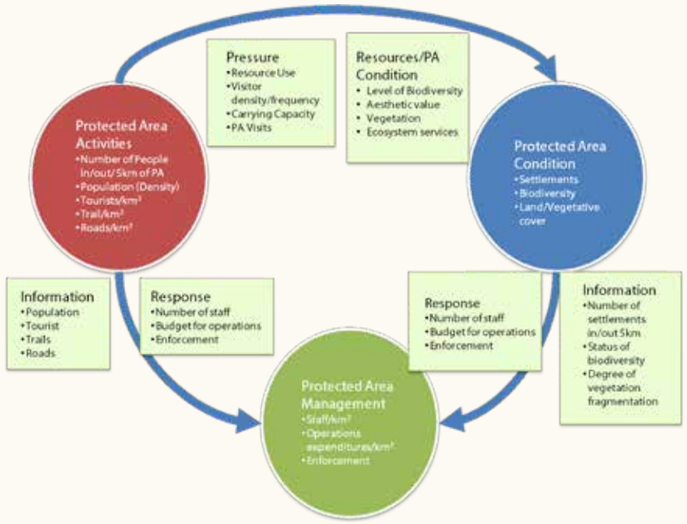

Figure. Pressure-response framework of the study

at an exploratory workshop held in Manila, Philippines. This meeting was attended by many of the researchers who participated in the study.

To undertake the research, a standardized questionnaire was either mailed to PA managers or used for face-to-face interviews. There were slight variations in the survey questionnaire used in each country. These variations took into account the different categorizations, representations, and mandates of the various national authorities in charge of the PAs.

Success rates in terms of the percentage of PAs assessed in each country varied considerably. For example, Cambodia surveyed all 23 of its PAs (as designated by the Royal Decree of Cambodia in 1993). In comparison, China had planned to survey 319 national nature reserves (NR)—which accounted for 63% of the total area of its NRs—but only managed to collate 58 completed questionnaires.

Data collection and analysis

A wide range of data was collected. This included background information on the PAs and information related to PA management (such as management plans and whether park offices were in place). Details of the physical characteristics of the PAs were collected, including inhabitant numbers, the modes of travel that were available within the PAs, and existing tourist facilities.

Information on visitor characteristics was collected for each PA. This included visitor numbers, visitor entrance fees, accommodation fees, and activity fees. Staffing, revenue, and costs data were also gathered. This included an assessment of staff adequacy and information on staffing levels, operational expenditures, collected fees, and other revenues. Much of this information was collected specifically for the year 2009.

Pressure and response indicators

The collected information was first analyzed to establish the way in which PA managers respond to the pressures on their PAs. To prepare for this part of the study, a large number of potential "pressure indicators" (that might highlight development pressure on PAs) were assessed. Of these, five were considered significant. These were the (1) number of inhabitants per 1,000 hectares (ha) of each PA; (2) population adjacent to each PA per 1,000 ha of the PA; (3) number of visitors per 1,000 ha; (4) length of trails per 1,000 ha; and (5) length of roads per 1,000 ha.

Similarly, a selection of potential "response indicators" (that might shed light on the way in which park managers responded to the pressures their parks faced) was highlighted. Of these, four were considered significant: (1) full-time staff per 1,000 ha; (2) number of enforcement staff per 1,000 ha; (3) expenditure for operations per hectare; and (4) patrol stations per 1,000 ha.

The collected information was then analyzed using canonical correlation (a statistical analysis tool) to assess if indeed there is a direct or indirect correlation of response variables to the pressures faced by PAs. This part of the assessment also looked at the funding and staffing shortfalls that existed. This was done by comparing the number of full-time staff and the annual budget for each PA, with national and regional benchmarks. These benchmarks were calculated by looking at both the average and the highest budgets and staff numbers in each participating country and in the region as a whole.

How parks responded to the pressures they face

The results of the analysis showed that all of the response indicators had a positive relationship with the following pressure indicators: "length of roads and trails," "number of visitors," and "population adjacent to each PA." In comparison, the response indicator "operating expenditure per hectare" showed an inverse relationship with the pressure indicator "length of roads and trails." This indicates that PA operating expenditures are not affected by changes in the length of their roads and trails.

However, the relationship between the pressure and response indicators was weak. This suggests that the response of PA managers, in terms of staff allocation and amount of money spent on PA management, is inadequate and not in line with the scale of the pressures faced by the PAs in the region.

The staffing gap

Based on the results of the analyses at the country level, PAs in SEA and China are understaffed by between 50% and 230%.

Based on the results of the regional benchmarking, the average understaffing gap is between 313% and 341%. The ratios of country benchmarks to the existing number of full-time staff ranged between 1.5:1 and 3.3:1. The ratio of the regional benchmark to existing staff numbers was between 3:1 and 8.2:1.

The Philippines was consistently the least-performing country in terms of understaffing. Based on the regional benchmark, it will need to increase its present staffing level by eight times. Using the regional benchmark, countries in SEA and China will need to increase their staff levels by at least 1.5 times.

The financial gap

At the country level, PAs in the region have been underfunded by between 25% (as in the case of Malaysia) and 324% (as in the case of the Philippines). The average underfunding gap was between 115% and 139%. The ratios of the national benchmarks to current operating expenditure levels were between 1.2:1 and 4.2:1, with Malaysia at the lower end and the Philippines at the higher end of this spectrum.

Fiscal gaps in terms of operating expenditure per hectare ranged between 25% and 300% for the

Table 1. Analysis of staff gaps based on clustered PAs of each country

Country	No. of PAs Included in the Analysis	Existing No. of Staff of Sample	Benchmark Staff of Sample	Staff Gap of Sample	National Gap	% of Understaffing	Ratio of Benchmark to Existing Staff
Cambodia	23	891	1,365	474	467	53	1.5:1
China	58	4,650	9,916	5,266	83,273	113	2.1:1
Indonesia	49	1,588	3,674	2,086	26,984	131	2.3:1
Lao PDR	20	644	1,071	427	475	66	2.7:1
Malaysia	44	607	1,012	405	546	67	1.7:1
Philippines	79	259	854	595	2,137	230	3.3:1
Thailand	79	4,481	7,539	3,058	5,913	68	1.7:1
Vietnam	53	2,910	4,867	1,957	2,665	67	1.7:1
Regional Total	**405**	**16,030**	**30,298**	**14,913**	**122,458**	**89**	**1.9:1**

Table 2. Estimations of OpEx gaps at the country level

Country	Method 1		Method 2		% Difference (Method 2 minus Method 1)
	% of Underfunding	Ratio of Benchmark to Existing OpEx	% of Underfunding	Ratio of Benchmark to Existing OpEx	
Cambodia	98	2.0:1	93	1.9:1	–6
China	102	2.0:1	139	2.4:1	37
Indonesia	160	2.4:1	162	2.6:1	18
Lao PDR	98	2.0:1	98	2.0:1	0
Malaysia	25	1.2:1	28	1.3:1	3
Philippines	216	3.2:1	324	4.2:1	108
Thailand	122	2.2:1	134	2.3:1	12
Vietnam	118	2.2:1	132	2.3:1	14
Average	**115**		**139**		**23**

country-level analysis, and between 200% and 900% at the regional level. In particular, it is clear that the allocation of resources to large PAs is inadequate.

Overall, the regional-level shortfalls were consistently larger than the country-level estimates because the regional benchmark against which all the PAs were compared was higher than the country-level benchmarks.

Policy implications

This research produced significant results at both the country and regional levels. These should be widely shared to support policy and decision making related to PA management and to assist future research. Overall, it is clear that resources for biodiversity conservation in Southeast Asia and China should be increased significantly.

Given the funding and staffing shortfalls faced by PAs across the region, decision makers need to consider other forms and structures of PA management. These should involve the participation of local government units, the nongovernmental sector, and private entities.

More resources needed

The allocation of resources to PAs is in no way sufficient. National actions should therefore go beyond formalizing policies and implementation structures, and should provide sufficient resources in order to manage large PAs effectively.

Many of the PAs included in the study had no access to or have very limited external funds. The majority of those with external funding had unique features or global benefits, and were therefore able to attract international donors. Small-sized PAs rarely had any funding from external sources. External sources of financing should therefore be found to offset the deficits that exist in the funding available from government institutions.

Internal sourcing of funds, for staff and operating expenses, should be obtained from user charges, fees, and other payment mechanisms. As part of this process, PA managers need to capitalize on every opportunity to charge fees. They should also market any special features of their PAs to get more support from local communities and from visitors.

Future research

The PAs included in the survey varied widely in terms of the resources they had available, the information they had access to, and their importance. As a result, researchers need to be careful in making any generalizations based on the results of this study.

However, the research compiled a significant amount of information, which can be further expanded to create a useful database for further analysis over time. For example, future research could compare the results of this research with studies from other regions of the world.

WorldFish Philippine Country Office, SEARCA Building, College, Los Baños, Laguna 4031
Tel/Fax: +63 49 501 7493

Email: admin@eepsea.net

For more information about opportunities available at EEPSEA and to download EEPSEA publications for free visit **www.eepsea.org**

EEPSEA is administered by Worldfish on behalf of its sponsors, Sida and IDRC.