Socio-Economic Benefits of Natural Resources: A Perspective of the Members of the Local Protected Areas in Northern Cambodia

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Abstract

This study explores the economic benefits of local protected areas (LPA), the Community Forestry (CF) and Community Protected Areas (CPA) in Kampong Thom and Siem Reap provinces, Cambodia, and their role in local livelihoods. The study selected 8 LPAs with a sample of 320 households. The study reveals that agriculture, forest-related activities, and labor are major income sources, with forest-related income contributing an average of 23%. Regression analyses show that livelihood changes are linked to income sources, perceived importance of LPAs, and participation in natural resources (NR) protection. Despite conservation efforts, challenges like deforestation and limited financial support persist. Women significantly contribute to livelihood activities but are less involved in NR management. A perception gap exists between the poor and non-poor regarding NR benefits. Logistic regression predicts a 96% likelihood of NR persistence, influenced by the benefits derived and protection activities. The study concludes that enhancing community awareness, especially among the poor, along with financial and technical support, is crucial for sustainable NR management, recommending targeted awareness programs, government financial support for LPAs, and external assistance to address challenges and seize opportunities.

1. Introduction

In 2020, the Ministry of Environment (MoE) reported that Cambodia's forest cover was 46.86% in 2018, providing a crucial livelihood source for 41% of rural communities (McKenney et al., 2004). As of 2022, 57% of Cambodian households are still engaged in agriculture (MoP, 2022), which contributes 22.2% to the country's GDP (The World Bank, 2024). The sustainability and productivity of this sector are closely linked to forest resources (APFNet, 2020). Forestry management in Cambodia is overseen by two key institutions: MoE and the Ministry of Agriculture, Forestry and Fisheries (MAFF). At the community level, forestry management under the MoE is termed Community Protected Areas (CPA), whereas under MAFF, it is termed Community Forestry (CF).

There are 648 CFs and 193 CPAs established in 21 and 15 provinces, respectively (FA, 2023; MoE, 2023). Forestry resources are critical for the livelihoods of rural Cambodian communities. Chou (2017) highlighted the roles of Non-Timber Forest Products (NTFPs) in livelihoods and ecosystem services within a protected area in Cambodia, noting that the importance of these resources is often overlooked due to their non-monetary value. Ehara et al. (2016) reported an inverse relationship between household wealth and NTFP dependence, indicating that as households become wealthier, they rely less on forest resources. Socio-economic development has drastically impacted natural resources, particularly forest cover, which decreased from 10.7 million hectares in 2002 to 7.9 million hectares in 2021, with the most significant decline occurring between 2010 and 2013 (MoE, 2020). This accelerated reduction has adversely affected rural livelihoods, contributing to internal and external migration (IOM, 2017).

This study aims to understand the economic benefits of protected areas, specifically CF and CPA, for their members in Kampong Thom and Siem Reap provinces. It seeks to provide

insights into how changes in forestry resources affect economic benefits, community roles, and perceptions regarding natural resource protection.

2. Method

2.1 Study Area and Samples

There is a total of 8 LPAs—3 CFs and 5 CPAs—located in Kampong Thom and Siem Reap provinces, in the northeastern part of Cambodia, included in the study. The study employed both qualitative and quantitative methods to explore the economic benefits of LPAs in response to the needs of the community members.

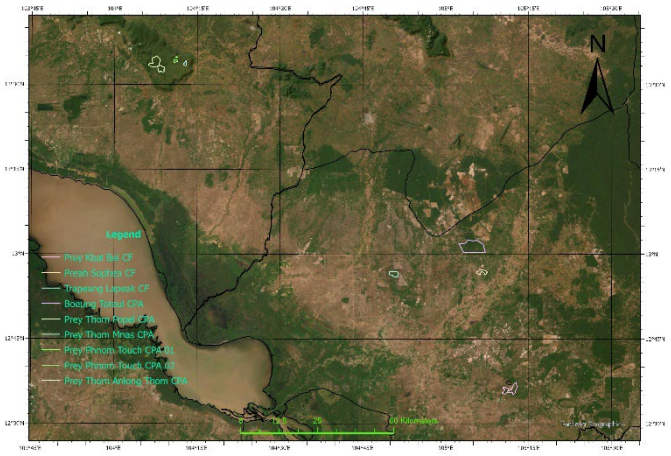
The sample for the study was calculated from the 1,719 member households of the selected 8 LPAs. Using Cochran's sample formula with a confidence interval of 95%, a margin of error of 5%, and a proportional response of 50%, the number of households to be interviewed was determined to be 315. The final number of samples included in the survey was 320 households across the 8 LPAs. Out of the 320 respondents, 252 were female. A structured questionnaire was used for the household interviews, following the completion of questionnaire testing.

Table 1: Demographic and samples of the study

No.	Community	Total Area (ha)	Total HH Members	Total People	Female	Sampled HHs	Female Respondents
1	Boeung Toteul CPA	772	402	1,889	957	41	40
2	Trapeang Lapeak CF	325	300	400	180	42	23
3	Preah Sophea CF	384	293	1,393	720	38	31
4	Prey Kbal Bei CF	2,587	62	152	82	41	34
5	Prey Thom Anlong Thom CPA	798	308	1,186	624	37	20
6	Prey Phnom Moneas CPA	113	109	463	233	41	40
7	Prey Phnom Kduoch CPA	92	141	656	335	40	35
8	Prey Thom Popel CPA	365	104	410	204	40	29
	Total	**5,436**	**1,719**	**6,549**	**3,335**	**320**	**252**

In addition to the quantitative survey, the study utilized qualitative interviews with a total of 17 key informants: 3 from natural resource protection Non-Governmental Organizations (NGOs), 2 officials from the Provincial Department of Environment, 4 commune leaders, and 8 village leaders. Additionally, 8 group interviews were conducted with the 8 community-based protection committee members, representing each LPA.

Figure 1: Map showing location of the study area



To measure the perception of the respondents, a five-point rating scale was applied and considered as the interval scale for the analysis of the data.

2.2 Data Analysis and Interpretation

Descriptive statistics were used to describe the general responses of the respondents. Additionally, Pearson Product Moment Correlation (Pearson's r), multiple regression analysis, and binary logistic regression were employed to determine the correlation and predictability of factors influencing the socio-economic situation of the LPA members. The qualitative data were analyzed using both narrative and content analysis to understand the actual situation and how the community received support, as well as their mechanisms for responding to challenges to ensure the longevity of the natural resources. Furthermore, qualitative data were used to triangulate with reviewed documents and quantitative data.

3. Results and Discussion

3.1 Contribution of Natural Resources to the Livelihood of the Community

The data indicated that dependence on natural resources remains highly significant for members of community-based natural resource management, with it being one of the three major income sources: agriculture (82%), forest-related activities (66%), and laborers/workers (48%). Moreover, the average share of income from forest-related sources among the surveyed respondents was 23%, following agriculture (61%) and laborers/workers (41%). This portion, although lower, still reflects a strong connection to natural resources.

Table 2: Livelihood activities of the membered household

No.	Sources of Income	Total	Percent	Percent Share	SRP	Percent	Percent Share	KPT	Percent	Percent Share
1	Agriculture	261	82%	61%	129	82%	59%	132	81%	63%
2	Forest related	211	66%	23%	110	70%	25%	101	62%	21%
3	Laborers or workers	155	48%	41%	93	59%	43%	62	38%	38%
4	Vendors/business	31	10%	55%	15	9%	57%	16	10%	53%
5	Wage workers	20	6%	47%	3	2%	37%	17	10%	49%
6	Migration	5	2%	26%	1	1%	50%	4	2%	20%
7	Vendors at tourism site	3	1%	40%	2	1%	50%	1	1%	20%
8	Government salary	4	1%	50%	2	1%	40%	2	1%	60%
9	Others	56	18%	29%	9	6%	14%	47	29%	32%
	Total	**320**	**100%**	**100%**	**158**	**100%**	**100%**	**162**	**100%**	**100%**

The findings suggest a significant change in the role of natural resources in the livelihoods of the poor, with the proportion of income from forest-related sources decreasing to 23%, down from 41% as reported by McKenney et al. (2004). To understand the livelihood changes of the community members, correlation and multiple regression analyses were conducted. The results showed that livelihood changes were significantly associated with eight factors: income from forest-related sources, income from non-forest-related sources, perceived importance of the LPAs, current importance of natural resources, benefits received after joining LPAs, changes in pest and disease prevalence, current severity of pest and disease changes, and the number of natural resource protection activities. However, stepwise multiple regression analysis indicated that only three factors—income from forest-related sources, income from non-forest-related sources, and the number of natural resource protection activities—were predictors of livelihood changes among the members, with a prediction level of 30%. These results highlight the critical importance of participation in natural resource protection, suggesting that participants possess the necessary knowledge, courage, sacrifice, and commitment for both natural resource and livelihood development.

3.2 Roles of Local Protected Areas in the Protection of Natural Resources

LPAs have been prominent players in protecting natural resources, supported by various organizations. The government has recognized the importance of these communities and allowed their establishment. Interviews with committee members confirmed the significant contribution of these communities in managing and protecting natural resources, with some suggesting that the natural resources might not exist without community involvement. Four out of the eight interviewed communities reported significant forest loss adjacent to the LPAs. Qualitative data also indicated that the existence of LPAs is closely tied to the livelihoods of community members, and without direct benefits, their role in protection would diminish. Multiple regression analysis showed that the existence of natural resources depends on two key factors: the level of poverty and the perceived importance of LPAs by community members, suggesting that protection improves as living conditions and community acknowledgment of LPAs' importance increase.

Despite positive conservation and protection activities, challenges remain, including continuous degradation of natural resources, limited law enforcement (e.g., land grabbing, deforestation, illegal logging, and fishing), insufficient financial and technical support, limited knowledge, lack of environmental responsibility, and difficulties dealing with powerful land grabbers. The capacity of the committees to sustain LPAs without external support is also a concern. However, opportunities such as promoting sustainable agriculture, eco-tourism linked to cultural and natural resources, advancing non-timber forest products (NTFPs) as unique products, and developing financial sustainability models have been identified. These opportunities require technical and financial support to be feasible.

3.3 Roles of Women in Natural Resources Management

Key informant interviews confirmed that women play crucial roles in livelihood activities, including saving, handicraft, and agricultural production, across all LPAs related to natural resources. However, their involvement in the management and conservation of natural resources, particularly in planning and patrolling activities, is limited due to household responsibilities and safety concerns. Despite this, women are the most affected group if natural resources were to vanish.

3.4 Awareness and Perception Regarding the Importance of Natural Resources

The comparison of perceptions between the poor and the non-poor regarding natural resources revealed that out of 20 variables tested, only one showed a significant difference: the perceived benefits received from natural resources. The poor perceived these benefits as lower compared to the non-poor. In contrast, the income contribution from forest resources was 25% for the poor and 23% for the non-poor, a difference that was statistically insignificant. This suggests that the poor value natural resources less than the non-poor, possibly due to limited knowledge and understanding of their importance for livelihood.

Qualitative interviews further confirmed that committee members of the LPAs have a better grasp of the importance of natural resources. They are more aware of both the short- and long-term benefits to their communities. In contrast, community members typically focus on immediate physical and financial benefits rather than the broader, more abstract advantages such as biodiversity and ecosystem services.

3.5 Predicting the Future Existence of Natural Resources

Logistic regression analysis was conducted to predict the future existence of NR. The results suggest that halting the destruction of NR is likely dependent on the benefits individuals can derive from these resources. Correlation analysis indicates that preventing NR destruction is positively influenced by several factors: the perceived importance of the LPA, the number of participations in NR protection activities, the shift in income sources away from forest-related occupations, and the frequency with which people currently benefit from NR. The likelihood of NR existence is positively estimated at 96%.

Additionally, the level of changes in benefits from NR over the next 10 years is influenced by multiple factors, including changes in income sources, the importance of NR, benefits before and after joining LPAs, past and current severity of pests and diseases, and participation in NR protection. These factors are significantly associated with the level of impact expected over the next decade. Stepwise multiple regression analysis predicts the impact levels based on six key factors: participation in NR protection, benefits after joining the LPA, current severity of resource changes, current resource changes, current pest and disease changes, and changes in income sources from forest-related occupations. The prediction model estimates a 45% proportion of the impact.

4. Conclusion and Way Forward

At the local level, individuals and organized communities, including local organizations, have played a crucial role in protecting natural resources. It has been confirmed that without their efforts, these resources would likely have vanished, as evidenced by the degradation of nearby areas. Currently, natural resources continue to be vital for the livelihoods of community members, contributing significantly to their household incomes and influencing their livelihood

stability. Local protected areas reflect a positive outlook on their future preservation, with communities believing in the areas' potential for significant conservation. However, the study also indicates that without community recognition of the importance and benefits of these resources, their condition would be worse. This contrasts with the perception of some leaders who anticipate resource depletion due to changing economic conditions. Although government support is gradually improving, it remains limited in financial aspects. The poor exhibit a lower recognition of the NR's contribution to their livelihoods compared to the non-poor, which may contribute to resource degradation. The study also highlights that long-term changes in benefits significantly impact people's livelihood, with a high level of predictability. While challenges persist in community-managed areas, there are also reported opportunities.

The study suggests that special attention should be given to the poor and vulnerable in recognizing the benefits of natural resources. Awareness-raising efforts should focus on understanding the risks and threats to these resources, as community members' views often differ from those of their leaders. The government should consider regular financial allocations to LPAs to support resource management. Finally, external and technical support is necessary to leverage opportunities and address challenges and threats.

5. References

APFNet. (2020). *Community Forestry Development in Cambodia.* Yunnan Science and Technology Press.

Chou, P. (2017). The Importance of Non-timber Forest Products in Rural Livelihoods and Ecosystem Services at Phnom Prich Wildlife Sanctuary, Cambodia. *IJERD – International Journal of Environmental and Rural Development, 8*(1), 7-13.

Ehara, M., Hyakumura, K., Nomura, H., Matsuura, T., Sokh, H., & Leng, C. (2016). Identifying characteristics of households affected by deforestation in their fuelwood and non-timber forest product collections: Case study in Kampong Thom Province, Cambodia. *Land Use Policy*, 92–102.

FA. (2023). *Statistics of Community Foresty.* Phnom Penh: Forstry Administration.

IOM. (2017). *Assessing Vulnerabilities and Responses to Environmental Changes in Cambodia: The Migration, Environment, and Climate Change Nexus.* International Organization of Migration.

McKenney, B., Chea, Y., Prom, T., & Evans, T. (2004). *Focusing on Cambodia's High Value Forests: Livelihoods and Management.* Phnom Penh: Cambodia Development Resource Institute.

MoE. (2020). *Cambodia Forest Cover 2018.* Phnom Penh: Ministry of Environment.

MoE. (2020). *Guidebook on Natural Resources and Wildlife Situation in the Northern Protected Areas and Biodiversity Conservation Corridors in the North of Tonle Sap Lake.* Phnom Penh: Ministry of Environment.

MoE. (2023). *Statistics of Community Protected Areas.* Phnom Penh: Ministry of Environment.

MoP. (2022). *Cambodian Agricultural Survey 2020.* Phnom Penh: Ministry of Planning.

The World Bank. (2024). The World Bank Database.