



CAMBODIA MSME 2/BEE PROJECT

**BIODIVERSITY CONSERVATION MONITORING AND
ASSESSMENT REPORT.**

TASK ORDER NO. 04

FEBRUARY, 2010

This publication was produced for review by the United States Agency for International Development. It was prepared by Mr. Andrew Watson for the Cambodia MSME project implemented by DAI.

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TASK ORDER NO. 04

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Author: Mr. Andrew Watson, Senior Vice President
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Trip Report: January 2010

The overall purpose of the assignment was to assess progress on activity implementation in the Biodiversity Component of the project and advise the Cambodia MSME team on ideas for enhanced monitoring of biodiversity in the four priority regions of Prey Lang, the Elephant Mountains, Boeung Per and the forests of southern Oddar Meanchey.

1. Task 1: Assess implementation of Biodiversity activities both by DAI and PACT staff to ensure common understanding and approach in accordance with the Year 2 work plan.

During the assignment, Andrew Watson visited two sites where MSME2 is supporting community forest management activities and NTFP training and marketing. The sites were the Chiouk Boeung Pre community bordering the Boeung Per Wildlife Reserve in Preah Vihear Province and the Samaky community in Oddar Meanchey Province.

CHIOUK BOEUNG PRE

The community manages a Community Forest Area (CFA) of 1,500 ha that was established in 2002. The community has zoned the area in parcels designated for agriculture, conservation, resin production, rattan production and forest rehabilitation. One significant observation is that the CFA is not all forest. This is an important consideration for the MSME2 monitoring plan (the PMP) since we have been assuming the CFAs and CPAs (Community Protected Areas) are completely forested when recording “areas of biological significance under improved management.”

The local people belong to the Kouy indigenous group that comprises traditionally forest people. About 160 households make up the community and 140 of these are members and participate in the management activities. They each pay a 100 riels/month membership fee. This is used for compensating people for the patrolling efforts. Those households that do not belong to the group are mainly recent settlers that are engaged in trading and other non-farming activities. The CFA members patrol the forest, making sure that rules and regulations are being respected. About 90% of the community complies with the rules. The local authorities – including the representatives of the Ministry of Agriculture, which is responsible for management of the Boeung Per reserve – have delegated authority to the committee to “arrest” and sanction outsiders that are caught breaking the rules. This authority has extended to confiscation of motorbikes and physical arrest of people.

The economic benefits to the community are limited. Of the 140 households involved in implementing the management activities, 34 are resin tappers and 60 households harvest rattan. These people pay a small fee for harvesting activities. Of 31 recent incidents, 4 involved illegal hunting (of monkeys). Others were illegal logging. The byelaws allow the community to impose fines even on outsiders. This is unusual and it would be appropriate for MSME2 to establish whether this is legal under Cambodian law.

Beyond the NTFPs, several households have agricultural plots in the CPA along the stream the forms the western boundary. These people are members of the management group but they are not engaged in the NTFP activities. It appears that these farmers acknowledge the importance of the CPA for access to land but also for the ecosystem services that the forest provides – mainly water and nutrients for their farming activities.

The group has gained some renown and visibility and there are numerous visitors. Many contribute to the community fund, which currently stands at about \$250 – a significant amount for a community such as this. Overall, commitment to forest management is very high but the group is looking for additional ways to generate revenue: timber harvest (poles) and ecotourism have been mentioned as possible initiatives.

SAMAKY

“The forest is my life” (Chairperson of the CFA group).

This community is not made up of indigenous forest people but most households have resided here for many generations. We met with a group made up of eleven members of whom three were women – including the Chairperson. The group comprises 515 member households from four villages. There are 1,115 individual members. It was formed in 2004 with help from an NGO – Children Development Association (CDA). The Committee comprises seven executive members that are elected every five years. There are no term limitations.

The main activities of the membership comprise marking the boundary of the area, patrolling the 1,000 ha of forest to prevent land conversion, illegal logging and hunting, and fire prevention activities. Only 3 households are currently involved in resin tapping activities. This is not something that the villages pursued in the past although other people in the area did. About six households have participated in rattan training – again this is not an activity that was pursued in the past. The people here are all rice farmers and traditionally they use the forest as a source of wood (timber and fuel), wild fruit and mushrooms.

When asked what the motivation was for devoting so much time and effort to protecting the forest (two people recently died of malaria after spending time in the forest on patrols), especially given the paucity of economic benefits, the respondents stated that it was important to conserve the forest for their children, that the forest maintained rainfall in the local area and that it contributed to preventing global warming. The latter two responses seem inconsistent with other comments that suggested there had been little change in rainfall levels over the past 30 years and that even “drought years” such as 2004 had little impact on rice yields. It seems likely that the respondents had internalized comments made by outsiders (project staff and visitors from elsewhere) regarding the role of forests in mitigating global warming and climate change. The bottom line here appears to be that the community realizes little economic benefit from the forest¹ but places a high “bequest value” on it. It seems likely that they also perceive an important “option value” – conserving the forest for possible uses and benefits in the future. It was noted that soon after an original 3,500 ha were demarcated as CFA, the authorities allocated

¹ One respondent noted that he spent ten days in the forest collecting mushrooms only to realize about \$5 when he sold them in nearby markets.

2,500 ha as a timber concession, which was subsequently harvested. Their current dedication to patrolling could be seen as an attempt to make sure that the authorities can't argue that the community is not meeting its management responsibilities and therefore revoke the CFA agreement. Undoubtedly, the number of outsiders that have visited the community (some making cash donations) and the potential promise of additional "projects" resulting from all the attention also motivates the community to continue their activities.

The group does have the authority to exclude outsiders from accessing forest resources but it has little authority to arrest or censure people caught breaking the regulations – especially outsiders who appear to be the main culprits. If they identify an infraction, they inform the local Forest Department authorities who issue a warning letter. The group members were not aware of any more censures or penalties being imposed².

Here are some observations on vulnerability and resilience to the climate change. First, as noted above, the community members have noted little change in rainfall patterns over the past few decades. 2004 saw a brief drought during the rainy season but this did not affect rice yields. In 2009, the rains started late but also ended later than usual and there was little impact on the harvest. When asked what rice yields were typical, one respondent said about 2 tonnes/ha for irrigated (paddy) rice and a little less for the rain-fed crop.

RECOMMENDATIONS

1 – MSME2 should immediately ascertain the forest coverage in each of the CFAs/CPAs where we are working and use these revised figures for PMP reporting.

2 – MSME2 and its implementing partner organizations such as Pact should make a concerted effort to ensure that community groups are being honest and transparent about their motivation for engaging in community forest management. While it is clear that these groups are highly committed to sustainable forest management, referencing "prevention of global warming" or "maintaining rainfall" as motivating factors is either fallacious (not the genuine reason) or is based on patently inaccurate information provided by outsiders. There is a danger that these groups will lose credibility with potential donors or even with Cambodian government agencies if they are unable or unwilling to explain the true reasons for their forest management activities.

2. Task 2: Coach the Biodiversity team on how to regularly analyze, monitor and document site specific treats and mitigation efforts in the four priority regions of Prey Lang, the Elephant Mountains, Boeung Per and the forests of southern Oddar Meanchey.

A PowerPoint presentation was developed for training purposes and was delivered to the MSME 2 team at the end of the assignment. A copy of the presentation is attached as Annex 1.

² It is worth noting that the community's location on the border with Thailand has led to considerable activity of the Cambodian Armed Forces in the area since tensions with Thailand have been high in recent years. Several roads have been constructed recently including one which cuts through the communities close to the CFA. Units of the military are posted along the road and have been observed cutting trees for timber. In addition, it is clear that the new roads are attracting settlers who are clearing woodland for agriculture adjacent to their homesteads.

3. Consult with EWMI and PACT and advise the project on mechanisms for regular information sharing between development partners working on biodiversity conservation activities in the four sites to ensure harmonized implementation of field activities.

Consultations were held with Pact, EWMI and Conservation International to discuss ways to improve collaboration among key partners that are active in biodiversity conservation in and around the MSME 2 target sites. These consultations have led to the development of a draft memorandum of understanding for the Prey Lang area, which is presented as Annex 2. Since Pact is collaborating with MSME 2 at other target sites as a subcontractor, we do not anticipate any further need for formal agreements that describe the collaborative procedures.

In addition to these efforts, a draft scope of work has been developed to provide MSME 2 support to this collaborative effort – specifically, to undertake an assessment of the hydrological functions that Prey Lang provides and an estimate of the direct and indirect value of these functions. The objective is to be able to quantify the amount of water that is captured and slowly released from the Prey Lang ecosystem and to be able to calculate the economic value of these resources to farmers, fishers and other people that benefit from them. A draft scope of work is presented in Annex 3.

4. Advise the project on how to use the web-based mapping tool developed by the USAID funded Capitalizing Knowledge, Connecting Communities (CK2C) Project for sharing information on the specific site-based conservation and development activities.

The MSME 2 project's activities funded through the biodiversity earmark have already demonstrated some important lessons on how to engage local communities in improved management of forest resources. Aspects of resource tenure, governance, market-based incentives for improved forest management and the value chain approach are all themes that are central challenges for biodiversity conservation. MSME 2 is an excellent candidate for participation in a new USAID initiative that seeks to share information about natural resource management (NRM) across multiple interested partners. The CK2C project, which manages USAID's FRAME website has developed a tool to facilitate such information sharing using geospatial technologies. The tool has been developed to facilitate sharing knowledge and best practices using maps and linked spatial data. The tool will allow users to search information about NRM initiatives around the world, share their own ideas and experiences, and upload country and site specific case studies. The goal is to build a database housing regional, national and local experience that can be readily searched, accessed using maps and enriched with information from users and practitioners around the world.

CK2C is now testing the second phase in the process of rolling out the tool: this involves giving users/contributors the ability to upload information about specific initiatives that are interesting, informative or can be classified as best practices in NRM. CK2C has invited MSME 2 to participate in a test of the upload function using information from MSME 2 implementation activities. At this time, CK2C is limiting participation in this phase of the testing to a few key partners and expects to be able to extend the invitation to a broader audience in March once the results of the initial test are assessed and any issues have been addressed.

The MSME 2 biodiversity team and GIS support staff were briefed on the use of the tool and invited to upload site-specific information. The following information provides a basic description of how MSME 2 will go about doing this. Additional "help" and "how to" functions are found on the site and a training video can also be accessed via the site. The MSME 2 team will review the support functions and provide CK2C with feedback on how useful they found them and how they might be improved. The site can be accessed at: <http://gis.frameweb.org/beta/default.htm>

This web-based application has been tested in Mozilla Firefox 3.x and Internet Explorer 7.x.

The purpose of the test is to solicit feedback on several aspects of the tool. Specifically CK2C has asked MSME 2 staff to provide the following:

Comments about content:

1. Does the application capture the relevant information?
2. Is the information easy to understand?
3. What other information do you think is relevant that was not captured?
4. Is the information on success factors useful?

Comments about the interface:

1. Is the user interface intuitive? Is it easy to use?
2. Did you need to use the How To Guide and, if so, was it easy to use and did it provide sufficient help?
3. What other features/functionality do you think would be useful?
4. Other comments/likes/dislikes.

Once the tool has been tested, it will be rolled out to the public (FRAME membership) and the MSME 2 site information will be available to an audience of several thousand members and conservation practitioners. We feel that this will increase the visibility of USAID/Cambodia's efforts and provide valuable feedback from the NRM community world-wide.

5. Conduct site visits to monitor implementing partner, PACT's work on Natural Resource Management Training for Community Forestry Associations.

This task was accomplished through the assessment conducted under Task 1, which is described above.

6. Advise the project on identifying indicators of forest health and establish baselines for the sites in the Prey Lang, Boeung Per and Oddar Meanchey landscapes. Draft SOW for a firm that can assist the project in monitoring the health of ecosystems in the three sites.

MSME 2 has developed indicators of impact on biodiversity that emphasize the area of biological significance that is under improved management or shows improvement in biodiversity status. To date, we have assumed that measuring the extent of forest cover in MSME 2 target areas is a reasonable indicator of the area under improvement management when community management activities are underway. Periodic monitoring of the forest cover would identify areas of forest conversion and even areas of degradation resulting from logging activities or in-forest agriculture. Yet, using forest cover as a proxy indicator for improved biological status is an assumption that requires testing before it can be justified. DAI has developed a simple, cost-effective methodology for monitoring “forest health” and biodiversity status that has been tested in Malawi. The methodology for monitoring impacts on biodiversity using carefully selected indicator species provides a simple but tangible measure of the extent and status of conservation areas and the effectiveness of threat reduction activities. It has enabled the COMPASS 2 project to measure the areal extent of biologically important sites using satellite imagery and also provides a cost-effective approach to gauging the health of the important habitats through periodic site visits. The scientific rigor that has been used to make these on-the-ground assessments is limited but the results are scientifically valid provided the indicator species that are selected accurately reflect habitat preferences.

The methodology is simple provided that the indicators are straightforward and it was felt that using the same approach for MSME 2 would be relatively easy and cost effective. Field assessments were conducted at Boeung Per (Preah Vihear) and at Samaky in Odder Meanchey. The possibility of using various types of indicators was assessed. It was felt that using mammal species would require expensive investment in camera traps since most key mammal species are nocturnal and population densities of many species appear to be low. Insects can be a very good indicator of forest health since they are often closely dependant on plant species that are restricted to forest ecosystems. However, many insects have a highly seasonal life cycle and their numbers can be affected by weather conditions or other unpredictable factors. It was felt that using insects as an indicator of forest health would be potentially difficult. Similarly, using flora as an indicator would require the creation of monitoring plots that could be periodically surveyed. One potential challenge is that monitoring plots are typically protected more assiduously than surrounding forest, so the plot results are not representative of the forest as a whole. Secondly, flora does not respond to changes in overall forest health in a rapid manner. Monitoring plots may remain intact while the wildlife disappears and adjacent areas are felled.

Experience elsewhere (in Malawi, in Uganda and in Haiti) has shown that using bird species as indicators of forest health and ecosystem integrity is a simple, cost effective tool. It is important to select indicator species that meet certain criteria: 1 – forest specialists (they do not inhabit degraded habitat); 2 – resident species (not migratory species); 3 – not extremely rare; and 4 – are not nocturnal species that are difficult to observe. Ideally, the simple presence of the indicator species should be strong evidence that the habitat is intact. It should not be necessary to undertake lengthy or complex population counts.

The identification of appropriate indicator species and monitoring procedures is a specialized activity. A scope of work has been developed (Annex 4). Preliminary assessments of potential indicator species (forest-restricted, resident bird species) were made during this assignment and these are presented in Annexes 5, 6 and 7 for the three main ecological regions that are

represented at the MSME2 target sites: Indochinese Dry Evergreen Forests; Indochinese Dry Forests; and Cardamom Mountain Evergreen Forests. The scope of work also calls for consultant(s) to assess the utility of various software packages and tools that are available for the management and analysis of data from biodiversity indicators and reporting of the results.

7. Advise the team on methodology for enhanced monitoring and reporting of progress on biodiversity indicators.

This task was accomplished under the foregoing Tasks 1, 2 and 6.

8. Work with the biodiversity team to develop a study tour plan for Community Forestry Group representations and Forestry Administration officials to Indonesia to learn from successful conservation efforts particularly from ongoing initiatives supported by USAID. Advise on a host organization that could facilitate the study tour.

Several possible site visits were explored with partner organizations working with USAID/Indonesia forestry and biodiversity projects (the Environmental Services Program and the Orangutan Conservation services Program). Information from a recent study of community-based forest conservation success in Kalimantan undertaken by the CK2C project was also used to assess various opportunities.

The preferred option was selected based on applicability to MSME2 staff and partners and basic logistical requirements that impact cost and time spent at the target sites. The following rough itinerary has been developed and potential local support staff identified. A preliminary budget is being prepared.

The itinerary for the site visit is as follows. This does not yet include international travel and possible visits to relevant agencies in Jakarta).

The trip would be coordinated through the Indonesian NGO Riak Bumi that works with local communities around Danau Sentarum National Park to market honey and other non-timber forest products. The point of contact is Heri Valentinus of Riak Bumi

Here a few details:

1. A trip for 20 people is possible. They have done this before with Vietnamese group. Total trip time would be about 6 or 7 days of which 3 on the lakes in and around Danau Sentarum.
2. The honey harvest takes place from December to March with one harvest underway now (February). A second harvest will end in early March.
3. After the March harvesting, honey processing can be demonstrated. Other activities include: demonstration of bee-hive construction and installation; use of smoke; key flower

identification (if in season); discussion on sustainable harvest concepts; post-harvesting processing; packaging (either in Pontianak or Danau Sentarum); and marketing issues.

4. The best way to get a large group to the lakes area is as follows:
 - a. Fly to Pontianak and arrive late afternoon.
 - b. Rent a bus (US\$350) from Pontianak to Danau Sentarum (8-10-hours drive) and drive overnight. Day-time travel is also possible and stops can be made in oil palm areas, if that's of interest as a potential threat to honey producers.
 - c. After the night-time bus trip, rent 4 cars (US\$75/car = US\$300) from Sintang to Suhaid (4-hours drive).
 - d. In Suhaid board the Riak Bumi's house-boat. Capacity 100 people – easily sleeps 20 on mattresses. Mosquitoes are an issue in Danau Sentarum and mosquito nets are essential. There's a toilet on board; a kitchen on board; and a mandi on board. The boat will take the group to Bukit Tekenang (the old park headquarters under Wetlands/ODA) where we stay the night (sleeping onboard the boat).
 - e. Next day: travel across the Danau Sentarum lakes to Nanga Leboyan, and then take motorized long-boats up the Sungai Leboyan to Semanggit where the honey production areas are found. Riak Bumi has one long-boat (seats 14), and another will have to be rented locally. There is also an opportunity to see Iban longhouses and more honey production in Sungai Kelaik, which is further upriver (excellent riverine forest and biodiversity interest with endemic birds and proboscis monkeys).
 - f. Return trip is the same as above but in the reverse order.
5. The trip would either be guided by Heri Valentinus or Hermanto (Secretary of the Indonesian Honey Network). Both speak English (have been invited speakers at international honey conferences, such as a recent one in France).
6. We will consider engaging another expert to finalize the logistical arrangements and accompany the group to provide additional technical information of biodiversity conservation, USAID conservation efforts and other relevant information about Kalimantan and Indonesia.

A scope of work for the support services will be developed as soon as the overall itinerary is finalized.

Monitoring Plans and Adaptive Management

Some lessons from DAI projects

What is Monitoring?

- The Monitoring Plan is not just the tool for reporting progress to USAID
- The Plan should be used to gauge progress toward achieving specific objectives
- A Monitoring Plan is an essential component of Adaptive Management – a strategy for recognizing success or underperformance as early as possible and then correcting deficiencies and building on strengths
- The audience for reporting the results of the Monitoring Plan should include project staff, partners (Government, NGOs, communities, other donors)

Adaptive Management



What are the Key Components of a Monitoring Plan?

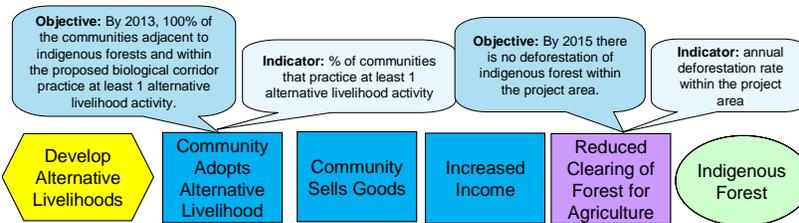
- Establish clear objectives – what are we seeking to accomplish?
- Identify the steps that are needed to achieve these objectives – “in order to accomplish A, B and C, we need to do X, Y and Z.
- Measure performance (outputs) and impact (outcomes)
- The PMP must include impact (outcome) indicators that help gauge the validity of our assumptions – that accomplishing specific tasks will lead to desired impact

What should we be tracking?

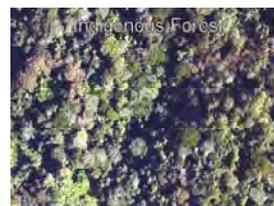
- Impact – typically not something that we can control
- Performance – what we need to do
- Customer satisfaction
- Critical assumptions



Performance & Impact



→ ? →
Assumptions



Characteristics of Good Indicators

- The fewer the better
- Relevant
- Measurable
- Quantitative
- Simple and understandable
- Cost effective
- They help gauge progress – not just yes/no
- Baseline information is either available or can be readily collected

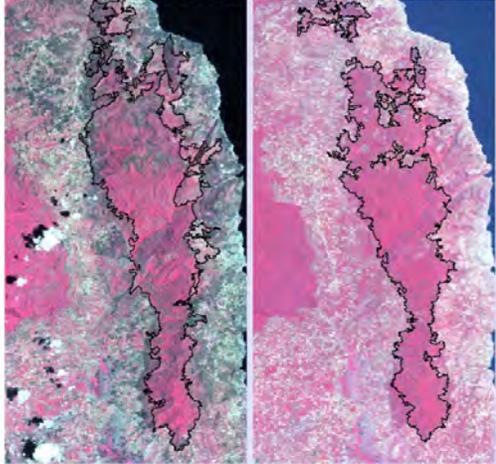


Measuring Impact on “Biodiversity”

- Linking performance to impact on conservation initiatives faces several challenges:
 - Assessing impact in “real time” to identify unintended consequences quickly
 - Measuring impact in a cost-effective yet sufficiently accurate way... and at scale
- For example: measuring changing forest cover and ecosystem health

COMPASS II - Malawi

Kandoli Forest Cover Time series Analysis: Year 2000-01 scene (left); Year 2008 scene (right)



- High-resolution, low cost imagery helps identify rapid change
- But degradation is more difficult to track
- COMPASS used simple baselines to gauge ecosystem health
- Site-specific monitoring is essential

Opportunities for MSME2

- Use low-cost, high-resolution imagery to track forest cover
- Develop indicators of “forest health”
- Train community groups in M&E and data collection
- Develop data management and analysis system (MIST?)



Gauging Customer Satisfaction



- Information sharing
- Knowledge management
- Access to support services
- Partner participation in M&E
- Data Quality Assessments

Challenges

- Monitoring systems need to be responsive to the needs of the program – from adaptive management to reporting – but they must not become an end in themselves
- Scientific rigor is important but if it must be balanced with cost effectiveness and the need for timely reporting

ANNEX 2: DRAFT STRATEGY FOR THE CONSERVATION AND SUSTAINABLE MANAGEMENT OF PREY LANG

Background: Prey Lang is an area in north central Cambodia that encompasses the largest remaining lowland evergreen forest in Southeast Asia. Straddling four provinces, it has a core area of 80,000-100,000 hectares but approaches 300,000 hectares when its buffer is included. Because of its value as a watershed, and contribution to the Tonle Sap and Mekong river ecologies, its geographical significance extends further and, because its run-off provides water essential to farming and fishing in the region, it is consequential to the general economy and food security of the country.

Prey Lang's core area is inclusive of seven distinct ecologies, including areas of dry evergreen and riparian forests. It provides habitat for rare and endangered species, including large mammals such as tigers, wild elephants, and gaur, one of the many species of giant wild ox that were once common in Cambodia. Recent botanical research suggests that Prey Lang's primordial swamp forests are unique to the world and are certain to contain a plethora of as yet unknown plant species that could provide new medicines and foods in the future.

Prey Lang has special value in possible carbon credits, as its lowland soil is believed to include large areas of peat, which have high carbon content. The primary forest with its exceptionally large trees and deep root systems demonstrates high carbon value. Conservation International and the Blue Moon Foundation are pursuing a REDD project with the Cambodian government that would provide economic return for that carbon value.

Non-timber forest products from the Prey Lang area include resin, honey, rattan and bamboo. Resin and honey production are subjects of a project using a value chain approach that correlates economic improvement to the willingness to advocate for one's interest in maintaining biodiversity, with a related component promoting formalizing Community Forestry funded by USAID, and implemented by DAI.

USAID also funds a EWMI program, PRAJ, supporting community organizing and advocacy within Prey Lang's communities, which has enabled them to voice their concerns for forest conservation and is helping to prepare them for a role in Prey Lang's sustainable management. Engaging communities in Prey Lang's management also has an economic value, albeit less easily quantified, since this is expected to lower forest protection and management costs, by actively engaging communities in those processes.

Substantial development has been earmarked for the greater Prey Lang area, in the forms of timber harvesting, mining, plantations and related infrastructure. Illegal logging and in-migration are also problematic. These and other uses threaten, in the near- and mid-term, the survival of the habitat and watershed. The elusive Koh prey ox, Cambodia's national animal and known to have inhabited Prey Lang, is now believed to be extinct as are indigenous rhinos and lions. Of particular concern is the expansion of rubber plantations into the southwest corner of Prey Lang, as well as two annual logging coupes, scheduled for Prey Lang, that would realize significant deforestation. Concessions are being awarded that will accelerate destructive development.

Strategic approach: By identifying and combining the layers of economic value resulting from Prey Lang’s conservation and long-term managed use, and sharing this data with Cambodian agencies, the Cambodian government will have the opportunity to consider that this value may exceed the benefits of short term development that could destroy Prey Lang and cause related social and economic damage to the thousands of families who live there and depend on these resources. Up to this point, decision makers have generally been asked to weigh anticipated revenue against the ecological and social benefits associated with conservation. The present strategy would balance dollars against dollars, though some revenue derived from managed use would be long-term and continuous.

Tactically speaking, this strategy builds on CI/BMF’s advancement of REDD as a program proposed to the FA. There is now an agreement in place between CI and the FA, supporting a feasibility study. By June, CI plans to forward, for the consideration of the FA and the Council of Ministers, a report documenting the economic value of REDD. That report could also include additional economic data based on the other ecological services provided by the forest (such as watershed) and sustainable harvest of forest products, as well as suggesting the added value of joint management with communities. EWMI and MSME are cooperating with CI/BM in this regard.

Combining the value of CI’s REDD carbon credits, the economic value of what is produced in Prey Lang, including here the water that supports farming and fishing downstream, along with management practices that include communities in the management assisting in protection and regeneration of the forest and the production of non-timber forest products at reduced cost to government, may add up to considerable figures.

Furthermore, it is anticipated that the involvement of indigenous communities, their regeneration of buffer areas, and the conservation of biodiversity will make Prey Lang eligible for value-added REDD programs and other payments for ecological services. These aspects could also generate complementary funds, especially in regard to community development.

Although this strategy is based on promoting comparison of direct economic benefit, the social and political importance of preserving habitat that supports farming and fishing should also be emphasized; not only the GDP lost as a consequence of collapsing livelihoods, but the consequent political and social consequences, should be identified.

The forest’s long-term preservation will be further enhanced by strengthening Prey Lang’s identity through the development of a “Prey Lang” brand.

Roles of USAID funded projects and others

CI/BM- REDD valuation; primary FA contact; lead in compiling overall valuation study and management presentation for FA and COM. Their networking through the Prey Lang working group and coordination with other NGOs would ensure complementary approaches in Prey Lang area.

DAI/MSME – increasing economic benefit of PL products through value chain activities for resin and honey; cooperation on valuation report, including funding the hydrological assessment and contribution of data on value chains; investigating and, where possible, initiating branding through of products, cooperation with EWMI/PRAJ and technical support on participatory community mapping; cooperation with EWMI/PRAJ to outline joint-management models for consideration by the FA. In collaboration with the Prey Lang Working Group, coordination with other NGOs to ensure complementary approaches in Prey Lang area. For project activities, include FA and MOE provincial and national officials, whenever relevant, to encourage understanding and improve relationships between PL’s communities and the public sector.

EWMI/PRAJ –In cooperation with MSME community organizing and cross-forest networking for participatory mapping; network-building and capacity development to enable communities to participate in long-term forest management; contribution of data supporting hydrological and other valuation; cooperation with MSME to outline potential management models and their advantages and disadvantages; international marketing of Prey Lang as a world conservation site. Via the Prey Lang Working Group and management of the Prey Lang group on-line, coordination with other NGOs to ensure complementary approaches in Prey Lang area.

Next steps

CI’s feasibility study (to be completed by April-June?)

DAI’s hydrology study (to be completed by April-June? – to run in tandem with CI study)

DAI to assess possible branding strategies for resin and honey products by value chain participants, ensuring quality standards meet customer requirements, licensing of brand and logos, etc.)

DAI cooperates with EWMI and consults with CI to outline management options

EWMI/PRAJ’s provision of data that supports above studies

EWMI/PRAJ mapping, in cooperation with DAI

Draft basic advocacy/marketing plan to build the Prey Lang brand.

EWMI cooperates with DAI and consults with CI to outline management options.

Meeting (joint) with FA Director to obtain his support for international advocacy

Video interview of FA Director to round out PRAJ informational package on PL.

All groups coordinate on compiling valuation and management options presentation

Prey Lang working group, to especially focus on improving coordination and support to communities at ground level.

Seek corporate sponsorship of an environmental concession to add up-front money to package?

(To be discussed with Blue Moon Foundation).

Seek international donor support for paying Kingdom of Cambodia economic impact aid that would support the conservation of PL. The funds would need to be enough that, in conjunction with REDD, hydrological impact and “value chain” NTFP, as well as other layered values would

support Council of Minister's/Gov's selection of option. Donor outreach will be first directed to SIDA and EU, as each has indicated an interest in entertaining a proposal.

ANNEX 3: DRAFT SCOPE OF WORK – HYDROLOGICAL ASSESSMENT FOR MSME2 PROJECT (CAMBODIA)

Background

General description of water services work that we are doing.

In Cambodia today, forests are valued mainly for the goods that they provide and this is principally timber. Often, however, this provisioning function is usurped by the even greater demand for the land that the forest occupies. Many forests have been removed to make way for small-scale agriculture and commercial plantations. Moreover, the still significant extent of forest cover in Cambodia (almost 60%), the confused tenure arrangements and weak systems of governance have led to open-access exploitation of the resources. In effect, though forests and forest lands are perceived to have value, there are few incentives to conserve the assets. In this case the real “tragedy of the commons” is that the forests and forest lands have been woefully undervalued because many people, businesses and governments have not taken into account the wide array of additional services beyond land and timber that the forests provide. These services include ecological functions such as water supply, flood control and carbon sequestration as well as cultural values that are especially important to local communities.

The importance of ecosystem functions in regulating spring discharge and stream flow, the sequestration of carbon and maintaining biological services such as plant pollination cannot be overstated. Wider recognition of the importance of ecosystem services would create an opportunity to promote better stewardship of forests and enhance the benefits that people can derive from the management of the forest assets. An ecosystem services approach helps forge clear and tangible linkages between sound forest management and sustainable livelihoods. Whether the goal is to derive immediate economic benefits (wealth) from the forest, or to preserve the assets for future generations (endowment) or ensure continuity of cultural values (non-economic values), the outcomes are the same: a healthy, functioning forest that provides goods and services to people provided they maintain the ecosystem.

In several locations, there are opportunities for MSME to work on water services provision in locations downstream from communities where the project is supporting improved management and conservation of forest ecosystems. The Chheu Teal community in Kampong Thom, for example, lies immediately to the south of four communities where MSME2 is supporting forest conservation and resin marketing activities. There is potential for the project to explore upstream-downstream linkages across these communities particularly in relation to water resource management. Chheu Teal relies on water from wells and from the Stoeng Sen River, which derives part of its flow from forested sub-catchments in the communities that are upstream. Since water service providers rarely pay for raw water in Cambodia, there is limited scope to create commercial water-based schemes. Nevertheless, there is considerable potential for raising public awareness about the linkages between the ecosystem services that are sustained through forest conservation and how these relate to people’s health and well-being.

MSME will undertake an assessment of the hydrological functions of one of the landscapes where the project is supporting forest conservation initiatives. The best opportunity appears to be the Prey Lang area in Central Cambodia (on the borders of Kampong Thom, Preah Vihear, Stung Treng and Kratie Provinces). The study will provide information on the ecological functions of the landscape – specifically as they relate to hydrology – and provide an assessment of the importance of these functions to sustaining water supply, agriculture and other socioeconomic activities in the greater watershed.

Objectives

Improve the ability of Cambodian government agencies, local authorities, communities and donors to make/support land use decisions for Prey Lang that are conducive to sustainable economic growth and do not result in unforeseen consequences that are detrimental to the socio-economic well-being of people in the watershed and elsewhere in Cambodia. The goal is to conduct a rigorous assessment of the hydrological functions of the Prey Lang that can be used to communicate the contribution of the forests to the economic, social and ecological well-being of people throughout the watershed. This information will be used to communicate with partner organizations on the potentially deleterious impact of significant changes in land use in and around the forested area.

Tasks

There are three principal tasks:

1 – Data collection and review: collect available data on bio-physical conditions including but not limited to rainfall, evapotranspiration, hydrogeology, surface runoff, soils and vegetation cover (past and present). Collect and collate available information on population, infrastructure, land use - past, current and proposed, and other relevant socio-economic data. Review recent studies of changing land use around Prey Lang such as that prepared by ARUNA in August 2009.

2 – Analysis of hydrological functions: to the fullest extent possible based on data availability, estimate the contribution of the Prey Lang landscape to water availability through the watersheds that include Prey Lang. The assessment should include Prey Lang's contribution to water flow in major river systems, provision of water for irrigation, livestock, industry and domestic use as well as sustaining the ecological integrity and functions of wetlands and other natural habitats elsewhere in the watersheds.

3 – Impact assessment of potential changes in land use and land cover on ecosystem functions: assess the potential environmental and social impact of changes in Prey Lang's ecology based on different scenarios that reflect conversion to Prey Lang to other land uses. Scenarios should include different potential land uses (plantations, agriculture) and best estimates of the accompanying demands for land and natural resources assuming likely population dynamics. The scenarios should also distinguish between at least three different scenarios for the rate of change: 1 – conservation option, 2 – the status quo (current rate of change), and 3 – rapidly accelerated change over the next decade (?). These assessments should take into account the likely impact of climate change based on the available models.

4 – The Consultant(s) will coordinate closely with key Cambodian Government agencies in designing and implementing this study. Key agencies include The Ministry of Environment, The Ministry of Water Resources and Meteorology and the Forestry Administration among others. MSME2 will undertake to provide logistical support for this coordination by organizing workshops, briefing sessions and participation of government representatives in some aspects of the field work.

Schedule

The assessment should be completed in a period of no more than 90 days (?).

Deliverables

A detailed report describing the likely economic impact of changing land use with the Prey Lang area based on three different scenarios (described above).

Reporting

The Consultant(s) will report to Mr. Curtis Hundley, Chief of Party of the MSME2 project.

Qualifications

The Consultant(s) should have expertise in developing environmental and social impact assessments for land conversion schemes. Relevant experience in Cambodia or Indochina is preferred. The Consultant(s) should have demonstrated experience and capacity to undertake rigorous analyses of anticipated impact of changing land use and climate change. Specific technical expertise should include hydrology, ecology, agricultural development, watershed management as well as land use mapping and modeling.

ANNEX 4: SCOPE OF WORK – BIODIVERSITY MONITORING FOR MSME2 (CAMBODIA)

BACKGROUND

The MSME 2/BEE project's support for the Royal Government of Cambodia (RGC) and USAID/Cambodia's biodiversity objectives is contributing to the sound management for areas of biological importance through the implementation of activities that reduce threats to biodiversity in priority areas and promote sustainable conservation practices by local communities and government agencies. During the first year of implementation, the project has worked at 17 sites in four priority landscapes. Over 400 people have been trained in improved forest management techniques and the total area of forest that is under community management across these sites is over 25,000 ha.

The project adheres to USG requirements on the use of the US Congressional earmark for biodiversity by following the following guidelines:

- The biodiversity component will have explicit conservation objectives.
- Activities will target site-specific threats to biodiversity.
- Impact will be measured in terms of the direct benefits to the conservation of biodiversity.
- Site-based activities will target areas of biological significance.

Cambodia has an extremely rich natural heritage: there are six major eco-regions represented in the country - each with extremely high biological diversity and all extreme threatened either by conversion to agriculture, illegal logging or large-scale development activities such as dams and mining. The six eco-regions are as follows:

- Cardamom Mountains rainforests (536 species of mammals, birds, reptiles and amphibians)
- Southeastern Indochina dry evergreen forests (751 species)
- Central Indochina dry forests (813 species)
- Tonle Sap-Mekong peat swamp forests (447 species)
- Tonle Sap freshwater swamp forests (443 species)
- Indochina mangroves (528 species)

The project's geographical focus is the 12 provinces of Battambang, Siem Reap, Prey Veng, Kandal, Kampong Cham, Kampong Thom, Kratie, Kampot, Banteay Meanchey, Kampong Speu,

Takeo, and Svay Rieng but also includes adjacent areas of neighboring provinces including Koh Kong, Oddar Meanchey, Preah Vihear and Stueng Treng. The principal areas of biological significance are areas as follows: 1 – the Cardamom Mountains eco-region in Battambang, Koh Kong, Kampong Speu and Kampot; 2 – areas of dry evergreen forest in Kampong Thom, Kratie, Preah Vihear, Siem Reap and Oddar Meanchey; 3 – areas of dry forest in Kampong Thom and Kratie; and 4 – areas of swamp forests around the Tonle Sap in Battambang, Siem Reap and Kampong Thom.

STRATEGY AND APPROACH

Conservation initiatives in Cambodia that are effective in the short term and sustainable well into the future must be based on a strategy that unlocks rural growth while forging tangible linkages between improved livelihoods and sound conservation. Identifying opportunities for creating these linkages is a significant challenge. For example, community-based enterprises built on the marketing of natural products—though successful—often benefit relatively few people and have limited geographical impact on natural ecosystems. Moreover, success can have its dangers: witness the overexploitation of fish in the Tonle Sap or of rattan in Ratanakiri driven by the Vietnamese market. To address these challenges, the project will use a framework of tools and approaches that promote integrated conservation and development initiatives that attract broad support from the private sector and civil society.

The framework is built on a conviction that successful conservation and development must begin by focusing on the natural and social assets upon which people can draw to meet their needs and accomplish their goals. People will become better stewards of natural resources and of biological diversity if they are able to derive tangible benefits from their endeavors. People can only manage resources with appropriate governance and knowledge of best practices. Thus, the integration of conservation and development requires an emphasis on three pillars—nature (biodiversity), wealth (livelihoods), and power (partnerships, governance, and knowledge).

To ensure effective implementation, the project works to build a collective vision of how conservation, development, good governance, and knowledge sharing can be integrated to the benefit of all parties. Moving from a common vision to implementation requires participatory planning that considers the inevitable tradeoffs between conservation and development and addresses the potential conflicts. Finally, implementation of activities—particularly site-specific activities—requires action that is grounded in alliances and collaboration among key players.

To achieve successes at scale and sustain them, the project will use two tandem approaches to build ownership and motivate partners from the national to the local level. First, the project will focus on assets and opportunities rather than trying to mitigate problems. Second, the project will emphasize establishing clear rights for the people and institutions charged with managing natural resources.

ASSETS-BASED APPROACHES

Many communities rely heavily on outside technical and financial assistance, but as long as the community groups maintain control over planning and decision making, their ownership of a concept and their commitment to achieving the desired outcome will not be undermined. Such

fundamental ownership can only be accomplished through careful community mobilization, and this requires facilitated and inclusive processes.

Donor-funded development efforts in Cambodia have often focused on mitigating the impact of poor forest and fisheries practices by targeting “hot spots” of degradation. Few of these efforts have succeeded; fewer still have been sustained. Communities are left with a ranking of “problems” but do not have the confidence or resources to implement viable opportunities, thereby cementing an ethos of dependence. The project will work to reverse this trend through the application of an “assets-based” conservation and development methodology. The project will assess what human capital and natural resources exist in target communities and determine how these can be used to spur development activities that will benefit the community and achieve conservation goals.

RIGHTS-BASED APPROACHES

Focusing on assets and opportunities can break the cycle of dependence on outsiders, but local vested interests can often create distortions in people’s ability to access and control natural resources. The best way to overcome these imbalances is to ensure that people’s rights are clear and unassailable. This can be accomplished by ensuring broad-based participation in decision making, overcoming discrimination, and empowering resource users: there must be clear objectives for the management of the resources; the rights and responsibilities of all parties must be stated; the authority of all parties must be known and in keeping with other legislation; and the mechanisms and procedures to hold people accountable for meeting their responsibilities must be understood.

The project engages stakeholders—representatives of communities, civil society groups, and government—in a transparent discussion of governance and tenure. This approach builds alliances and enhances visibility, addressing apparently intractable issues head-on. The project collaborates with partner organizations to assist community groups in negotiating formal rights and developing the institutional capacity to meet their responsibilities. One of the project’s underlying tenets is ensuring that disadvantaged groups, including women, youth, and indigenous minorities, are equitably represented in management bodies, business decisions, and subsequent agreements with the private sector and government authorities such as the Forestry Administration, the Ministry of Environment (MOE), commune, district and provincial authorities.

RESULTS AND EXPECTED OUTCOMES

MSME 2/BEE currently targets biodiversity conservation activities in ** communities and expects to increase this number to at least ** over the first two years of the project. The total area under improved management of natural resources in biologically significant areas will be 100,000 hectares (the year 1 target of 25,000 ha has been met) and the areas of biological significance showing improvement in biophysical conditions will be 50,000 ha.

MONITORING PERFORMANCE AND IMPACT

MSME2 uses forest cover as an indicator for gauging impact of the project's activities on conservation of biodiversity. Data is readily available from satellite imagery and field surveys. In addition, however, it is crucial to establish indicators that gauge the health of the forest ecosystem since maintenance of the forest canopy does not necessarily imply that biodiversity within the forest is being maintained. Based on experience on other USAID projects, we believe that simple, cost-effective monitoring of ecosystem health can be accomplished by identifying species whose presence in the forest is a good indication that the ecosystem is intact and relatively undisturbed. On projects in central Africa, we have used the numbers of specific large mammals (which are easy to count) and the presence of habitat-restricted birds in forest ecosystems where mammal counts are more difficult. In the case of the forest ecosystems that we have prioritized in Cambodia, we believe that a similar approach is warranted.

In Year 1, we determined that using the number of Giant Honey Bee (*Apis dorsata*) colonies in a predetermined area of forest was a good indicator of forest health and baselines have been established at those sites where communities are actively engaged in honey harvesting. In the case of forest sites where *A. dorsata* colonies are less common and where honey is not being harvested, other indicators are needed.

Looking forward, MSME needs to identify indicators of forest health and establish baselines for the sites in the Prey Lang, Boeung Per and Oddar Meanchey landscapes. An assessment of the validity and utility of the number of *A. dorsata* colonies as an indicator of forest health is also warranted. In addition, we believe that it is incumbent on the project to assess the potential impact of climate change on the selected NTFP value chains in the targeted areas. In the honey sector, the dependence on *A. dorsata* – a migratory species – may increase vulnerability if climate change results in ecological changes in the moist forest habitats that the bees favor. Our efforts to gauge vulnerability will include a review of established strategies for human adaptation to climate change in Cambodia. This is particularly relevant here since historical records indicate that past climatic changes have had major socio-economic impacts.

OBJECTIVES

Develop a simple, cost effective system for monitoring ecosystem health in the MSME2 target landscapes. This includes three key components: 1 – identifying appropriate indicators; 2 – designing a data collection system – ideally one that makes full use of local partners; and 3 – developing a data management tool that supports analytical needs and facilitates reporting to USAID and partner organizations including local communities.

TASKS

1 – Identify viable indicators of ecosystem health in the landscapes where MSME2 is working. The indicators should be readily measurable, unequivocal and data collection should be feasible using local expertise – ideally community members. One possible approach that has been used successfully elsewhere has been to identify bird species that are habitat-specific – in this case, restricted to intact forest ecosystems – and use the presence of these species as an indicator of

ecosystem health. If such an indicator is developed, the changing number of species (year-on-year) might be used to gauge improvement in forest health. Preliminary lists of forest-restricted bird species in three ecoregions of Cambodia are presented in Annexes 1, 2 and 3. These lists should be assessed and, if appropriate, refined as potential monitoring tools.

2 – A data collection system that draws on local expertise is desirable. If local community members or forest/wildlife rangers can be trained in data collection procedures, this is preferred. The monitoring plan should include specific information about periodicity, data capture and management, and reporting. For example, details should be provided regarding the relative merits of establishing fixed monitoring sites or set transects. The specifics of how data are to be collected should be provided. If different options are identified, a comparative analysis of their utility should be presented. A cost comparison should also be provided.

3 – Analysis of monitoring data for reporting needs will be the responsibility of MSME2 staff. Recommendations for a simple, cost-effective system should be made. One example that should be discussed is the MIST tool [<http://www.ecostats.com/software/mist/mist.htm>]. If a variety of options are identified, a comparative analysis of their utility and practicality should be presented. A cost comparison should also be provided.

4 – Opportunities to further refine and improve the MSME2 monitoring plan should be described and discussed. MSME2 is currently exploring ways in which the need to sustain ecosystems functions can be promoted as a rationale for improved forest management. At this time, we do not have a good understanding of how partner communities value “ecosystem services” including access to forest resources (provisioning services) or water resources (regulating services) or if forests have important cultural or bequest value. The consultant should explore the use of tools such as the Basic Needs Survey (BNS) tool used by WCS to assess community knowledge and attitudes to conservation. If a simple BNS can be developed, can it be customized in a way that enables MSME to use it as a monitoring tool to gauge “customer satisfaction” and changing perceptions about forest management and biodiversity conservation?

5 – If significant training of partners/communities will be required to implement the monitoring plan, a budget and schedule should be provided.

SCHEDULE

We estimate a Level-of-Effort of 45 days.

5 days: review available literature on forest ecosystems, indicator species and community-based monitoring in Cambodia and elsewhere.

5 days: meet with conservation groups and government agencies to assess current biodiversity monitoring programs and capacity to support MSME needs. At a minimum, these should include WCS, WCS, WWF, Frontier, Royal University of Phnom Penh, Forestry Department, Ministry of the Environment....

20 days: conduct site visits to all four MSME target landscapes to assess potential indicators and community/local capacity to support monitoring plans.

5 days: prepare draft recommendations and presentations. The report should include indicator descriptions, data collection tools and any customized data analysis tools.

10 days: deliver preliminary training on monitoring tools, procedures and guidelines to MSME staff and local partners at a number of selected sites to be determined in discussion with MSME2 management and staff.

DELIVERABLES

1 – Recommendations for a biodiversity monitoring plan that will enable MSME2 and its partners gauge the impact of project activities on forest ecosystems where community forest management activities are being supported.

2 – Tools such as comprehensive data collection sheets and training materials required to implement the monitoring plan.

3 – An assessment of MIST and other software packages that will facilitate the management and analysis of data provided through community-based, participatory monitoring initiatives.

REPORTING

The consultant will report to Curtis Hundley, Chief of Party of the MSME2 project.

QUALIFICATIONS

The consultant(s) should be familiar with biodiversity monitoring in Cambodia. GIS skills are essential. Khmer language skills are an asset.

ANNEX 5: RESIDENT, HABITAT-RESTRICTED BIRD SPECIES – DRY EVERGREEN FORESTS (CAMBODIA)

Common English name	Scientific name	Threat Level ³	Biome Restricted ⁴
1. Asian Fairy-bluebird	<i>Irena puella</i>	LC	No
2. Asian Stubtail	<i>Urosphena squameiceps</i>	LC	No
3. Austen's Brown Hornbill	<i>Anorrhinus austeni</i>		No
4. Banded Bay Cuckoo	<i>Cacomantis sonneratii</i>	LC	No
5. Banded Broadbill	<i>Eurylaimus javanicus</i>	LC	No
6. Banded Kingfisher	<i>Lacedo pulchella</i>	LC	No
7. Bar-bellied Pitta	<i>Pitta elliotii</i>	LC	No
8. Barred Cuckoo-Dove	<i>Macropygia unchall</i>	LC	No
9. Bar-winged Flycatcher-shrike	<i>Hemipus picatus</i>	LC	No
10. Bay Woodpecker	<i>Blythipicus pyrrhotis</i>	LC	No
11. Besra	<i>Accipiter virgatus</i>	LC	No
12. Black Bulbul	<i>Hypsipetes leucocephalus</i>	LC	No
13. Black-and-buff Woodpecker	<i>Meiglyptes jugularis</i>	LC	No
14. Black-browed Barbet	<i>Megalaima oorti</i>	LC	No
15. Black-crested Bulbul	<i>Pycnonotus melanicterus</i>	LC	No
16. Black-headed Woodpecker	<i>Picus erythropygius</i>	LC	No
17. Black-hooded Oriole	<i>Oriolus xanthornus</i>	LC	No
18. Black-naped Monarch	<i>Hypothymis azurea</i>	LC	No
19. Black-throated Sunbird	<i>Aethopyga saturata</i>	LC	No
20. Blue Pitta	<i>Pitta cyanea</i>	LC	No
21. Blue Whistling-Thrush	<i>Myophonus caeruleus</i>	LC	No
22. Blue-eared Barbet	<i>Megalaima australis</i>	LC	No
23. Blue-eared Kingfisher	<i>Alcedo meninting</i>	LC	No
24. Blue-rumped Pitta	<i>Pitta soror</i>	LC	No
25. Blue-winged Leafbird	<i>Chloropsis cochinchinensis</i>	LC	No
26. Changeable Hawk-Eagle	<i>Spizaetus cirrhatus</i>	LC	No
27. Collared Falconet	<i>Microhierax caerulescens</i>	LC	No
28. Coral-billed Ground-Cuckoo	<i>Carpococcyx renauldi</i>	LC	Yes
29. Crested Goshawk	<i>Accipiter trivirgatus</i>	LC	No
30. Crested Serpent-Eagle	<i>Spilornis cheela</i>	LC	No

³ IUCN threat level: LC = Least Concern; NT = Near Threatened; VU = Vulnerable; EN = Endangered

⁴ This information needs to be developed further. Check Seng et al., (2003) *Directory of Important Bird Areas of Cambodia: Key Sites for Conservation*.

31. Dusky Broadbill	<i>Corydon sumatranus</i>	LC	No
32. Eared Pitta	<i>Pitta phayrei</i>	LC	No
33. Fire-breasted Flowerpecker	<i>Dicaeum ignipectus</i>	LC	No
34. Fulvous-breasted Woodpecker	<i>Dendrocopos macei</i>	LC	No
35. Golden-fronted Leafbird	<i>Chloropsis aurifrons</i>	LC	No
36. Great Hornbill	<i>Buceros bicornis</i>	NT	No
37. Great Iora	<i>Aegithina lafresnayeii</i>	LC	No
38. Great Slaty Woodpecker	<i>Mulleripicus pulverulentus</i>	LC	No
39. Greater Racket-tailed Drongo	<i>Dicrurus paradiseus</i>	LC	No
40. Greater Yellownappe	<i>Picus flavinucha</i>	LC	No
41. Green Magpie	<i>Cissa chinensis</i>	LC	No
42. Green-eared Barbet	<i>Megalaima faiostriata</i>	LC	Yes
43. Grey Peacock-Pheasant	<i>Polyplectron bicalcaratum</i>	LC	No
44. Grey-eyed Bulbul	<i>Iole propinqua</i>	LC	No
45. Hainan Blue-Flycatcher	<i>Cyornis hainanus</i>	LC	No
46. Heart-spotted Woodpecker	<i>Hemicircus canente</i>	LC	No
47. Jerdon's Baza	<i>Aviceda jerdoni</i>	LC	No
48. Large Niltava	<i>Niltava grandis</i>	LC	No
49. Large Scimitar-Babbler	<i>Pomatorhinus hypoleucos</i>	LC	No
50. Large Woodshrike	<i>Tephrodornis gularis</i>	LC	No
51. Lesser Necklaced Laughingthrush	<i>Garrulax monileger</i>	LC	No
52. Lesser Racket-tailed Drongo	<i>Dicrurus remifer</i>	LC	No
53. Lesser Shortwing	<i>Brachypteryx leucophrys</i>	LC	No
54. Lesser Yellownappe	<i>Picus chlorolophus</i>	LC	No
55. Little Pied Flycatcher	<i>Ficedula westermanni</i>	LC	No
56. Little Spiderhunter	<i>Arachnothera longirostra</i>	LC	No
57. Mountain Bulbul	<i>Hypsipetes maclellandii</i>	LC	No
58. Moustached Barbet	<i>Megalaima incognita</i>	LC	No
59. Ochraceous Bulbul	<i>Alophoixus ochraceus</i>	LC	No
60. Orange-breasted Pigeon	<i>Treron bicincta</i>	LC	No
61. Orange-breasted Trogon	<i>Harpactes oreskios</i>	LC	No
62. Orange-headed Thrush	<i>Zoothera citrina</i>	LC	No
63. Orange-necked Partridge	<i>Arborophila davidi</i>	EN	Yes?
64. Pale Blue-Flycatcher	<i>Cyornis unicolor</i>	LC	No
65. Pin-tailed Pigeon	<i>Treron apicauda</i>	LC	No
66. Plain Flowerpecker	<i>Dicaeum concolor</i>	LC	No
67. Puff-throated Bulbul	<i>Alophoixus pallidus</i>	LC	No
68. Purple-naped Sunbird	<i>Hypogramma hypogrammicum</i>	LC	No

69. Pygmy Wren-Babbler	<i>Pnoepyga pusilla</i>	LC	No
70. Racket-tailed Treepie	<i>Crypsirina temia</i>	LC	No
71. Red Junglefowl	<i>Gallus gallus</i>	LC	No
72. Red-headed Trogon	<i>Harpactes erythrocephalus</i>	LC	No
73. Rosy Minivet	<i>Pericrocotus roseus</i>	LC	No
74. Ruby-cheeked Sunbird	<i>Anthreptes singalensis</i>	LC	No
75. Rufous-bellied Eagle	<i>Hieraaetus kienerii</i>	LC	No
76. Rufous-bellied Woodpecker	<i>Dendrocopos hyperythrus</i>	LC	No
77. Scaly-crowned Babbler	<i>Malacopteron cinereum</i>	LC	No
78. Scarlet Minivet	<i>Pericrocotus flammeus</i>	LC	No
79. Silver Oriole	<i>Oriolus mellianus</i>	VU	No
80. Silver Pheasant	<i>Lophura nycthemera</i>	LC	No
81. Streaked Spiderhunter	<i>Arachnothera magna</i>	LC	No
82. Thick-billed Flowerpecker	<i>Dicaeum agile</i>	LC	No
83. Tickell's Blue-Flycatcher	<i>Cyornis tickelliae</i>	LC	No
84. Velvet-fronted Nuthatch	<i>Sitta frontalis</i>	LC	No
85. Vernal Hanging-Parrot	<i>Loriculus vernalis</i>	LC	No
86. White-bellied Yuhina	<i>Yuhina zantholeuca</i>	LC	No
87. White-browed Scimitar-Babbler	<i>Pomatorhinus schisticeps</i>	LC	No
88. White-browed Shrike-Babbler	<i>Pteruthius flaviscapis</i>	LC	No
89. White-crested Laughingthrush	<i>Garrulax leucolophus</i>	LC	No
90. White-hooded Babbler	<i>Gampsorhynchus rufulus</i>	LC	No
91. White-rumped Shama	<i>Copsychus malabaricus</i>	LC	No
92. Wreathed Hornbill	<i>Aceros undulatus</i>	LC	No

Highlighted species were identified in Boeung Per (Chiouk Boeung Pre Community) January 22, 2010.

ANNEX 6: RESIDENT, HABITAT-RESTRICTED BIRD SPECIES – DRY FORESTS (CAMBODIA)

Common English name	Scientific name	Threat Level	Biome Restricted
1. Asian Fairy-bluebird	<i>Irena puella</i>	LC	No
2. Asian Stubtail	<i>Urosphena squameiceps</i>	LC	No
3. Austen's Brown Hornbill	<i>Anorrhinus austeni</i>		No
4. Banded Bay Cuckoo	<i>Cacomantis sonneratii</i>	LC	No
5. Banded Broadbill	<i>Eurylaimus javanicus</i>	LC	No
6. Banded Kingfisher	<i>Lacedo pulchella</i>	LC	No
7. Bar-bellied Pitta	<i>Pitta elliotii</i>	LC	No
8. Bar-winged Flycatcher-shrike	<i>Hemipus picatus</i>	LC	No
9. Bay Woodpecker	<i>Blythipicus pyrrhotis</i>	LC	No
10. Besra	<i>Accipiter virgatus</i>	LC	No
11. Black Bulbul	<i>Hypsipetes leucocephalus</i>	LC	No
12. Black-and-buff Woodpecker	<i>Meiglyptes jugularis</i>	LC	No
13. Black-crested Bulbul	<i>Pycnonotus melanicterus</i>	LC	No
14. Black-headed Woodpecker	<i>Picus erythropygius</i>	LC	No
15. Black-naped Monarch	<i>Hypothymis azurea</i>	LC	No
16. Black-throated Sunbird	<i>Aethopyga saturata</i>	LC	No
17. Blue Pitta	<i>Pitta cyanea</i>	LC	No
18. Blue Whistling-Thrush	<i>Myophonus caeruleus</i>	LC	No
19. Blue-eared Barbet	<i>Megalaima australis</i>	LC	No
20. Blue-eared Kingfisher	<i>Alcedo meninting</i>	LC	No
21. Blue-rumped Pitta	<i>Pitta soror</i>	LC	No
22. Blue-winged Leafbird	<i>Chloropsis cochinchinensis</i>	LC	No
23. Changeable Hawk-Eagle	<i>Spizaetus cirrhatus</i>	LC	No
24. Coral-billed Ground-Cuckoo	<i>Carpococcyx renauldi</i>	LC	Yes
25. Crested Goshawk	<i>Accipiter trivirgatus</i>	LC	No
26. Crested Serpent-Eagle	<i>Spilornis cheela</i>	LC	No
27. Crested Treeswift	<i>Hemiprocne coronata</i>	LC	No
28. Dusky Broadbill	<i>Corydon sumatranus</i>	LC	No
29. Eared Pitta	<i>Pitta phayrei</i>	LC	No
30. Emerald Dove	<i>Chalcophaps indica</i>	LC	No
31. Fire-breasted Flowerpecker	<i>Dicaeum ignipectus</i>	LC	No
32. Golden Babbler	<i>Stachyris chrysaea</i>	LC	No
33. Golden-fronted Leafbird	<i>Chloropsis aurifrons</i>	LC	No

34. Great Hornbill	<i>Buceros bicornis</i>	NT	No
35. Great Iora	<i>Aegithina lafresnayei</i>	LC	No
36. Great Slaty Woodpecker	<i>Mulleripicus pulverulentus</i>	LC	No
37. Greater Racket-tailed Drongo	<i>Dicrurus paradiseus</i>	LC	No
38. Greater Yellownape	<i>Picus flavinucha</i>	LC	No
39. Green Cochoa	<i>Cochoa viridis</i>	LC	No
40. Green Magpie	<i>Cissa chinensis</i>	LC	No
41. Green-eared Barbet	<i>Megalaima faiostriata</i>	LC	Yes
42. Grey Peacock-Pheasant	<i>Polyplectron bicalcaratum</i>	LC	No
43. Grey-capped Woodpecker	<i>Dendrocopos canicapillus</i>	LC	No
44. Grey-headed Parakeet	<i>Psittacula finschii</i>	LC	No
45. Hainan Blue-Flycatcher	<i>Cyornis hainanus</i>	LC	No
46. Heart-spotted Woodpecker	<i>Hemicircus canente</i>	LC	No
47. Indochinese Cuckoo-shrike	<i>Coracina polioptera</i>	LC	No
48. Jerdon's Baza	<i>Aviceda jerdoni</i>	LC	No
49. Large Niltava	<i>Niltava grandis</i>	LC	No
50. Large Scimitar-Babbler	<i>Pomatorhinus hypoleucos</i>	LC	No
51. Large Woodshrike	<i>Tephrodornis gularis</i>	LC	No
52. Lesser Necklaced Laughingthrush	<i>Garrulax monileger</i>	LC	No
53. Lesser Racket-tailed Drongo	<i>Dicrurus remifer</i>	LC	No
54. Little Pied Flycatcher	<i>Ficedula westermanni</i>	LC	No
55. Little Spiderhunter	<i>Arachnothera longirostra</i>	LC	No
56. Maroon Oriole	<i>Oriolus traillii</i>	LC	No
57. Moustached Barbet	<i>Megalaima incognita</i>	LC	No
58. Ochraceous Bulbul	<i>Alophoixus ochraceus</i>	LC	No
59. Orange-breasted Pigeon	<i>Treron bicincta</i>	LC	No
60. Orange-breasted Trogon	<i>Harpactes oreskios</i>	LC	No
61. Orange-headed Thrush	<i>Zoothera citrina</i>	LC	No
62. Pale Blue-Flycatcher	<i>Cyornis unicolor</i>	LC	No
63. Plain Flowerpecker	<i>Dicaeum concolor</i>	LC	No
64. Pompadour Green-Pigeon	<i>Treron pompadora</i>	LC	No
65. Puff-throated Bulbul	<i>Alophoixus pallidus</i>	LC	No
66. Purple-naped Sunbird	<i>Hypogramma hypogrammicum</i>	LC	No
67. Pygmy Wren-Babbler	<i>Pnoepyga pusilla</i>	LC	No
68. Red Junglefowl	<i>Gallus gallus</i>	LC	No
69. Red-headed Trogon	<i>Harpactes erythrocephalus</i>	LC	No
70. Rosy Minivet	<i>Pericrocotus roseus</i>	LC	No
71. Ruby-cheeked Sunbird	<i>Anthreptes singalensis</i>	LC	No

72. Rufous-bellied Eagle	<i>Hieraaetus kienerii</i>	LC	No
73. Rufous-bellied Woodpecker	<i>Dendrocopos hyperythrus</i>	LC	No
74. Scarlet Minivet	<i>Pericrocotus flammeus</i>	LC	No
75. Silver Pheasant	<i>Lophura nycthemera</i>	LC	No
76. Streaked Spiderhunter	<i>Arachnothera magna</i>	LC	No
77. Streaked Wren-Babbler	<i>Napothera brevicaudata</i>	LC	No
78. Thick-billed Flowerpecker	<i>Dicaeum agile</i>	LC	No
79. Tickell's Blue-Flycatcher	<i>Cyornis tickelliae</i>	LC	No
80. Velvet-fronted Nuthatch	<i>Sitta frontalis</i>	LC	No
81. Vernal Hanging-Parrot	<i>Loriculus vernalis</i>	LC	No
82. White-bellied Woodpecker	<i>Dryocopus javensis</i>	LC	No
83. White-bellied Yuhina	<i>Yuhina zantholeuca</i>	LC	No
84. White-browed Fantail	<i>Rhipidura aureola</i>	LC	No
85. White-browed Scimitar-Babbler	<i>Pomatorhinus schisticeps</i>	LC	No
86. White-browed Shrike-Babbler	<i>Pteruthius flaviscapis</i>	LC	No
87. White-crested Laughingthrush	<i>Garrulax leucolophus</i>	LC	No
88. White-rumped Shama	<i>Copsychus malabaricus</i>	LC	No
89. Wreathed Hornbill	<i>Aceros undulatus</i>	LC	No

Highlighted species were identified in Oddar Meanchey (Sankay community) January 27, 2010.

**ANNEX 7: RESIDENT, HABITAT-RESTRICTED BIRD SPECIES –
CARDAMON MOUNTAIN FORESTS (CAMBODIA)**

Common English name	Scientific name	Threat Level	Biome Restricted
1. Asian Fairy-bluebird	<i>Irena puella</i>	LC	No
2. Asian Stubtail	<i>Urosphena squameiceps</i>	LC	No
3. Banded Bay Cuckoo	<i>Cacomantis sonneratii</i>	LC	No
4. Banded Broadbill	<i>Eurylaimus javanicus</i>	LC	No
5. Banded Kingfisher	<i>Lacedo pulchella</i>	LC	No
6. Bar-bellied Pitta	<i>Pitta elliotii</i>	LC	No
7. Barred Cuckoo-Dove	<i>Macropygia unchall</i>	LC	No
8. Bar-winged Flycatcher-shrike	<i>Hemipus picatus</i>	LC	No
9. Besra	<i>Accipiter virgatus</i>	LC	No
10. Black-and-buff Woodpecker	<i>Meiglyptes jugularis</i>	LC	No
11. Black-crested Bulbul	<i>Pycnonotus melanicterus</i>	LC	No
12. Black-hooded Oriole	<i>Oriolus xanthornus</i>	LC	No
13. Black-naped Monarch	<i>Hypothymis azurea</i>	LC	No
14. Black-throated Sunbird	<i>Aethopyga saturata</i>	LC	No
15. Blue Pitta	<i>Pitta cyanea</i>	LC	No
16. Blue Whistling-Thrush	<i>Myophonus caeruleus</i>	LC	No
17. Blue-eared Barbet	<i>Megalaima australis</i>	LC	No
18. Blue-eared Kingfisher	<i>Alcedo meninting</i>	LC	No
19. Blue-rumped Pitta	<i>Pitta soror</i>	LC	No
20. Blue-winged Leafbird	<i>Chloropsis cochinchinensis</i>	LC	No
21. Changeable Hawk-Eagle	<i>Spizaetus cirrhatius</i>	LC	No
22. Chestnut-headed Partridge	<i>Arborophila cambodiana</i>	VU	Yes
23. Coral-billed Ground-Cuckoo	<i>Carpococcyx renauldi</i>	LC	Yes
24. Crested Goshawk	<i>Accipiter trivirgatus</i>	LC	No
25. Crested Serpent-Eagle	<i>Spilornis cheela</i>	LC	No
26. Crested Treeswift	<i>Hemiprocne coronata</i>	LC	No
27. Dark-sided Thrush	<i>Zoothera marginata</i>	LC	No
28. Dusky Broadbill	<i>Corydon sumatranus</i>	LC	No
29. Eared Pitta	<i>Pitta phayrei</i>	LC	No
30. Emerald Dove	<i>Chalcophaps indica</i>	LC	No
31. Fire-breasted Flowerpecker	<i>Dicaeum ignipectus</i>	LC	No
32. Fujian Niltava	<i>Niltava davidi</i>	LC	No
33. Golden-fronted Leafbird	<i>Chloropsis aurifrons</i>	LC	No

34. Great Hornbill	<i>Buceros bicornis</i>	NT	No
35. Great Iora	<i>Aegithina lafresnayeii</i>	LC	No
36. Great Slaty Woodpecker	<i>Mulleripicus pulverulentus</i>	LC	No
37. Greater Racket-tailed Drongo	<i>Dicrurus paradiseus</i>	LC	No
38. Greater Yellownape	<i>Picus flavinucha</i>	LC	No
39. Green Cochoa	<i>Cochoa viridis</i>	LC	No
40. Green-eared Barbet	<i>Megalaima faiostriata</i>	LC	Yes
41. Grey-capped Woodpecker	<i>Dendrocopos canicapillus</i>	LC	No
42. Hainan Blue-Flycatcher	<i>Cyornis hainanus</i>	LC	No
43. Heart-spotted Woodpecker	<i>Hemicircus canente</i>	LC	No
44. Jerdon's Baza	<i>Aviceda jerdoni</i>	LC	No
45. Large Niltava	<i>Niltava grandis</i>	LC	No
46. Large Scimitar-Babbler	<i>Pomatorhinus hypoleucos</i>	LC	No
47. Large Woodshrike	<i>Tephrodornis gularis</i>	LC	No
48. Lesser Necklaced Laughingthrush	<i>Garrulax monileger</i>	LC	No
49. Lesser Racket-tailed Drongo	<i>Dicrurus remifer</i>	LC	No
50. Lesser Shortwing	<i>Brachypteryx leucophrys</i>	LC	No
51. Lesser Yellownape	<i>Picus chlorolophus</i>	LC	No
52. Little Spiderhunter	<i>Arachnothera longirostra</i>	LC	No
53. Maroon Oriole	<i>Oriolus traillii</i>	LC	No
54. Moustached Barbet	<i>Megalaima incognita</i>	LC	No
55. Ochraceous Bulbul	<i>Alophoixus ochraceus</i>	LC	No
56. Orange-breasted Pigeon	<i>Treron bicincta</i>	LC	No
57. Orange-breasted Trogon	<i>Harpactes oreskios</i>	LC	No
58. Orange-headed Thrush	<i>Zoothera citrina</i>	LC	No
59. Plain Flowerpecker	<i>Dicaeum concolor</i>	LC	No
60. Pompadour Green-Pigeon	<i>Treron pompadora</i>	LC	No
61. Racket-tailed Treepie	<i>Crypsirina temia</i>	LC	Yes
62. Red Junglefowl	<i>Gallus gallus</i>	LC	No
63. Red-headed Trogon	<i>Harpactes erythrocephalus</i>	LC	No
64. Rosy Minivet	<i>Pericrocotus roseus</i>	LC	No
65. Ruby-cheeked Sunbird	<i>Anthreptes singalensis</i>	LC	No
66. Rufous-bellied Eagle	<i>Hieraaetus kienerii</i>	LC	No
67. Scaly-crowned Babbler	<i>Malacopteron cinereum</i>	LC	No
68. Scarlet Minivet	<i>Pericrocotus flammeus</i>	LC	No
69. Silver Oriole	<i>Oriolus mellianus</i>	VU	No
70. Silver Pheasant	<i>Lophura nycthemera</i>	LC	No

71. Streaked Wren-Babbler	<i>Napothera brevicaudata</i>	LC	No
72. Thick-billed Flowerpecker	<i>Dicaeum agile</i>	LC	No
73. Tickell's Blue-Flycatcher	<i>Cyornis tickelliae</i>	LC	No
74. Velvet-fronted Nuthatch	<i>Sitta frontalis</i>	LC	No
75. Vernal Hanging-Parrot	<i>Loriculus vernalis</i>	LC	No
76. White-bellied Woodpecker	<i>Dryocopus javensis</i>	LC	No
77. White-bellied Yuhina	<i>Yuhina zantholeuca</i>	LC	No
78. White-browed Shrike-Babbler	<i>Pteruthius flaviscapis</i>	LC	No
79. White-crested Laughingthrush	<i>Garrulax leucolophus</i>	LC	No
80. White-rumped Shama	<i>Copsychus malabaricus</i>	LC	No
81. White-tailed Robin	<i>Cinclidium leucurum</i>	LC	No
82. Wreathed Hornbill	<i>Aceros undulatus</i>	LC	No