



Analysis of Fiscal Gap and Financing of Cambodia's Protected Areas

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Abstract The Analysis of Fiscal Gap and Financing of Cambodia's Protected Area (PA) conducted by the Department of International Conventions & Biodiversity, Ministry of Environment (MoE), aimed to identify resource gaps in the management of 23 PAs of Cambodia. The pressure & response indicators were used to analyze resource gaps. Pressure indicators were population, number of visitors of each PA, roads, and hiking trails within PAs; while response indicators included the number of full time staff and operational expenditure. To examine resource gaps for PAs management, all PAs were classified into three clusters according to the area size. The comparisons between pressure and response demonstrated trends of existing resources for the management of PAs, therefore they were analyzed by pairing pressure and response indicator. To calculate resource gaps, two benchmarks were set for each cluster: the average and the highest. Each PA resource gap was identified based on two rules: 1) bringing the number of fulltime staff and operational expenditure that was below average to the "average benchmark"; 2) bringing the number of fulltime staff and operational expenditure that was higher than the average to the "highest benchmark". As a result, the total gap of full time staff in 2009 was 449 personals, equal to 1/3 of existing staff. However, the gap of full time staff in this context did not take into account of their capacity to fulfill PA management tasks. The total operational expenditure gap in 2009 was 1,221,405 USD, equal to 25% of the benchmark estimation of 2,462,881 USD. In conclusion, for better management of 23 PAs, the budget for PAs operation should be doubled; therefore it should be increased up to 2.5 million USD per year.

Keywords fiscal gap, Cambodia, protected area, financing

INTRODUCTION

A 1993 degree of the Royal Government of Cambodia designated 23 Protected Areas (PA) comprising approximately 18% of the total land areas of the country. Following IUCN (2004) categorization, these PAs can be classified into National Park (7), Wildlife Sanctuary (10), Multiple-use Areas (3), and Protected Landscape (3). Through Royal decree (2001) and Declaration N.4010 (1999), one Biosphere Reserve has been established and three Ramsar sites have been identified in addition to the 23 PAs. Those PAs are managed by the General Department of Administration for Nature Conservation and Protection (GDANCP) of the Ministry of Environment by Law on Protected Areas 2008.

In addition, the Royal Government of Cambodia has designated 6 Protected Forests (PF), which are managed by the Ministry of Agriculture Forestry and Fisheries (MAFF). The management of Protected Forests is regulated under the Forestry law and relevant Royal Decree, Sub-Decree and Declaration of the MAFF.

Each type of PA has a specific inclusion definition and a management objective. The management of PAs has complied with the Royal Decree on the Creation and Designation of Protected Areas (1993), the Law on Environmental Protection & Natural Resource Management (1996), the Law on Protected

Areas (2008), which define a framework of PA management, biodiversity conservation, and sustainable use of natural resources within PA. Other PA related legislations and regulations include the Environmental Impact Assessment (EIA) sub-decree (1999), Biosafety reserve (2008), Forestry Law (2002), Fisheries Law (2002), Royal Decree, Sub-Decree and Declaration, and other relevant laws. Protected Areas is the main approach to biodiversity conservation in Cambodia. Data collection and interview in 2012 by Department of International Convention and Biodiversity, it showed that 23 Protected Areas had residents within or around them; tourism activities, unsustainable use of natural resources, illegal logging, wildlife trade, and insufficient resources, which were main challenges for PA management. The resources for PA management are generally considered to be insufficient while updated information and practical evaluation are lack to support the argument. This research finding and recommendation options are expected for use by PA responsible institutions to increase budget and sustain finance for effective management of PA System in Cambodia.

OBJECTIVES

This paper aimed to identify the fiscal gap and financing needs for Cambodia's Protected Area management. The overall objective was to analyze the resource gaps in PA management. The research was targeted for 23 Cambodian PAs under administration and management of the Ministry of Environment (MoE). The data were analyzed based on setting internal and external indicators and relevant criteria as appropriate. The findings of resources gaps and recommendations in filling the gapes by either increase national budgets and recruit more rangers or full time staffs are expected to be used by PA responsible institutions for effective management of PAs in Cambodia.

METHODOLOGY

Research was conducted using both primary and secondary data/information collected from 23 Protected Areas established by Royal Decree in 1993. The data were collected directly from each PA's manager, key experts, relevant institutions, partners, stakeholders, and any available sources. Analysis of data collection, cluster classification, and benchmark identification were based on the following methodologies:

Primary Data Collection and Surveys

A research questionnaire was designed in Khmer language for data collection from 23 PAs. It was divided into four parts: part one focused on background information of PA including name, date of establishment, land area, location, IUCN's classification, and its purpose; part two related to the physical characteristics of PA such as access to PA, inhabitants of PA, travelling within PA, and facilities available within PA; part three aimed to gather information on visitor characteristics such as the number of visitors to PA, visitors entry fee, visitor accommodation fee, and activity fee; and part four captured information on staffing revenues and costs, number of staff, staff capacity, operation expenditure; fee collection, and annual revenues for an individual PA.

Secondary Data Collection

Some data could not be collected from the field. The research team directly communicated with relevant institutions, local authorities, and international agencies through available contact persons before sending official letters to request for cooperation in providing data. Data and information from research projects, annual reports, census, materials from workshops and seminars were also collected.

Data Analysis

To analyze the Fiscal Gap for each PA, pressure and response indicators were identified. The pressure indicators included population within 5 km radius, visitors, road, and hiking trail; while the number of full time staff and operational expenditures were identified as respond indicators. The analysis of population focused on total population in the 5 most populated villages within a 5 km radius of the boundary; the less population caused less pressure on natural resources. The total operational expenditure from government budget and other external sources supported some PAs' activities.

The following methods were used to identify resource gaps: analysis pressures and respond, and set benchmark.

Response: This study selected the number of full time staff, and operational expenditures in 2009 as response variable to assess the response to the pressure factors including: population, visitors, road, and hiking trail.

Benchmarking: According to size variance of PA and to maximize the accuracy of gap analysis, 23 PAs were classified into three clusters as follows:

- Cluster 1: PA with total land areas of $0 \leq 5,000$ ha; 2 Pas
- Cluster 2: PA with total land areas of $> 5,000$ ha $\leq 50,000$ ha; 6 Pas
- Cluster 3: PA with total land areas of $> 50,000$ ha $\leq 402,500$ ha; 15 PAs

A benchmark of response indicators was identified for each cluster to analyze resource gaps, which was carried out for full time staff (FTS) per 1,000 ha and operational expenditure (OpEx) per ha. The *average* and *highest* indicators of FTS/1,000 ha and OpEX/ha within each cluster were used as benchmarking tools to estimate gaps.

Resource Gaps: According to the method introduced by the Economy and Environmental Program for Southeast Asia (EEPSEA, 2012), the following rules were applied for calculation resource gaps.

1. If the Number of Full-Time Staff & Operational Expenditure is lower than the average, bring the value of Full Time Staff & Operational Expenditure to the *Cluster Average (Avr)*.
2. If the Number of Full-Time Staff & Operational Expenditure is higher than average in Cluster, bring the value of Full Time Staff & Operational Expenditure to the *Highest (Hst)* value in Cluster.

The resource gap analysis was carried out by comparing existing resource allocation for PAs management with averages & highest of individual clusters. The comparisons scenarios presented for looking at how PAs were currently managed, and should stimulate discussion as any action was to be taken for further improvement.

RESULTS AND DISCUSSION

The Cambodia Protected Areas were divided into three clusters based on size: Cluster 1 was for PA that had total land areas from $0 \leq 5,000$ ha; Cluster 2 was for PA with total land area from between 5,000 ha and $\leq 50,000$ ha; while Cluster 3 was classified for any PA having land area more than 50,000 ha but less than or equal 402,500 ha (Table 1). Cluster 3 represented highest number of PA in the amount of 15 PAs out of 23 PAs. According to the data in Table 1, the average total land area in cluster 1 is 3,898 ha, cluster 2 is 28,004 ha, cluster 3 is 209,919, and Kulen-Promtep wildlife sanctuary has highest total land area of 402,500 ha.

In 2009, 204,117 Cambodians visited 9 PAs: three national parks, three wildlife sanctuaries, one protected landscape, and two multiple use areas. In the same year, 339,199 foreigners visited 10 PAs. Therefore, the total number of tourists recorded in 2009 was 543,316 people. However, Bokor National & Phnom Kulen National Parks, and Ankor Multiple Use Area were not included in this analysis as the information on the number of visitors as these PAs could not be obtained as these were managed by other agencies and private companies.

Table 1 Cluster and benchmark for full time staff and operational expenditure

PA total area clustering		Full time staff (FTS)			Operation expend (OpEx)			
Cluster Interval (ha)	No. PA in Cluster	Avr. Total Area (ha)	Avr. No. FTS	Avr. No. FTS per 1000 ha	Hst No. FTS per 1000 ha	Avr. OpEx (USD)	Avr OpEx/ha (USD)	Hst OpEx per ha (USD)
Total = 23		Highest = 402,500 ha			Lowest = 2795 ha			
0 ≤ 5,000	2	3,898	10.50	2.97	3.94	7,570	2.10	2.67
> 5,000 ≤ 50,000	6	28,004	30.17	1.03	1.77	17,576	0.60	0.94
> 50,000 ≤ 402,500	15	209,919	45.93	0.25	0.52	74,725	0.30	1.24

According to interview information received from PA's directors, deputy directors, rangers, and commune chiefs, the revenue of each PA were through entry fees (0.25 - 0.75 for local visitors & USD 5 for foreigner), accommodation, and facilities such as boat rental, car park, guide fee, etc. Tourist facilities and accommodation rates varied from PA to PA depending on customer demand. As the road condition of PA was not so good and far from the town, entry fees were lower, e.g. \$0.12 per person. Some PAs had additional charges for visitors to see rare species.

Response Indicators

Number of full time staff in 2009: The Ministry of Environment set up 32 offices and 78 sub-offices around and within 23 PAs. For daily operations 891 full-time staff were employed by government to work in 23 PAs.

Operational expenditures in 2009: The operational expenditure for each PA including staff salary, uniforms, and medicine were covered under the government budget. Other operational costs such as project based activities supported by other donors. The total operation expenditures in 2009 for 23 PAs was USD 1,241,476.

Pressure Indicators

Population of five largest villages within 5 km radius in 2009: The total population in the 5 largest villages in a radius of 5 km from border of each PA was 347,625 people.

Roads and hiking trails: Roads & trails in each PA were constructed for filed monitoring recreation and ecotourism. Phnom Prich wildlife Sanctuary had the longest road (380 km), while Botum Sakor National Park had more trails (1,750 km) compared to other PAs. On the other hand, for Roniem Daun Sam Wildlife Sancturay, no road has been constructed and Preah Vihear Protected Landscape only has a 4 km trail.

Response vs Pressure

This research has compared pressure with response in pairs of: Population vs Full Time Staff; Population vs Operational Expenditure; Visitor vs Full Time Staff; Visitor vs Operational Expenditure; Road vs Full Time Staff; and Hiking Trail vs Full Time Staff. Road and Hiking Trail identified as pressures factors have elaborated in follow paragraph.

Population vs full time staff: According to data collection from all PAs (2009) the distribution of population and full time staff in 1000 ha tended to have a positive association in general because the more population was the more full time staff were employed. In this regard, the high pressure by population within 5 km radius in PAs had a response of higher number of full time staff, except

Angkor Protected Land Landscape which had less full time staff (0.93/1,000 ha) in proportion to population of 4,212.50 per 1000 ha compared to other PAs.

Population vs operational expenditure: The same source of data from directors and rangers in 23 PAs (2009) on the distribution of population and operational expenditure for 23 PAs resulted in positive conditions. The results indicated that the greater the population was, the more staff were employed for management. However, distribution of both factors in Prea Vihear Protected Landscape, Phnom Samkos Wildlife Sanctuary, and Kirirom National Park had more response and less pressure, especially Prea Vihear with operational expenditures of 1,533 USD per 1000 ha in 2009 with no population within this PA. Besides, Angkor Protected Landscape had less resources in term of operational expenditures (470.09 USD/1,000 ha) to response with a high population of 4,212.50 per 1,000 ha.

Visitors vs full time staff: Only nine PAs recorded the number of visitors. The distribution of pressures and response factors for visitors and full time staff was the focus for nine PAs that had data available. The trend of Visitors vs Full Time Staff moved to a positive relationship although three PAs (Prea Vihear Protected Land Landscape, Kirirom National Park, and Peam Krasop Wildlife Sanctuary) had high pressure because of the number of full time staff did not fully respond to the number of visitors, so it led to limited human resources for effective management in those PAs.

Visitors vs operational expenditure: The distribution of the number of visitors per 1,000 ha and total operational expenditure per 1,000 ha in 23 PAs also had a positive trend. Distribution of visitors ranged from 0 to 3,589 per 1000 ha, while operational expenditure had a distribution range from 82.27 USD per 1,000 ha in Roniem Daun Sam Wildlife Sanctuary to 2,674.06 USD per 1,000 ha in Kep National Park. In general, many distributions of both factors showed less pressure.

Roads v full time staff: Length of road per 1,000 ha had been considered as pressure factor for PA management due to it was potential and easy for poacher to conduct illegal activities within PA. Besides, it could be considered also as respond factor for PA manager or ranger to control other activities. Nevertheless, this study deliberated existing road, which PA was a pressure factor, but its distribution tended to be positive respond. According to data in this study, there was two contrast outliers at Angkor Protected Land Landscape trended to have high pressure with road distribution in 13.80 km per 1,000 ha, and Kep National Park had high response within 4 full time staffs per 1,000 ha.

Hiking trails vs full time staff: Moreover, the length of hiking trails was also considered as pressure factor. The results showed that almost of PAs had enough staff to patrol illegal activities if poachers used only hiking trail.

Benchmarking

This study set benchmarks of *full time staff/1,000ha* and *operational expenditure/ha* at *average* and *highest* points for each cluster, to estimate and calculate resource gaps with the above rules and methodology. However, resource gaps of PAs management did not refer to the quality of full time staff and sufficient financial resources for *effective* PAs management.

Resource Gaps

To estimate resource gaps, the number of full time staff/1,000 ha and operational expenditure/ha had been identified as shown in Table 1. The serial number on horizontal axis in Figs. 1, 2, 3, and 4 represent each PA. The 7 National Parks are: 1- Kirirom, 2- Bokor, 3- Kep, 4- Ream, 5- Botum Sakor, 6- Phnom Kulen, and 7- Virachey; 10 Wildlife Sanctuaries are: 8- Phnom Aural, 9- Peam Krasop, 10- Phnom Samkos, 11- Roniem Daun Sam, 12- Kulen Promtep, 13- Beng Per, 14- Lomphat, 15- Phnom Prich, 16- Phnom Nam Lyr, and 17- Snoul; 3 Protected Landscapes are: 18- Angkor, 19- Banteay Chmar, and 20- Prea Vihear; and 3 Multiple Use Areas are: 21- Dong Peng; 22- Samlaut; and 23- Tonle Sap.

Full time staff GAP: According to the *average* and *highest* benchmark of Full Time Staff (Table 1) and data shown in Fig. 1, cluster 1 had only one PA below *average* and cluster 2 had four PAs below and one PA above its *average*, while cluster 3 had eight PAs below and six PAs over *average*. Therefore, Cluster 1 had 0.97/1,000 ha or approximately 5 (4.8) full time staff gap, cluster 2 had 1.47/1,000 ha or 42 full time staff gap and cluster 3 had 1.85/1,000 ha of 402 full time staff gap. The calculation of full time staff gap in each PA was shown in Fig. 2. Among 23 PAs, only Tonle Sap multiple use area and Phnom Aural wildlife sanctuary had high full time staff gap: 82 staff gap were for Tonle Sap and 66 staff gap for Phnom Aural. For other PAs, the gap was between 0 to 45 staff. The result of full time staff gap assessment indicated that an additional 448.55 staff needed to be employed to the existing 891 staff to meet the benchmark of 1,339.55 staff. That means 1/3 of existing staff is required to recruit in addition.

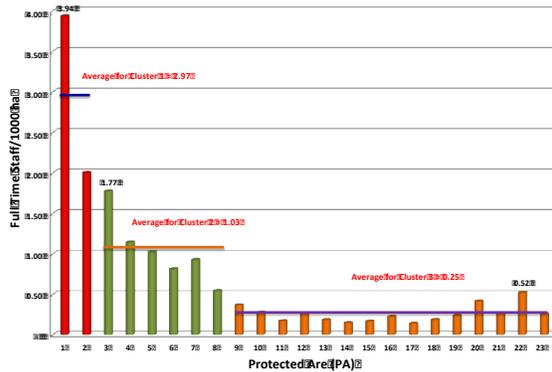


Fig. 1 Full time staff / 1000 ha

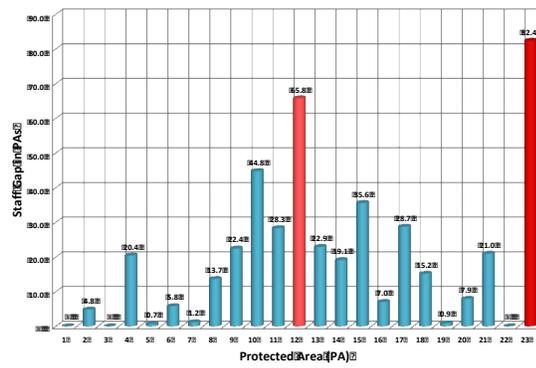


Fig. 2 Full time staff gap in each PA

Operational expenditure GAP: The assessment of the financial gap was based on the annual budget (2009) for PA management of the Ministry of Environment. The funding for supporting PA management received from Government was 40 person (equivalent to USD 499,515) and from other external sources was 60 person (equivalent to USD 741,964). This amount of external sources pertained to only nine PAs. There was not any donor’s funding included, as some portion was undisclosed due to the confidential policy of the management. Therefore, this paper focused only donor’s funding that worked with government or had a joint project through the Ministry of Environment.

The operational expenditure for each PA included salary for full time staff, expenditure for uniform, medicine and conservation projects. The *average* and *highest* of operational expenditure for each cluster are presented in Table 1. Figure 3 shows that cluster 1 had an *average* expenditure of USD 2.10/ha and the *highest* expenditure USD 2.67/ha, so the total gap was USD 2,853. In cluster 2, operational expenditure in six PAs was not very diverse and was below the *average*, only Dong Peng multiple use area was spending above the *average*. Therefore, the total gap for this cluster was USD 16,886. Besides, cluster 3 operational expenditure in 15 PAs was variance from one PA to another; and 10 PAs were below the *average*, while 4 PAs were above the *average*. The total operational expenditure for cluster 3 was USD 1,201,666. Total gap for each PA is shown in Fig 4. It articulated that Kelen Promtep wildlife sanctuary had highest gap (347,092.7 USD) while Tonle Sap multiple use was the second highest gap of operation expenditure in 2009. Phnom Prich wildlife sanctuary and Botum Sakor national park also presented high gaps.

Total gap of operational expenditure in 2009 for 23 PAs was USD 1,221,405 approximate 50 percent of benchmark estimation at USD 2,462,881. For better management of PA system in Cambodia, operational fund should be increased to double of 2009 budget.

As the results of assessment, the resource gaps for full time staff & operational expenditure for 23 PAs are shown in Table 2.

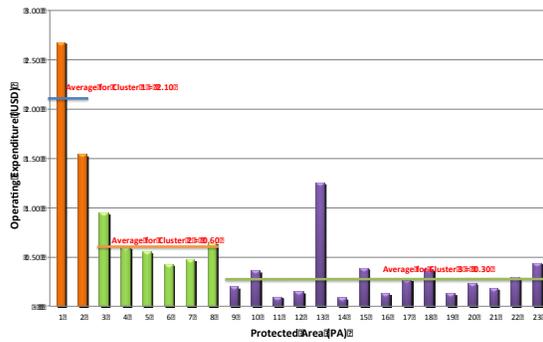


Fig. 3 Operational expenditure per ha.

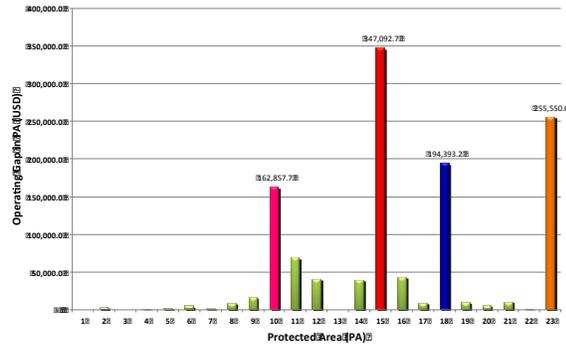


Fig. 4 Operational expenditure gap

Table 2 Resource gaps

Resources gap assessment	FTS (Number)	OpEx. (USD)
Existing resources (2009)	891.00	1,241,476
Estimated resources benchmark	1,339.55	2,462,881
Estimated resources gap	448.55	1,221,405

CONCLUSION

The resource gap analysis is reliant on data availability in setting indicators. The gap analysis is based on the *average* and the *highest* full time staff per 1,000 ha and operational expenditure per ha in year 2009. The *average* and the *highest* for both indicators vary from cluster to cluster according to the size of PAs. Logically, the bigger size of the PA presents bigger number of full time staff and a bigger operations budget. However, results of this study showed that the smaller PA size had the higher *average* of full time staff, and the higher *average* of operational expenditure. It is more than double expenditure compared with PAs which highest size.

Generally, PAs that had high resource gaps were from cluster 3 as this cluster had very wide gap between the *highest* and above *average*. For cluster 1 and cluster 2 each PA was not much different gap in terms of proportion.

The full time staff gap in this research did not taking into account the qualification of staff. Therefore, this study focuses on quantity only. To assess the effectiveness of PA management, staff quality should be considered as an important indicator and it should be considered for further research.

The protected area depending on the government budget was only able to support for staff salaries, uniforms, and medicine. This budget is neither adequate for effective management nor to improve facilities for resource mobilization. More than half of the total operational expenditure in 2009 received from external sources, if this study could assessed more information on budgets of conservation projects for PA management that supported and implemented by external partners, the figure of operation expenditure for 23 PAs would be increased.

In conclusion, to assess the resource gaps for effectiveness in PA management, gap of full time staff should examine both quantity and quality, including skills & professional requirements, and other criteria such as management plan, equipment, operation facilities etc. Without quality, motivation, and incentives, even if there are adequate staff, a successful or an effective PA management is not guaranteed. Although 1/3 of existing staff is required to fill the gap; or if existing staff can improve their capacity with well equipped facilities, there will be improvement in PAs management.

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