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Monsoon Wind Power Project, Sekong and Attapeu Provinces, Lao PDR

Environmental and Social Impact
Assessment

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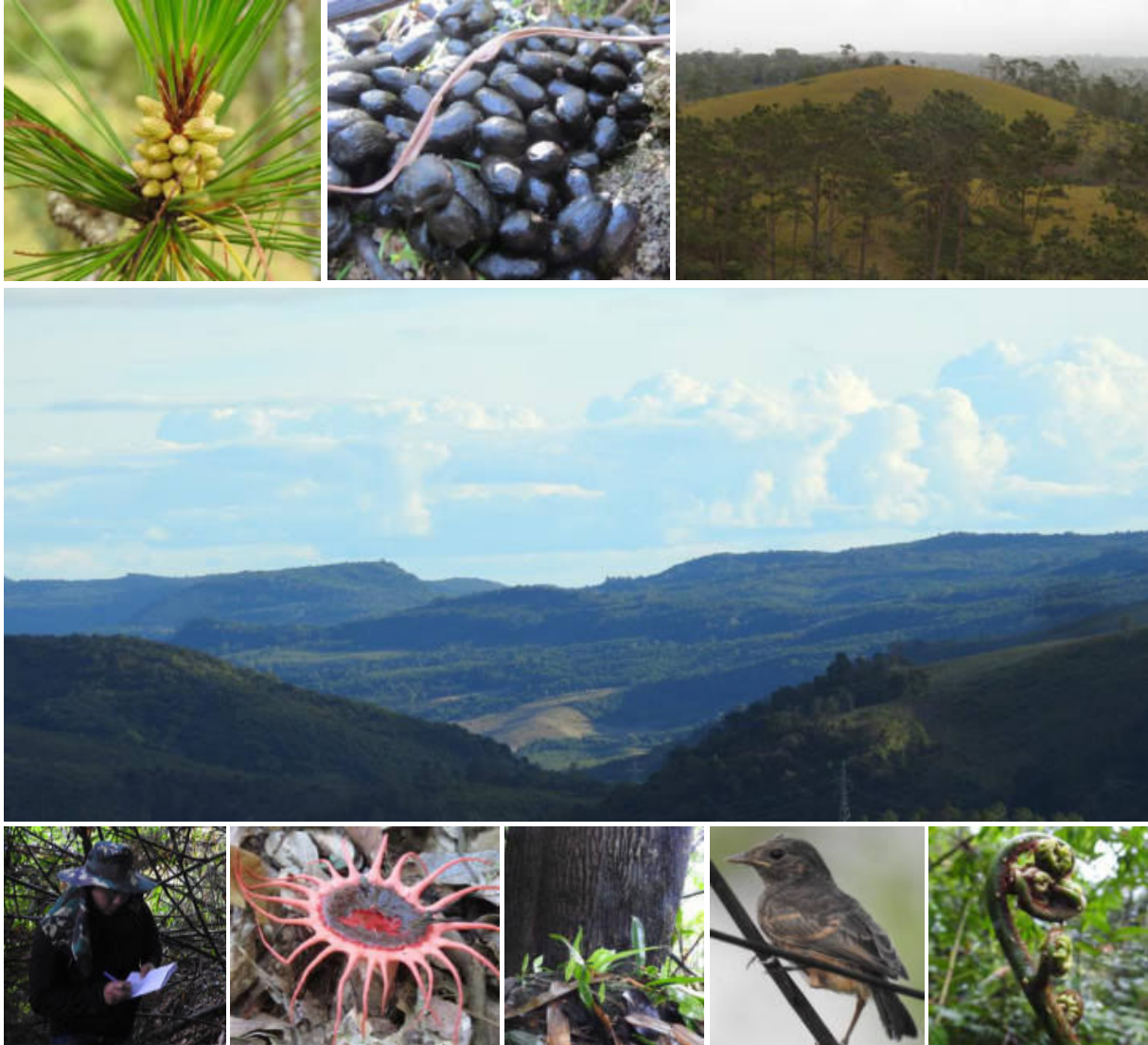
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APPENDIX F BIODIVERSITY BASELINE SURVEY REPORTS

**SUMMARY BIRD REPORT
(MONTHLY REPORTS AVAILABLE ON REQUEST)**

RAPID ECOLOGICAL ASSESSMENT REPORT

Rapid Ecological Assessment at Monsoon Windfarm Power Project, Dakcheung District



Final Draft Report

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February 25th, 2021

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SUMMARY

This report of Rapid Ecological Assessment (REA) was prepared for Monsoon Windfarm Power Project of Impact Energy Asia Development Limited (IEAD). The purpose was to gather the current status of ecological health of the proposed concession area of the Project through a rapid assessment based on survey points that covered a wide cross section of both natural and modified habitats across the entire concession site, focusing particularly on areas where turbines or overhead lines are proposed.

The proposed Monsoon Windfarm Power Project has a concession area of ca. 708km² with its capacity of 600 MW and a 500 Kv Transmission Line of 21.3 km crossing to Vietnam. The project is located in Dakcheung District of Sekong Province, the highland of the southern Laos and known Dakcheung Plateau of altitudes over 1,000 m a.s.l., (ranges from 800-1,600m). The Dakcheung Plateau is also internationally recognized as is one of Key Biodiversity Areas (KBAs)/and Important Bird Area (IBA) of BirdLife International.

The rapid ecological assessment was conducted from December 2020 to January 2021 through direct observations after meeting with relevant provincial and district offices. At field survey as 29 sample plots (SP) were defined in the Monsoon Windfarm Power Project. Using GIS and Mapping helped define the sample plots to cover all habitat representatives including grassland. For each survey site was estimated for ranging up to 500m around the GIS point where the survey was conducted. The assessment recorded properly on data set using data forms. A grading system was used for this assessment as to give a score from 1 lowest to 5 highest in scaling the values of each sample plot.

Given a short period of time for many sample plots (SP) were completed as on average up to 2 hours per sample plot was available. Apart from some quantitative data collection, a qualitative assessment as expert judgement was used to assess each SP as much as any possible justification with available evidences and photos to support for references of the assessment. At each SP, the survey team recorded waypoints, geographic conditions, habitat conditions/forest structures, dominant tree species, key species as well as fauna species. Also, based on the field condition and its remote area it was also predicted a likely species to occur. In addition, some interviews with local villagers around the sample plots were conducted accordingly.

Results of the REA showed that the concession area of the project and according to GIS analysis was mainly evergreen forest (upper evergreen/semi-evergreen), shrubland, coniferous forest (pine woodland) and grassland, of which some parts of the Upper evergreen forest at higher elevation over 1,500 m a.s.l., is considered montane forest (e.g SP 4). Good forest cover was found in the northernmost and eastern section - along the proposed Transmission Line (located outside the concession area). The evergreen forest of the project concession area was counted for 40%, then shrubland/secondary forest/fallow, was counted for 43%; while, the coniferous forest is only 3%.

Dominant flora species slightly varies based on forest types. The dominant species tree in the project area, based on frequency of detection from sampling plots consist of Mai kor *Lithocarpus lolystachyus* (Wall.) Rehd, (Fagaceae), Mai Paek sambei *Pinus kesiya* Royle ex Gognep. (Pinaceae), *Diospyros silvatic* Roxb, Mai khaen *Hopea pierrei* Hance, *Cinnamomum iners* Reinw. Ex Blume, *Castanea mollissima* Blume, *Aporosa lplanchoniana* Baillon ex Mull-Arg. (Euphorbiaceae).

The dominant species in the evergreen forest - the large evergreen trees such as *Hopea pierrei* Hance (Dipterocarpaceae), *Cinnamomum iners* Reinw. ex Blume (Lauraceae), *Dacrydium elatum* (Roxb.) Wall. ex Hook., *Dacrycarpus imbricatus* (Blume) de Laub. (Podocarpaceae) and *Pinus kesiya* Royle ex Gordon (Pinaceae). In the lower layer is also dominated by evergreen trees such as *Lithocarpus polystachyus* (Wall.) Rehd, *Castanea mollissima* Blume, *Diospyros silvatica* Roxb (Ebenaceae), *Aporosa tetrapleura* Hance (Euphorbiaceae) and *Ficus annulata* Blume (Moraceae).

With reference to the distribution of plant species, there were some key species not only globally threatened species but also national prohibited and special tree species list of the Lao PDR according to the national regulation were present in the project area. Nevertheless, not all of them were recorded during the assessment. Apart from key species there are some important tree species which were found in the proposed transmission line (TL) section such as *Mai hing luang* (*Dacrydium elatum*), *Mai hing deng* (*Dacrycarpus imbricatus*), *Mai Chuang* (*Cinnamomum iners*) and *Mai Khaenhin* (*Hopea pierrei*). These are listed as special tree species of the country. Interesting, Mai Paek sam bei (*Pinus kesiya*) which is one of dominant species was recently recorded in Laos. This pine forest was found in scatter within semi-evergreen forest throughout the project area especially in the southern and central-north sections. This *pinus* species in Dakcheung Distict is under high threat due to large forest area was slashed for cultivation. Likely the pine is not well recovered when the plot was slashed repeatedly. Succession plants were observed and dominant pine tree to regrow which therefore this species will be degraded and lost.

There would be some endemic flora species in the area as recently some new species were discovered in southern Laos, Champasak Province such as *Hedychum chayanianum* Wongsuwan in the family of Zingiberaceae and so due to their potential distribution areas these species might be found in the project area, likely in the northernmost and eastern sections.

Through the current reviews and rapid assessment of fauna species showed that the project area especially the concession area is considered poor ecological status except the northernmost zone and along the proposed TL revealed important ecological value. Overall, some forest bird species were seen during the assessment especially small forest birds and some evidences of mammals were recorded especially at SP 4, 7, 8, 9 and 10 where these SPs were located in Upper evergreen forest. The globally threatened species that were recorded directly during the field assessment such as Sambar *Rusa unicolor*

(VU), Southern Serow *Carpriconis sumatraensis* (VU) and Bear - probably Asiatic Black Bear *Ursus thibetanus* according to the IBAT database. These species were found at SP 4 (northernmost zone at altitude of 1,600 m a.s.l. Further on north from the SP 4 is more interesting since Buff-cheeked Gibbons and Red-shanked Douc Langurs were reported. Some more interesting globally threatened wildlife species were reported and would be present in these SPs.

Although the previous known Important Bird Area (IBA), its value has no longer. Three sample plots (SP 1, 5 and 6) are located in the Dakcheung IBA/KBA, its habitats at these SPs are highly degraded, converted to agricultural land (hill rice cultivation). Actually, this issue was reported during the reassessment in 2008 (BirdLife International). Therefore, the degradation of the Dakcheung IBA is well confirmed.

For the ecological value, a total of 29 SPs were rated and showed that the ecological value of the project area is considered poor. The SPs with poor and seriously poor ecological values covering highest proportion of the total SPs, and that was counted for 58.62%, then the SPs with satisfied ecological value was counted for 31%. While, only 3 SPs were rated as high ecological value which was counted for only 10.34%.

This is a rapid assessment which would not provide details of the ecological values and species counts. However, it provides and guide where high or low ecological values which the project can redesign by relocating some turbine towers and power plant appropriately and where of less environmental and social impacts. In addition, as to ensure sound project development, a full biodiversity assessment in the critical habitats (high biodiversity zone) with specific survey for key species should be conducted in the near future. They key and target species for the assessment and are sensitive and associated with the project induction like Buff-cheeked Gibbon *Nomascus annamensis* (EN) and Red-shanked Douc Langur *Pygathrix Nemaus* (EN).

In principle, the assessment should cover all taxon (mammal, bird, herps, fish and plant) and by 2 seasons. Camera traps should be used for this assessment as to verify some important species that could not be detected from direct observations. Consequently, ecological baseline can be developed based on the assessment results for long-term monitoring.

ACKNOWLEDGEMENTS

This assignment of consultancy for Rapid Ecological Assessment could not be well made possible without the assistance from the Impact Energy Asia Development Limited (IEAD)'s team and technical guidance from Environmental Resource Management (ERM), as well as Sekong Provincial Office of Natural Resource and Environment (PoNRE) and Dakcheung District Office of Natural Resource and Environment (DoNRE).

Therefore, we would like to sincere thanks and appreciate all your assistance and advice throughout the period of this assignment especially Mr. Chanhao Sayathong (Head of Environment Section of Sekong PONRE), Mr. Somphone Bounxayalath (Head of Dakcheung DoNRE) and Mr. Chaovalit Khunchaiyaphum (Project Site Manager) of IEAD. The field assistants, Mr. Thipphasone Saynamlin from Sekong PoNRE and Mr. Outhid from Dakcheung DonRE who participated in the fieldwork throughout the field assessment.

Special thanks to Mr. Narut Boakajorn (IEAD) and the ERM team, Mr. Les Hatton and Mr. Pobai Tang for their technical guidance, coordination and cooperation.

1. INTRODUCTION

This report of Rapid Ecological Assessment (REA) was prepared as part of Environmental Resource Management (ERM) Consulting for Monsoon Windfarm Power Project of Impact Energy Asia Development Limited (IEAD). The purpose was to gather the current status of ecological health of the Project through a rapid assessment using random sampling and as to provide recommendations whether any section of the area is considered high biodiversity value and that necessary to conduct a full biodiversity assessment or not.

The proposed Monsoon Windfarm Power Project has an area of ca. 708km² with its capacity of 600 MW and a 500 Kv Transmission Line of 21.3 km from the power plant to the Lao-Vietnam border. The project is located in Dakcheung District of Sekong Province, the highland of the southern Laos (see Fig. 1). A windfarm power project is an inexpensive source of electric power and it is clean power technology, competitive with and cheaper than a hydropower dam project as well as coal and gas plants, with lower negative impacts. However, it requires quite large area of land concession which would generate some negative impact on terrestrial ecosystem and other species associated during the project construction, in particular. Sound investment project is necessary to be careful with project induction to avoid major environmental and social impacts. Any potential negative impacts to be prevented and mitigated from the planning and engineering design as to ensure mitigation measures are well in place at all stages of the project development. Therefore, understanding the current status of ecological health is fundamental in this regard.

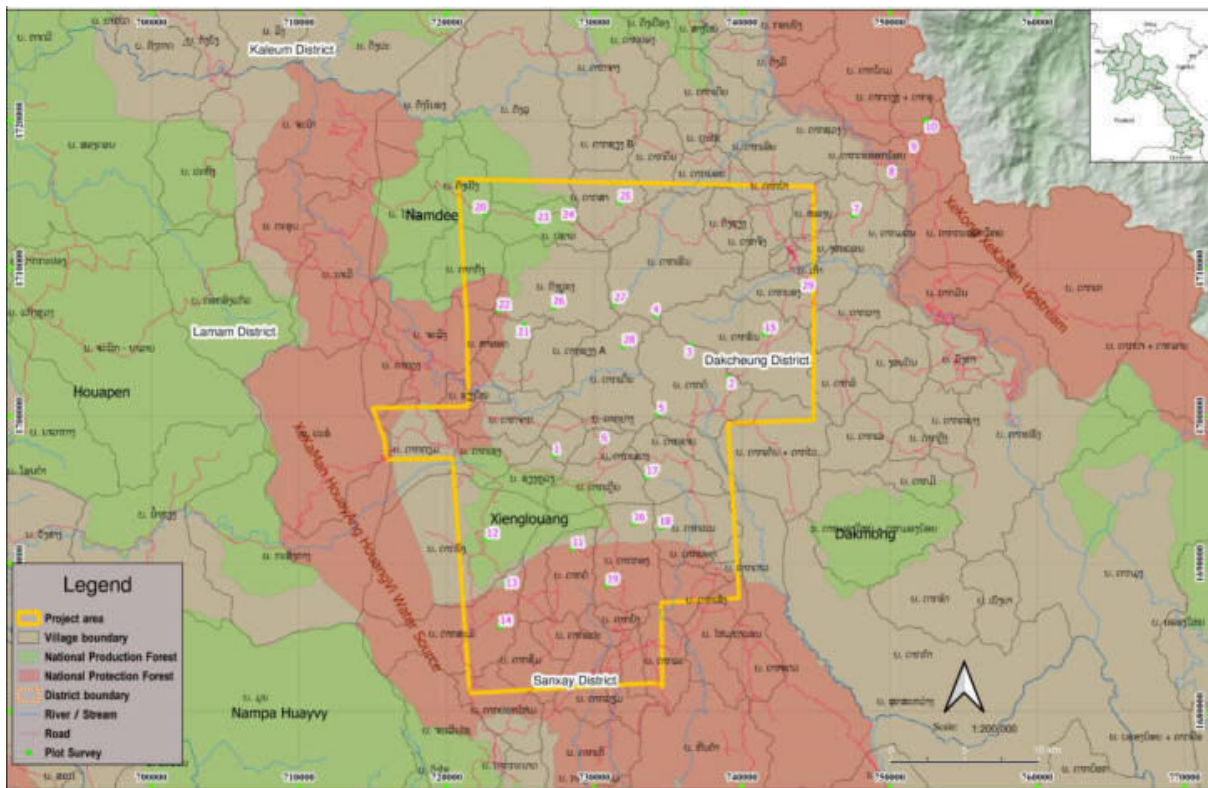


Figure 1. Monsoon Windfarm power project

2. BACKGROUND

Dakcheung District of Sekong Province is located in Dakcheung Plateau and borders to Vietnam. Sekong Province is the smallest province, also has the smallest population (113,048 as of 2015) and the lowest population density of any province in the country. It was established in 1984 by splitting from Salavanh Province. The province has the most diverse ethnic groups in Laos as 14 ethnic groups, they are more of animism worship.

Dakcheung District is upland district, the remote district with about a half of it is plateau, non-plateau is found in the north to the east which are mountainous of high terrains. The average of altitudes in the district is ca. 1,000 m a.s.l., (ranges from 800-1,600m). Access to the district was very difficult in the past but it is easier today after the access road was upgraded in recent years. Local villagers rely on hill rice cultivation, cattle raising and crop plantation especially coffee plantation. It is one of coffee producing areas of Lao PDR, but not much known to public.

2.1 Forest zones and key habitats and species

Dakcheung District is part of Southern Annamite Mountain Range, with considering low temperature during dry season in January to March with high precipitation of the southern region. According to the data source from <https://www.weather2visit.com>, the lowest temperature at 11°C (see Fig. 2). Although during dry season it has some rain. These conditions are influencing to the dominance of specific vegetations in the district.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Min °C	11.8	13.7	15.8	17.5	18.4	18.4	18.9	18.5	17.6	16.7	15.3	13.2
Max °C	21.8	23.1	25	26.9	27.3	27	26.5	26.6	25.7	24.6	22.9	22.1

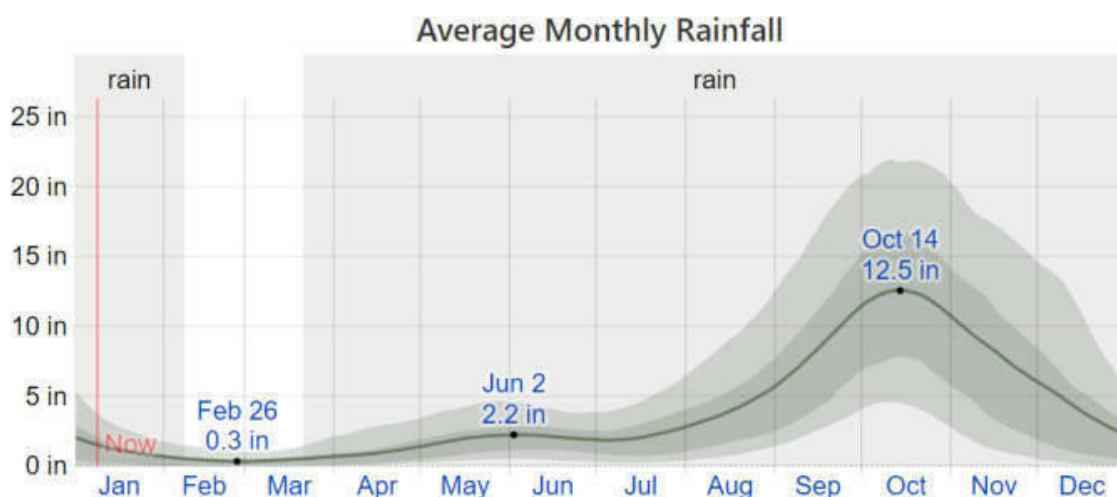


Figure 2. Climate of Dakcheung District

Forest zones and forest ecology of Lao PDR were originally classified by Vidal (1960) and later by Rundal (1999) and also related wildlife habitats by Duckworth (*et al.* 1999). The recent publication confirmed the previous forest zones identified in the country

(Inthakoun and Delang, 2008). In this regard, Dakcheung District is dominated by upper evergreen forest, coniferous forest, shrubland and grassland. The eastern section of Dakcheung District is part of Annamite Mountain Range with good forest condition; the southwestern section of the district is mainly semi-evergreen forest, coniferous forest, shrubland/grassland; the northeast section is mainly semi-evergreen/Montane forest, and the central section is semi-evergreen, coniferous, shrubland/grassland.

Internationally, at Dakcheung, Key Biodiversity Area (KBA) was identified by IUCN and Important Bird Area (IBA) by Birdlife International; however, these two international recognized names are just exactly the same site. It is located in the central-west of the district (see Fig. 3). The habitat is characterized with semi-evergreen, pine woodland, shrubland and grassland. The Dakcheung Plateau IBA, LA015 has an area of 5,140 ha was identified in 2003 and reassessed in 2008. Its value of international conservation of significance due to being home to some endemic birds and winter birds. According to the Birdlife International the area supports important habitat for Yellow-billed Nuthatch (*Sitta solangiae*) as Globally Near-threatened, Black-crowned Barwing (*Actinodura sodangorum*) as Globally Vulnerable species and Yellow breasted Bunting (*Emberiza aureola*) as Globally Critically Endangered.

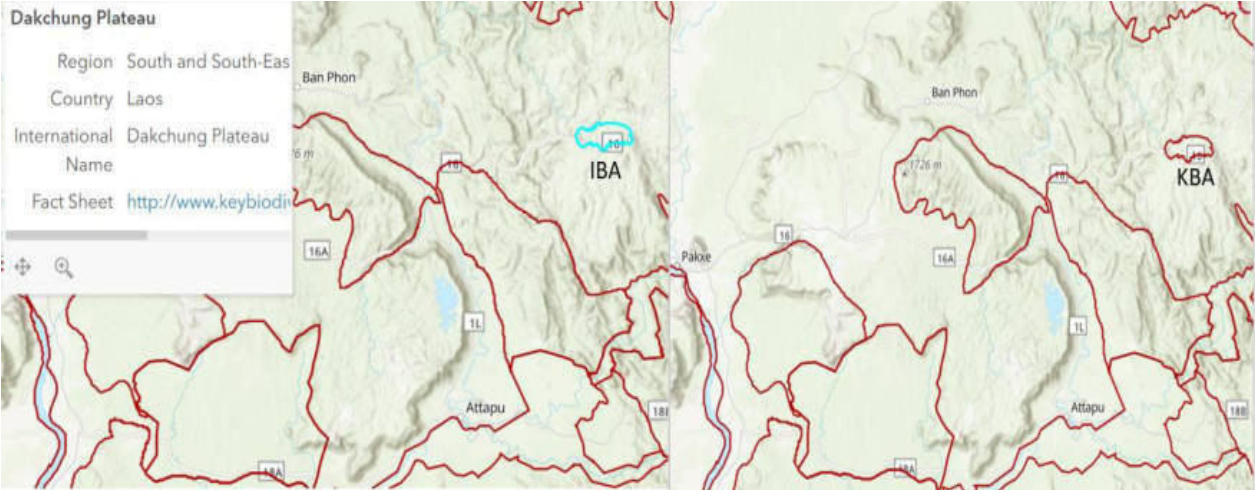


Figure 3. Location of Dakcheung Plateau IBA

2.2 Understanding of ecological health

Ecosystem health have emphasized the integration of ecological, economic and human processes (Rapport *et al.* 1998) and measures of sustainability and system resilience. It is also briefly to count for structure and function of that ecosystem. It can vary from site-to-site and for ecosystem to ecosystem. Ecological health is certainly about structure/composition and function; terrestrial ecological health is about forest structure, species in composition and forest ecosystem services. The forest structure can vary which is depending on types of forests and habitats.

For Lao PDR, evergreen or deciduous forest has very similar in habitat structure and species composition. It is meant the origins of these forest types without human

disturbance and located in remote area can provide very similar biodiversity values - species composition, as well as their forest ecosystem services, forest products including watershed and carbon sequestration. For a deep study, ecosystem health can indicate in water quality and flows which is undoubted that these parameters to be included for freshwater ecological health assessment and monitoring (Brien et al. 2016). Notedly, fauna species is more important and sensitive than flora regarding their concern of extinction. A presence of globally threatened fauna species is more important to give a rate of particular ecological health than the globally threatened flora species. Meanwhile, it needs to understand the value of some particular species whether it is also endemic or unique to only the area or not. Thus, the key value of weighting an ecological health is for globally threatened species and then original evergreen/mixed deciduous/deciduous forest where is often identified to higher biodiversity, as well as any remote site is likely remaining of important biodiversity. Of which, flagship species or indicator species for biodiversity value can be told by the presence of some certain species.

Similarly, High Conservation Value Forest (HCVF) is used to classify the value of forest ecosystem, it is to define critical ecological attributes, ecosystem services and social functions (Jennings and Jarvie, 2000). The term “High Conservation Value Forest” (HCVF) is one of conservation principles has been developed since early 2000s and the first publication made in 2003 (Jennings *et al.* 2003). Where a forest is identified to HCVF is often meant a critical habitat especially for HCVF 1, 2 and 3.

A term of High Conservation Value it must be anything of really sufficient attributes for conservation value. It is about all forests contain environmental and social values, such as wildlife habitat, watershed protection and cultural significance. There are associated with important fauna and flora species as well as basic and ecosystem services. Firstly, it needs to understand the current status of biodiversity, find out if any endangered and key species (Phiapalath, 2020). Relevant support data would be gathered from reliable reports and field verifications (Phiapalath, 2019). The values identified should contain globally, regionally or nationally significance for conservation regarding key species and habitats/ecosystem, status of those species whether they are viable population¹ (Phiapalath, 2020).

Among HCVF types, of which HCVF 1 is most important HCVF type for ecological conservation. Any site to be defined as HCVF 1 should be qualified enough regarding habitats and species. The habitats should contain a critical value which is used by globally threatened/endangered wildlife species (Phiapalath, 2020). There will be the presence of even a few endangered species with viable populations and containing of important mineral licks where some wild animals use them permanently or for nesting site (refugia) of some or a few globally threatened species; or outstanding of old growth forest which

¹ The viable population is meant that species have some reasonable number of populations in the assessment area which could be understood by any means.

contains critically/endangered flora species; as well as important endemism species which could not be found elsewhere.

For Lao PDR, the important indicator species in terrestrial forest at canopy level are Gibbon and Great Hornbill, but including Langur (Silver Langur *Trachypithecus cristatus* and Red-shanked Douc Langur *Pygathrix nemaeus*), on the ground will be a large mammal (Asian Elephant *Elephas maximus*, Gaur *Bos gaurus*, Banteng *Bos javanicus*, Sambar *Rusa unicolor*, Bears *Ursus thibetanus*), and a large ground birds (Green Peafowl *Pavo maticus*, Silver Pheasant *Lophura nycthemera*, Siamese Fireback *Lophura diardi*, Grey Peacock *Polyplectron bicalcaratum*). Importantly, for the part of Anammite could be including also Saola *Pseudoryx nghetinhensis*, Large antlered Muntjac *Muntiacus vuquangensis*, Stripped Rabbit *Nesolagus timminsi*, as well as Great Argus *Argusianus argus*.

Using IUCN database for understanding a distribution of globally threatened species according to IUCN Redlist. The globally threatened species are critically endangered (CR), endangered (EN) and vulnerable (VU) species. A presence of globally threatened fauna species with some reasonable population is considered important as viable population than just a few individuals.

Therefore, in principle, ecological health can be measured on current status of habitats, forest composition (flora and fauna species) and forest functions. The habitat to be observed on its structure and physical components but that should consider the nature of particular habitat origins. The flora to be observed and roughly identified as to obtain a species diversity. Also, for the fauna to be observed from any evidences encountered, understanding from forests and its remote area, access ability e.g steep terrain. By understanding these can help complete score sheet of ecological health appropriately (see Table 1).

3. OBJECTIVES OF THE ASSESSMENT

The objective of this assessment was to gather the ecological status of the proposed concession area of the Monsoon Windfarm Power Project. It was to identify key elements of terrestrial ecosystem, understanding the current status of ecosystem health – forest structure and compositions.

4. METHODOLOGY

4.1 Reviews and Assessment Approach

Forest types as well as habitat types in the project area were reviewed and analyzed. Some relevant databased (IBAT/KBA/IBA), materials e.g reports on biodiversity/wildlife monitoring in the survey areas including along the transmission line. Field assessment of this REA at the project area using appropriate techniques was conducted accordingly.

4.1.1 Forest types and habitat reviews

Forest cover and habitats were reviewed and described from some information support during the field visit. Using ArcGIS for forest type analysis which was interpreted from Landsat imageries based on pixel-based classification. Land cover/land use was classified using ArcGIS application to produce land cover maps of the project area. Based on habitat classification by ADB (2010), the natural habitat is an environment where the biological communities are largely formed by native plant and animal species, primary ecological functions remain by non-modifying. The modified habitat is altered natural habitat, often formed by degrading of or the removal of native species for harvesting, land conversion and/or introduction of alien flora and fauna species which we can understand as agricultural land/fallow. By the way, it is to be noted for some natural bareland/grassland.

Once again as mentioned early, forest habitats/zones and forest ecology of Lao PDR were originally classified by Vidal (1960) and later by Rundal (1999) and also related wildlife habitats were by Duckworth (*et al.* 1999). The recent publication confirmed the previous forest zones identified in the country (Inthakoun and Delang, 2008). In this regard, Dakcheung District is dominated by evergreen forest with some coniferous forest, shrubland and grassland.

4.1.2 Reviews of fauna species distribution

Apart from habitats, habitat suitability a species distribution in the project area including the transmission line section was conducted based on the database of IUCN IBAT, IUCN Redlist and Key Biodiversity Area (KBA) as well as International Bird Area (IBA) of BirdLife International. Particularly those globally threatened species in the project area to which are present today. The most important species are critically endangered (CR), endangered (EN) and vulnerable (VU) species as sometime they are called key species.

4.1.3 Field assessment techniques

The rapid ecological assessment was conducted in the field from December 2020 to January 2021 through direct observations after meeting with relevant provincial and district office. The team met with Environment section of Sekong PoNRE (Provincial Office of Natural Resource and Environment) and Dakcheung DoNRE (District Office of Natural Resource and Environment). The field survey including along the proposed transmission line, 29 sample plots in total were defined in the Monsoon Windfarm Power Project prior to the field visit Using GIS and Mapping helped define the sample plots to cover all habitat representatives including grassland. For each survey site was estimated for ranging up to 500m around the GIS point where the survey was conducted. The assessment, the team did try to get to the point and walked around the point to record necessary data properly using data form (Annex 5).

Habitat observation: for each SP, the team observed the forest structure, understanding original habitats, habitat changes, and identified dominant tree species, key species and some endemic species where possible. A type of tree species present and tree species dominance informs a forest type.

Flora species identification: the dominant and key plant species were identified during the field assessment with photographing of tree trunks/barks, leaves, flowers and fruits where possible especially those plants were unidentified immediately. For the unfamiliar trees, their fruits were collected and photographed.

Fauna species identification: collected any possible evidences with photos to support for references of the species which often seen feces, droppings, tracks, feeding sites, and direct sighting (birds). Apart from this as expert judgement was used to qualify the assessment (qualitative) for each SP. Also, based on the field condition and its remote it was predicted a likely species to occur. In addition, some interviews with local villagers whose settlement are closed to the SPs were conducted accordingly (see Fig. 4).

4.2 Data Analysis

Flora species identification: unidentified tree species, with their photos and specimens were identified using the Herbarium of the Biology Department, Faculty of Natural Science/NUoL in Vientiane, as well as using identification keys and resources available for the region (Smittinand et al. 1990, Nanthavong et al., 2019). Senior botanists were consulted for double check, and also, some plant collections were compared with type specimens that digitized in the website of National d'Histoire Naturelle Herbarium Paris/Royal Botanical Garden Edinburgh UK.

Fauna species identification: mostly fauna species including birds were identified immediately during the field visit except some of them as well as evidences found such as feces/droppings which were double checked and also consulted with senior wildlife specialists. Any evidences of fauna species were photographed.

4.3 Expert Judgment for Ecological Rating

The survey team wrapped up the key findings for each sample plot and gave appropriate scores. The team discussed and agreed on scoring for each sub-parameter using the grading system (see Table 1). In principle, ecological health can be measured on current status of habitats, forest composition (flora and fauna species) and forest functions. The habitat to be observed on its structure and physical components but that should consider the nature of particular habitat origins. The flora to be observed and roughly identified as to obtain a species diversity. Also, for the fauna to be observed on any evidences, understanding from forest and its remote area, access ability e.g steep terrain.

Based on the current available data from the field assessment and verification. Some quantitative data were collected as any possible evidences with photos to support for references of the assessment, and with qualitative assessment by expert judgement was used for final assessment of each SP.

Therefore, a grading system for this assessment was to give a score from 1 lowest to 5 highest in scaling the values of a sample plot, given in Table 1 as below.

Table 1. Definition of given scoring by scale of each sub-parameter

Parameter	Scoring	Definition
Habitat	1	Lowest, very poor, basically barren, rocks, no trees only some bushes
	2	Fairly low, poor forest condition, mostly fallows, shrubland, orchard
	3	Medium, some fairly good habitat but some degradation
	4	Fairly high, as mostly original forest with some changes, just 2 stories
	5	Highest, exceptionally as all original forest, good structure, 3-4 stories
Flora	1	Lowest, no any diversity of flora species with no any globally threatened species present.
	2	Fairly low, likely low diversity of flora species with no any globally threatened species present or likely to occur.
	3	Medium, some fair diversity of flora species with some fewer number of globally threatened species present or likely to occur.
	4	Fairly high, high diversity of flora species with some good number of globally threatened species present or likely to occur.
	5	Highest, exceptionally it is very high diversity of flora species with many globally threatened species present, likely to occur.
Fauna	1	Lowest, no any diversity of fauna species with no any globally threatened species present.
	2	Fairly low, likely low diversity of fauna species with no any globally threatened species present or likely to occur.
	3	Medium, some fair diversity of fauna species with some fewer number of globally threatened species present or likely to occur.
	4	Fairly high, high diversity of fauna species with some good number of globally threatened species present or likely to occur.
	5	Highest, exceptionally it is very high diversity of fauna species with many globally threatened species present, likely to occur.

4.4 Assessment Team

The consulting team consists of 10 members (6 consultants, 2 government staff and 2 villagers). The expert team with similar background on ecology (biodiversity, wildlife, botany). Also, with some strength and multiple disciplinaries, qualified degrees and relevant experiences. This assessment was led by Dr. Phaivanh Phiapalath who has substantial work experience in biodiversity assessment. The expert team consists of 4 experts and 2 assistants (see Table 2 and Fig. 3).

Table 2. List of experts and participants

No	Name	Degree	Expertise	Key tasks and Remarks
Expert team				
1	Dr. Phaivanh Phiapalath	PhD in Environ. Biology	Wildlife and protected area	Team Leader, and Mammal/ bird/ecology
2	Dr. Thananh Khotpathoom	PhD in Forest Resource Management	Wildlife, Bird and forest habitat	Bird/habitat/ecology

3	Dr. Metmany Soukhavong	PhD can. in Forest Ecology	Botany	Botanist/forest ecology
4	Mr. Duangphachanh Souvansai	M.Sc in Forest Management	Forest and wildlife ecology	Habitat/forest ecology
5	Mr. Sounthone Phiravong	B.Sc in GIS	Mapping	GIS/mapping
6	Mr. Nep Thonephakdy	Certificate	Biodiversity Survey	Field assistant
Field assistants from Government and local community				
	Mr. Thipphasone, PoNRE			Sekong PoNRE
	Mr. Outhid, DoNRE			Dakcheung DoNRE
	Mr. Phanthaphone			Village assistant
	Mr. Kideng			Village assistant



Figure 4. Survey team and field activities

4.5 Field Equipment

Binoculars (2 units), long lens camera (4 units), GPS (3 units) etc. Also, maps (3 set), fine pencils, data forms, compasses, rulers etc.

4.6 Limitation of the Assessment

During the field assessment in December and January it was quite cold and little raining in the first few days at Dakcheung District especially in early morning. Road access to some sample plots was difficult, only 4WD is capable to get through. A dozen of SPs was away from access road so only on foot to get reach the point. Due to many SPs and only a short time per sampling plot was available which made limitation of the assessment. With reference to the field plan design it was estimated time takes for the assessment up to 2 hours per sample plot; however, to reach some SPs took longer especially for SP 4 that the team stayed overnight at the plot. Luckily, we employed more team members so we can split to work concurrently by sub-teams after the all team members had worked together from the beginning.

5. RESULTS

5.1 Forest Zones and Habitats

Dakcheung District is located at higher elevation of over 800 m a.s.l., dominated by evergreen forest, shrubland, coniferous forest and grassland. Forest zones of the project area - Monsoon Windfarm Power Project, were environmentally divided into 3 zones as eastern, northern and central-southern zones. The eastern zone where the alignment of the proposed transmission line runs through is upper evergreen forest. It is part of the Southern Annamite Mountain Range with good forest condition, receives high precipitation; also the northern zone is the highest elevation of the district at peak of over 1,600 m a.s.l., with influencing by high precipitation, this area is considered Montane forest. These two forest zones are mountainous, upper evergreen forest/montane forest but not considered as Dakcheung Plateau. The central-southern zone is mainly known Dakcheung Plateau, it is highly dominated by semi-evergreen forest, coniferous forest, shrubland and grassland. The habitat of the Dakcheung Plateau is poor since as majority of the habitats has been converted to agricultural land. Only the forest block nearby Ban Daknong is legally known Xieng Luang Production Forest². By the way, the Dakcheung Plateau is considered one of Lao IBAs for bird conservation. Nonetheless, forest habitats of the IBA (SP 1, 5 and 6) were highly degraded, mainly converted to agricultural land.

5.2 Forest, Land Use Type and Habitats

With reference to the data source from National Forest Inventory and Planning/ Department of Forestry, there are 12 categories of land use identified in the Monsoon Windfarm Power Project (see Fig. 5 and Annex 2). Of which, 3 main forest types were identified as Evergreen which covers for 40% of the project area; shrubland³ is counted for 43%, then coniferous and other land use types. The evergreen forest in Dakcheung District especially in the project area has 3 sub-types as Upper evergreen forest, Montane

² Production forest is the forest for use, provides a supply of forest products (including timbers).

³ Shrubland is a mosaic of bushes, clumps of short trees occur in poor soil. It may be the nature vegetation type in a particular region and remain stable over time, or a transitional community that occurs temporarily as the result of a disturbance, such as fire or human activity e.g shifting cultivation. It is heavily degraded vegetation which could be part of secondary forest but in poor condition and likely impossible to regrow well.

forest and Semi-evergreen forest. The Upper evergreen forest is located in the proposed TL section from Dakcheung town toward the Lao-Vietnam border; the Montane forest is in the northernmost of the project area and the Semi-evergreen forest is mainly in the central and southern sections of the project area. The Evergreen forest which was found largely in the project area, and this sub-forest type includes some small scattered pine trees. It is not a coniferous forest since its portion is lower than 70% of Sample Plot (SP).

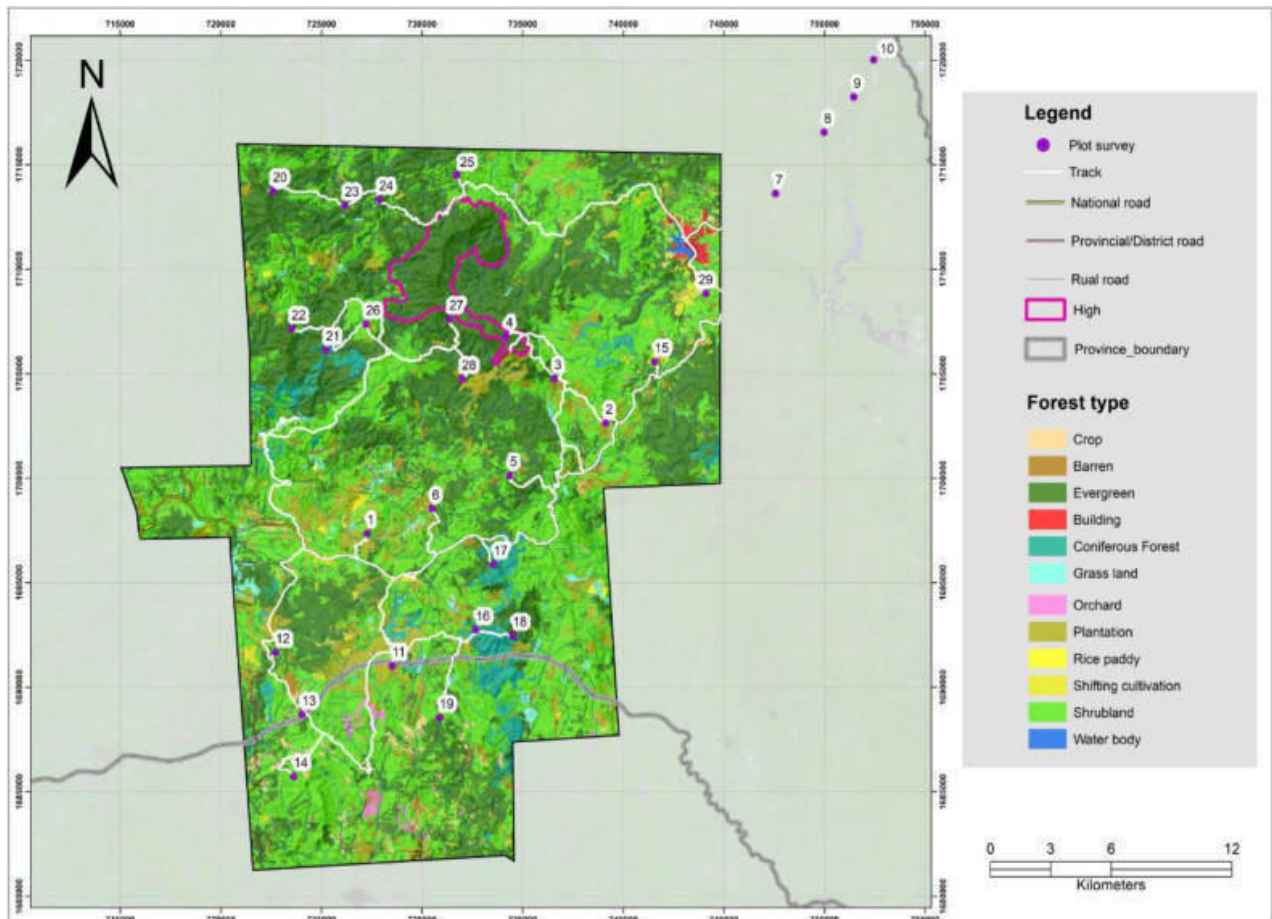


Figure 5. Land use of the project concession area

5.2.1 General description

The project area for this assessment is located in southern Lao PDR, between Sekong and Attapeu Provinces (UTM: 1681183-1716006 N; 715042-744933 E), little information is known in the area and the habitat condition was early described by Timmins and Vongkhamheng (1996), as Upper evergreen forest/Mountain evergreen forest where at elevation of over 1,000 m a.s.l. The project area, mainly in the northern and eastern sections of the project area are mountainous. More than 80% of the project area is above 1,000m and the peak exceeds 1,650m in the northern area. The habitats of the project area are Evergreen Forest (upper), coniferous forest, secondary forest/shrubland and grassland⁴.

⁴Due to different definitions and purposes, forest types can be described differently. Land use type has different category

The Evergreen forest of Dakcheung District is the Upper evergreen forest and Semi-evergreen forest as it occurs at high elevation of above 1,000 m a.s.l., which it is sometime called Mountain evergreen forest. Also, under the Evergreen forest, it has sub-type Semi-evergreen forest which receives lower precipitation compared to that of the Upper evergreen forest. However, these two sub-forest types have some little differences in forest structure, characteristics and compositions.

Evergreen Forest



Evergreen forest can be principally classified into sub-types such as upper evergreen forest, montane forest, semi-evergreen forest, dry evergreen forest and lower evergreen forest. For Dakcheung District it has both upper evergreen, montane and semi-evergreen forests.

The **Upper evergreen forest** occurs in mountains area of above 1,000 m a.s.l., and that receives high precipitation. Also, if it is located at higher 1,500 m a.s.l., is considered **Montane forest**⁵. While, the Semi-evergreen forest is considered receives lower precipitation but it is part of Upper evergreen forest. At a high elevation than 800 m a.s.l, the Semi-evergreen forest (SEF) has some pine species while no any pine tree can be found in the Semi-evergreen forest at lower elevation.

The Upper evergreen forest (UEF) was found in the project area – just along the proposed transmission line from SP 7 toward the Vietnam border, including SP 8, 9 and 10. Of which, the Montane forest was found in the northern section of the project area at the SP 4 and this forest extends toward the north.



The floristic composition of the high mountain evergreen forest is composed of the large evergreen trees around 25-30 m in height and around 60 cm in diameter. In general, this habitat consists of two layers. The upper layer is dominated by large evergreen trees such as *Hopea pierrei*, *Cinnamomum iners*, *Dacrydium elatum* (Roxb.) Wall. ex Hook., *Dacrycarpus imbricatus* (Blume) de Laub. (Podocarpaceae) and *Pinus kesiya* Royle ex Gordon (Pinaceae). In the lower layer is also dominated by evergreen trees such as

Lithocarpus polystachyus (Wall.) Rehd, *Castanea mollissima* Blume, *Diospyros silvatica* Roxb (Ebenaceae), *Aporosa tetrapleura* Hance (Euphorbiaceae) and *Ficus annulata* Blume (Moraceae). In the understory is dominated by fern species such as *Blechnum*

from forest type and also habitat (wildlife). The forest type can be anything forested that includes riparian and swamp forest; while the land use type can include secondary forest, agricultural land and settlement; and the habitat can include grassland and paddy field etc. Therefore, their differences can be noted and described in this report among forest zone, land use, forest type and habitat.

⁵Montane forest is a sub-type of Upper Evergreen Forest that is located at above 1,500 m a.s.l., has little difference in forest structure and tree characteristics. The shorter and quite smaller tree, basically covers with mosses and lichens.

orientale (Blechnaceae), *Dicranopteris linearis* (Gleicheniaceae), *Cibotium barometz* (Cibotiaceae) and *Brainea insignis* (Blechnaceae).

The **Semi-evergreen forest (upper)** has some similar forest structure and compositions to the Upper evergreen forest but it has 3 layers with not located in or not much influenced by high precipitation. The top canopy which ranged from 15m to 30m, the middle canopy



which ranges from 5m to 15m and the understory below 5m. Within the project area, this type of habitat was found in SP 2, 3, 5, 6, 12, 13, 14, 16, 17, 18, 19, 20, 23, 24, 26, 28 and 29. Nevertheless, some of these plots although as part of the semi-evergreen forest, they were converted to agricultural land which is sometime called shrubland. The dominance trees of the Semi-evergreen forest are more in the genus of *Quercus*, *Lithocarpus* and *Castranopsis* of Fagaceae

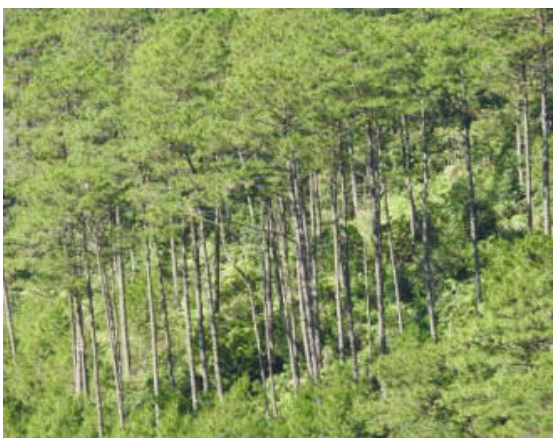
which some of them drop leaves seasonally. However, it is quite mixed sometime as this forest type is also called coniferous broadleaved forest when it has some higher portion of *Pinus*.



This pure stands with nearly closed canopy, and mixed coniferous trees and broad-leaved trees species. Therefore, the dominated tree species can include *Pinus kesiya* (Pinaceae), *Morella cerifere* (L.) small, *Lithocarpus polystachyus* (Wall.) Rehd, *Lithocarpus tubulosus* (Hickel & A. Carmus) A. Camus. (Fagaceae), *Aporosa planchoniana* Baillon Müll-Arg. (Euphorbiaceae), *Memecylon edule* Roxb. (Melastomataceae). On the ground story cover with fern species such as *Dicranopteris linearis*

(Gleicheniaceae), *Cibotium barometz* (Cibotiaceae) and *Brainea insignis* (Blechnaceae).

Coniferous Forest



Coniferous forest is mainly interspersed with areas of grass and scrub, the trees are relatively small. Pure stand of Pine tree species *Pinus kesiya* Royle ex Gordon (Pinaceaeas) as Coniferous tree species was found such as SP 15 and 25, but still include some patterns of Semi-evergreen forest in the plots. The CF habitat has a poor or no understory with up to 60% of its canopy cover, their average height is around 20-25 m. This type of habitat was found in SP 15, 17 and partly for SP 2, 3, 5, 6, 12, 13, 15, 16, 24 and

26. Although the coniferous forest there are still present of some broad-leaved tree species that belong to genus of *Quercus*, *Lithocarpus* and *Castranopsis* in Fagaceae. On the understory of coniferous forest was dominated by ferns such as *Blechnum orientale*

(Blechnaceae), *Dicranopteris linearis* (Gleicheniaceae), *Cibotium barometz* (Cibotiaceae) and *Brainea insignis* (Blechnaceae) and also palm like *Cycas micholitzii* (Cycaceae).

Secondary Forest



This habitat is one of forest and land use type which is mainly modified from SEF, it is located widely, in scattered small areas but found throughout the project area, especially the southern, central and central-northern sections of the project area. The secondary forest is the habitat that was modified from originally semi-evergreen forest. According to the land use map as it also shows in shrubland largely. This habitat was found in the SP 2, 3, 4, 5, 7, 11, 12, 14, 16, 23, 24, 25 and 29.

In general, the secondary forest of these SPs was originally from evergreen/semi-evergreen. The tree height of old fallow at 10 m, they are usually dominated by the species of families Fagaceae as *Lithocarpus polystachyus* (Wall.) Rehd, *Quercus fabrei* Hance, Euphorbiaceae as *Sterculia lancaviensis* Ridl., *Phyllanthus emblica* L. Euphorbiaceae as *Phyllanthus emblica* L., *Aporosa tetrapleura* Hance, *Aporosa planchoniana* Baillon ex Müll-Arg. The secondary forest also includes distribution of tall grass as Khem *Thysanolaena latifolia* and Lao *Saccharum arundinaceum* (Poaceae). The bamboo species are also available in this habitat such as Mai Hia *Schizostachum virgatum* and/or Mai sod *Pseudostachyum polymorphum*.

Shrubland: Shrubland is a mosaic of bushes as clumps of short trees occur in poor soil condition and not well grow – as height of not over 3-4 m, part of secondary forest by the habitat definition (see below).



It was originally modified from evergreen/semi-evergreen forest. It is about non-potential forest/degraded forest around agricultural land, secondary forest (fallow) is part of it, the fallows that could not be well regenerated due to lower soil layer and poor

soil. This forest type/habitat was found largely in the project area, covering 43%. The shrub land is usually dominated by *Melastoma floribundum* Blume (Melastomataceae), *Rhodomyrtus tomentosa* (Aiton) Hassk. (Myrtaceae).

Grassland: Grassland occurs scattered in the project area especially in the southern and central, but just covering 1%. This habitat type is often found in a plateau including Dakcheung Plateau. It is located mainly within the landscape of coniferous forest and some semi-evergreen forest (upper).



5.2.2 Dominant flora species

Dominant flora species slightly varies based on forest types as the dominant species tree in the project area based on frequency detection from sampling plots consist of *Lithocarpus lolystachyus* (Wall.) Rehd, (Fagaceae), *Pinus kesiya* Royle ex Gognep. (Pinaceae), *Diospyros silvatic* Roxb, *Hopea pierrei* Hance, *Cinnamomum iners* Reinw. Ex Blume, *Castanea mollissima* Blume, *Aporosa lplanchoniana* Baillon ex Mull-Arg. (Euphorbiaceae).

The dominant species in the evergreen forest which is dominated by large evergreen trees such as *Hopea pierrei* Hance (Dipterocarpaceae), *Cinnamomum iners* Reinw. ex Blume (Lauraceae), *Dacrydium elatum* (Roxb.) Wall. ex Hook., *Dacrycarpus imbricatus* (Blume) de Laub. (Podocarpaceae) and *Pinus kesiya* Royle ex Gordon (Pinaceae). In the lower layer is also dominated by evergreen trees such as *Lithocarpus polystachyus* (Wall.) Rehd, *Castanea mollissima* Blume, *Diospyros silvatica* Roxb (Ebenaceae), *Aporosa tetrapleura* Hance (Euphorbiaceae) and *Ficus annulata* Blume (Moraceae). In the understory is dominated by fern species such as *Blechnum orientale* (Blechnaceae), *Dicranopteris linearis* (Gleicheniaceae), *Cibotium barometz* (Cibotiaceae) and *Brainea insignis* (Blechnaceae).

5.2.3 Key flora species

With reference to the distribution of plant species, there are some key species not only globally threatened species but also national prohibited and special tree species list of the Lao PDR according to the national regulations for tree species conservation (see Table 3).

Table 3. List of key species in the project area

No	Lao Name	Scientific names	Family names	IUCN Redlist	National List
1	Mai Ket sana	<i>Aquilaria crassna</i>	Thymeliaeaceae	CR	I
2	Mai Ket dam	<i>Dalbergia oliveri</i>	Fabaceae	EN	I
3	Mai Khaen hin	<i>Hopea ferrea</i>	Dipterocarpaceae	EN	II
4	Khapa lamxay	<i>Meistera celsa</i>	Zingiberaceae	EN	NE
5	Mai dou	<i>Pterocarpus macrocarpus</i>	Fabaceae	EN	I
6	Mai Yong phai	<i>Aglaia malaccensis</i>	Meliaceae	NT	NE
7	Mai Hua la	<i>Cycas simplicipinna</i>	Cycaceae	NT	NE
8	Mai Pek ha yoi	<i>Pinus dalatensis</i>	Pinaceae	NT	I
9	Mai Hua la noy	<i>Cycas micholitzii</i>	Cycaceae	VU	NE
10	Mai Yang deng	<i>Dipterocarpus costatus</i>	Dipterocarpaceae	VU	II
11	Mai Si hay ton	<i>Cinnamomum iners</i>	Lauraceae	LC	SL
12	Mai Nang dam	<i>Diospyros silvatica</i>	Ebenaceae	LC	SL
13	Mai Pek sam yoi	<i>Pinus kesiya</i>	Pinaceae	LC	SL

Remarks: CR = Critically endangered; EN = Endangered; VU = Vulnerable; NT = Near-threatened; LC = Least Concern; I = Prohibited species of Laos; SL = Specialist List

Not all of the above species were recorded during the assessment and mainly not found in the SPs. There are possible for some number of key flora species occur in the wider project area (including the proposed TL section).

In addition, apart from key species there are some important tree species which were found in the proposed TL section such as *Mai hing luang (Dacrydium elatum)*, *Mai hing deng (Dacrycarpus imbricatus)*, *Mai Chuang (Cinnamomum iners)* and *Mai Khaenhin (Hopea pierrei)* – key species, EN. Interestingly, *Mai Paek sam bei (Pinus kesiya)* which is one of dominant species is recently recorded in Laos (Thomas et al. 2007), it is not listed as globally threatened species since it has a wide distribution in Asia and also in Laos. It occurs at high altitude and can be up to 2,000 m a.s.l (Thomas et al. 2017). A large distribution of this species along the Lao-Vietnam border including most part of Xiengkhouang Province, eastern part of Bolikhamxay, Khammouane and Savannakhet Provinces. This pine was found in scatter within Semi-evergreen forest throughout the project area especially in southern and central-north sections. This *pinus* species in Dakcheung District is under high threat due to large area where this forest type occurs was slashed for cultivation. It is likely the pine is not well recovered when the habitat was slashed repeatedly. Successional plants were observed and is dominated by other

plants in the original pine wood land which therefore the pine “Mai Paek sombei” being degraded and about to lost in many places.

5.2.4 Endemic flora species

There would be some endemic flora species in the area. Recently, some new species were discovered in southern Laos, Champasak Province such as *Hedychum chayanianum* Wongsuwan (Wongsuwan, 2008) and 2 new species of *Kaempferia* (Picheansoonthon and Koonterm, 2009) as these are in the family of Zingiberaceae and so these species might be found in the project area, likely in the northernmost and eastern sections. By the way, there are some flora species encountered during the field assessment that could not be identified (see Fig. 6).



Figure 6. Unidentified plant specimens collected from the field

Given unidentified species is not meant a new or endemic species for the time being these should be collected apart from leaves are their barks and fruits for further identification. There are likely some endemic flora species present in the Montane forest at high elevation such as SP 4 at 1,600 m a.s.l. Some specimens of the plants collected have not yet been identified, including from SP 4, 7, 8, 23 and 22. Therefore, it is interesting to conduct further study on plants in the area.

5.3 Fauna

Through the current reviews and rapid assessment showed that the project area especially the concession area is considered poor ecological status except the northernmost zone and along the proposed transmission line (see Fig. 7). Although the previous known Important Bird Area (IBA), its value has no longer. Three sample plots (SP 1, 5 and 6) are located in the Dakcheung IBA/KBA, its habitats at these SPs are highly degraded, converted to agricultural land (hill rice cultivation). Actually, this issue was

reported during the reassessment in 2008 (BirdLife International). Therefore, the degradation of the Dakcheung IBA is well confirmed.

Overall, some forest bird species were seen during the assessment especially small forest bird species and some evidences of mammals were recorded especially at SP 4, 7, 8, 9 and 10 where these are located in Upper evergreen forest (see Fig. 7, 8 and 9). In addition, some more interesting globally threatened wildlife species were reported in these SPs. In reality, there are considered high number of globally threatened species in the project area according to the IUCN/IBAT database for their habitat distribution as totally 63 species, including 1 amphibian, 6 reptiles, 12 birds, 22 mammals and 22 fishes (see Annex 6). The species distribution and suitability habitat of these are in the northern zone and the TL section, including Xekhaman at around Ban Dak Ta-or-noy. However, many of them would be no longer, fewer or rare to find today. That is why, they were given to their status of being likely possible present or maybe present (see Annex 6). Of which, the most important taxon could be for mammal, bird and reptile and the target species will be in high proportion for the mammal.

Meanwhile, some bird species were found have not been on the list of IBAT/Dakcheung IBA such as Pin-tailed Green Pigeon (*Treron Apicauda*). This bird species was seen at SP 13 on Dec 28th, 2020 with a flock of 30 individuals feeding in high tree (see Fig. 7 - Photo No. D). However, it is neither endemic nor threatened species.

5.3.1 Dominant fauna species

Dominant species would be those species with high frequency of encounters per particular spatial and unit effort. In this regard, there would be however no any dominant fauna species in the area could be described since the frequency of encounter of particular fauna species is very low. With reference to the species that was recorded most by any means (evidences and direct observation) are Wild pig *Sus scrofa*, Barking Deer *Muntiacus muntjac*, Bulbuls (Black Crested Bulbul *Rubigula flaviventris* and Sooty-headed Bulbul *Pycnonotus aurigaster*), Shrikes *Lanius*, Bushchat *Saxicola*, Pigeon *Treron* and Rock Thrush *Monticola*. The northern and eastern sections are better opportunity to detect some fauna species especially small forest birds in the project area.

5.3.2 Key fauna species

Key species, those species are classified as globally threatened species according to IUCN Redlist, there could be at least Vulnerable species, certainly for Endangered and Critically Endangered species. Through the assessment, the globally threatened species that were recorded directly during the field assessment such as Sambar *Rusa unicolor* (VU), Southern Serow *Capreolus sumatraensis* (VU) and Bear (VU) - probably Asiatic Black Bear *Ursus thibetanus* according to the IBAT database. These species were found at SP 4 (the northernmost zone at altitude of 1,600 m a.s.l. Further to north from the SP 4 is more interesting since Gibbons and Douc Langurs were currently reported by the villagers of Ban Prao.

Other globally threatened species that have current distribution and were reported their presence around the sample plots at the proposed transmission line from Dakcheung town to the Lao-Vietnam border. Particularly the area in some distance surrounding the SP 9 and 10 the potential key species are Red-shanked Douc Langur *Pygathrix nemaeus*, Pangolin *Manis* (CR), Large antlered Muntjac *Muntiacus vuquangensis* (CR), also probably include Buff-cheeked Gibbon *Nomascus annamensis* (EN). Also, Sambar *Rusa unicolor* (VU), Southern Serow *Capreolus sumatraensis* (VU) and Bear (VU) were reported in this section. In addition, some more key species (Globally Threatened) may be present in the project area but their chances to be detected from the survey would be low (see Annex 6).



Figure 7. Some evidences of fauna species identified in the project area

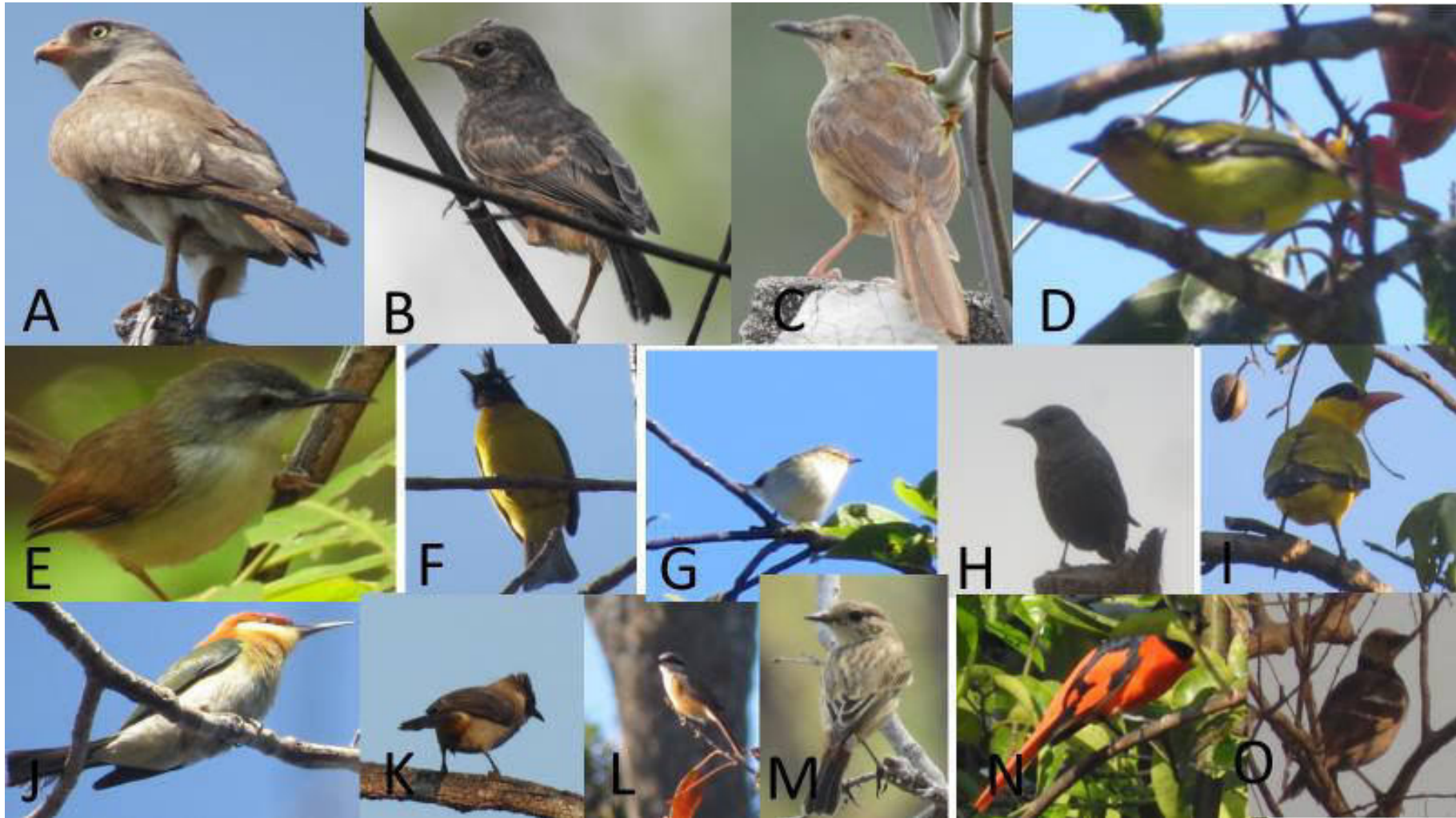


Figure 8. Some photos of bird species identified in the project area

A = Rufous-winged Buzzard; B = Pied Bushchat; C = Plain Prinia; D = Common Iora; E = Rufescent Prinia, F = Black-crested Bulbul; G = Davison's Leaf Warbler; H = Blue rock Thrush; I = Black-naped Oriole; J = Chestnut-headed Bee-eater; K = Sooty-headed Bulbul; L = Grey-back Shrike; M = Grey Bushchat; N = Scarlet Minivet; O = Black-collared Starling.



Figure 9. Some photos of bird species identified in the project area

A = Crested Serpent Eagle; B = Forest wagtail; C = Thick-billed Pigeon; D = Great Coucal; E = Blossom-headed Parakeet; F = Black-caped Woodpecker; G = Striped-throated Bulbul; H = Dark-side Flycatcher; I = Common Hoopoe; J = Hair-crested Drongo; K = Asian Barred Owlet; L = Large Cuckooshrike; M = Green-billed Malkoha.

For birds, there is no particular bird species of conservation significance in the area. According to IBA, it describes about some winter birds such as Yellow Breasted Bunting (CR) in the area and likely possible but the current habitat is seriously degraded which would limit for winter birds to visit. Once, our limited observation during the field assessment we could not find this bird. Meanwhile, some distance surrounding the SP 9 and 10 there would be possible to present of some large ground birds such as Silver Pheasant, Green Peafowl, Siamese Fireback, Great Hornbill and Great Argus. Of which, the Great Argus is most interesting since its population in the country is very low, inhabits in Upper evergreen forest (Annamite Mountain Range).

This bird species was reported in the TL section. It is a nationally conservation significance as well as some internationally. Other taxa, the reptiles and turtles, some globally threatened species would be present in the area especially the northern and eastern section such as King Cobra (VU), Spitting Cobra (VU), Keeled Box Turtle (VU) and Burmese Python (VU).

5.3.3 Endemic fauna species

Hardly any endemic mammal species can be found in the project area but probably some few endemic bird species would be present according to BirdLife International. The endemic birds are Yellow-billed Nuthatch (*Sitta solangiae*) as Globally Near-threatened, Black-crowned Barwing (*Actinodura sodangorum*). Nonetheless, the interesting endemic mammal species in the area, some distance surrounding of the SP 9 and 10 would be presence of Large antlered Muntjac, Annamite Muntjac, Annamite Striped Rabbit which were reported in the proposed TL section at sub-village of Ban Dak Ta-oronoy. In addition, although Pin-tailed Green Pigeon (*Treron Apicauda*) not endemic bird it is quite rare.

5.4 Rating of Ecosystem by Sample Plot

Rating of ecosystem value by sample plot was given based on 3 parameters as habitat, flora and fauna (see Table 4). A total of 29 SPs were assessed through quantitative and qualitative approaches it is realized that the ecological value of the project area is considered poor. The SPs with poor and seriously poor ecological values covering highest proportion of the total SPs, that was counted for 58.62%, then the SPs with satisfactory ecological value was counted for 31%. While, only 3 SPs are rated as high ecological value which was counted for only 10.34% (see Fig. 10).

The SPs are rated for high ecological value that met at score 4 including SP 4, 9 and 10. The SPs are rated as satisfactory ecological value that met at 3 including SP 7, 8, 12, 13, 20, 24, 25, 27 and 28. While, the rest of them are poor ecological value (see Table 4). The SPs with high ecological value are important as not all scores made from good forest habitat, high diversity of flora and also fauna. Although the SP 9 and 10 we had not detected any globally threatened species these were assessed based on village reports and their habitat suitability. Once, the SP 9 and 10 were just by the road so there are hardly any good number of GT species could be encountered.

The SPs with poor ecological value which are mainly dominated by secondary forest/fallow including SP 1, 2, 3, 5, 6, 14, 16, 17, 18, 21, 22, 23, 26 and 29. While, the SPs with serious poor ecological value which are considered coniferous/ shrubland/ bareland/grassland including SP 11, 15 and 19.

Table 4. Rating of ecological value by sample plot

Sample Plot	Habitat	Flora	Fauna	Eco. Integrity	Level	Remarks
SP 1	2.0	2.5	1.5	2.0	L+	Poor
SP 2	1.5	2.5	1.5	1.8	L	Poor
SP 3	1.5	2.0	1.5	1.6	L	Poor
SP 4	4.0	4.0	4.5	4.1	H	High
SP 5	2.0	2.5	1.5	2.0	L+	Poor
SP 6	2.0	2.0	1.5	1.8	L	Poor
SP 7	3.0	3.5	2.5	3.0	M	Satisfactory
SP 8	3.5	3.5	3.0	3.3	M	Satisfactory
SP 9	4.0	4.0	4.0	4.0	H	High
SP 10	4.0	4.0	4.5	4.1	H	High
SP 11	1.0	1.5	1.0	1.1	L	Poor
SP 12	3.0	3.5	2.5	3.0	M	Satisfactory
SP 13	3.0	3.5	2.5	3.0	M	Satisfactory
SP 14	2.0	2.5	1.5	2.0	L+	Poor
SP 15	1.0	1.5	1.0	1.1	L	Poor
SP 16	2.0	2.5	2.0	2.1	L+	Poor
SP 17	1.5	2.0	1.5	1.5	L	Poor
SP 18	2.0	2.5	2.5	2.3	L+	Poor
SP 19	1.0	2.5	1.0	1.3	L	Poor
SP 20	4.0	4.0	3.0	3.6	M+	Satisfactory
SP 21	2.5	3.0	2.0	2.5	L+	Poor
SP 22	3.0	3.0	2.0	2.6	L+	Poor
SP 23	2.5	3.0	2.0	2.5	L+	Poor
SP 24	3.0	3.5	3.0	3.1	M	Satisfactory
SP 25	1.0	2.0	2.0	1.6	L	Poor
SP 26	3.5	3.5	3.5	3.5	M+	Satisfactory
SP 27	3.5	3.5	3.5	3.5	M+	Satisfactory
SP 28	3.0	3.5	2.5	3.0	M	Satisfactory
SP 29	1.0	1.5	1.0	1.1	L	Poor

5.5 Threats

Threats to biodiversity in the project area are not really high, perhaps not many wildlife species are available to hunt so only 3 SPs where evidences of threats were found such as snare line (netting) for pangolin at SP 21, and other snare lines were found at SPs 10, also a small-scale logging activity at SP 9 (see Fig. 10). A hunting with guns is still used in the area as people with guns in forest were found in Ban Dak Sieng such as at SP 28.



Figure 10. Snare lines and wildlife traps

5.6 Critical Habitats and Key Species

Through the assessment, key fauna species were recorded at SP 4 and some at SP 9 and SP 10. Due to short field visit the assessment could not well confirm some possible globally threatened species in the area. With reference to the IBAT database/IUCN Redlist/KBA, and habitat suitability, the section especially at SP 9, SP 10 and SP 4, and partly SP 7 and 8, are in the distribution of key species such as Buff-cheeked Gibbon, Red-shanked Douc Langur, Pangolin, Sambar, Southern Serow, Stump-tailed Macaque, Large antlered Muntjac etc. However, the SP 7 and 8 are close to settlement which these species would not be present recently.

In addition, some globally threatened flora species would also be present in these plots. Therefore, at least the SP 4 toward on north, and SP 9 and 10 along the proposed TL section are considered most important habitats which their ecological values remain high today. The SP 9 and 10 have not much evidences of key species recorded during the assessment it is understood anyhow that this section is most important forest corridor of the Annamite Mountain Range. It functions to connect from north at the Southern Xesap National Protected Area (NPA) to the Northern Dong Ampham NPA. Also, this section is international recognized as BCC⁶ of ADB project. In this regard, these two sections are considered a critical habitat (see Fig. 11).

⁶ BCC =Biodiversity Conservation Corridor is a regional forest corridor of ADB funded project.

Finally, the assessment against the international environment standards as such IFC Performance Standard 6, ADB Environment and Social Safeguard, and World Bank Safeguard Policy by using checklist of key questions prepared as below:

No	Key questions	YES/NO	SP of Relevance
1	Is any natural habitat available?	YES	SP 4, 9, 10, and Partly for SP 7, 8, 13, 20
2	Is any global threatened species?	YES	SP 4, 9, 10, and partly for SP 8
3	Is a good number of globally threatened species?	Partly	SP 4, SP 9 and SP 10
4	Do they hold a large population	Maybe	Likely low for many of them

Therefore, the SP 4 are highly confirmed for critical habitat according to the International environment standards but it is quite pre-mature for the SP 9 and 10. However, the importance of biodiversity hotspot is more for the SP 9 and 10 because this forest section is regionally wildlife corridor. Although it has the road runs through this section from Dakcheung town to the Lao-Vietnam border the forest is still used by some globally threated species – at least Sambar was well reported. The road is just local and one existing TL from Xekhaman 2 was seen crossing the road but it does not run along the road. However, the road has already made the habitat fragmented which created barrier for some species such as Northern Buff -cheeked Gibbon *Nomascus annamensis*, EN).

5.7 Conservation Areas and Conservation Significance

- Internationally*

Annamite Mountain Range is internationally recognized as Indo-Burma Biodiversity Hotspot where the eastern section of Sekong is part of it. As 6 large mammal species have been discovered since 1990s, including: Large-antlered Muntjac, Annamite Muntjac, Grey-shanked Douc Langur, Annamite-striped Rabbit, Leaf Deer and Saola (CEPF, 2019; <https://en.wikipedia.org/wiki/Indo-Burma>). For the eastern section of Dakcheung is highly potential to presence of Large-antlered Muntjac (CR), Annamite Muntjac and Annamite-striped Rabbit. In addition, for the central-west of the project area is also international recognized as Key Biodiversity Area/Important Bird Area which is relevant to SP 1, 5 and 6 (see Fig. 11). Apart from birds the IBA supports habitat of Oriental Small-clawed Otter (*A. cinerea*) and Big-headed Turtle (*Platysternon megacephalum*) according to Showler et al. (1998), also tiger and Asian elephants were reported in the past but highly likely these two species are no longer in the area in recent years.

- Regionally*

The forest section from Dakcheung town to the Lao-Vietnam border is considered a regionally important forest area, it is a biodiversity conservation corridor (BCC) of ADB funded project. This section connects the forest zones of the Annamite Mountain Range

and also to the conservation forest of Vietnam known as Song Tran Forest Reserve where Critically Endangered Grey-shanked Douc Langur is present. The biodiversity conservation corridor in the region especially the tri-border with Vietnam and Cambodia has been funded by ADB project (2004 - present) with 3 phases so far. It is the highest investment project for forest conservation corridor in the region.

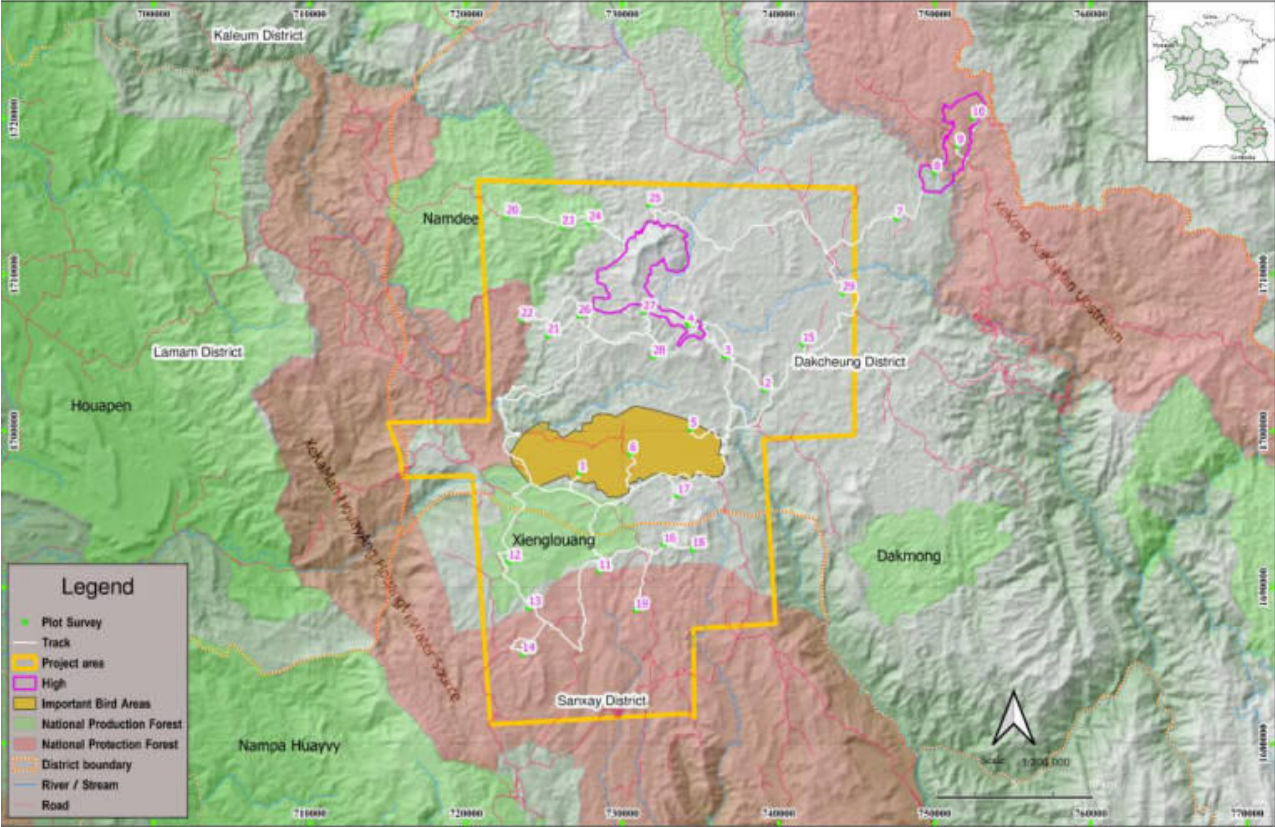


Figure 11. Conservation Areas and IBA/KBA in the project area

- *Nationally*

As the eastern section is part of Biodiversity Conservation Corridor, it is most important biodiversity conservation area in the country and that is legally recognized. The forest landscape in the area is important for biodiversity conservation so as to ensure the habitat connectivity and species can move from one-another within their ecosystem. In addition, Sekong-Xe Khamman National Protection Forest⁷ that are relevant to SP 8, 9, 10, 13, 14, 11, 19, 22 as forest and forest cover is priority for the protection to benefit a number of hydropower projects in the southern region.

- *Locally*

⁷ Protection forest is one of conservation forest types but it focuses on watershed protection by ensuring forests and forest cover are well maintained, also to protect soil erosion and provide services of water supply.

As 2 legally designated forest areas are located in the project area, including Namdae Protection Forest is relevant to SP 20, 23 and 24, and Xieng Luang Production Forest is relevant to SP 12 and 13 as forest and forest cover is priority for the protection to partly benefit some hydropower projects in the southern region.

6. RECOMMENDATIONS

Further survey may be needed for the northern zone at north and northeast section of the SP 4 as well as wider landscape surrounding the SP 9 and 10 since these are critical habitats that support some populations of globally threatened species. There are a high number of globally threatened species in the project area according to the IUCN/IBAT database for their habitat distribution as totally 63 species (1 amphibian, 6 reptiles, 12 birds, 22 mammals and 22 fishes). However, due to the current status of habitats in the project area, many of them would not be longer in the area, rare and not really relevant to the nature of the project so the most important and target species for further assessment will be mainly the groups of mammal, bird and reptile (see Annex 6).

For sake of sound power project development, a full biodiversity assessment should be conducted for certifying these globally threatened species as to plan for ensuring mitigation measures for potential negative impacts in place prior to the project construction. A baseline is important and essentially necessary for a large project development for long-term monitoring. Results of the assessment can be used by defining appropriate indicator species for regular monitoring throughout the lifespan of the project. Sufficient sample plots will be designed and the survey techniques apart from direct observation, camera trapping would be used. Therefore, 6 survey blocks (4 in northern zone and 2 in TL section) should be defined for biodiversity assessment and to be conducted for 2 seasons by skilled expert team.

7. CONCLUSION

Through the current review and rapid assessment showed that the project area especially the concession area is considered poor ecological status except the northernmost zone and along the proposed transmission line revealed important ecological value. The SPs with poor and seriously poor ecological values covering highest proportion of the total SPs, that was counted for 58.62%, then the SPs with satisfactory ecological value was counted for 31%. While, only 3 SPs were rated as high ecological value which was counted for only 10.34%. Although the previous known Important Bird Area (IBA), its value has no longer. Three sample plots (SP 1, 5 and 6) are located in the Dakcheung IBA/KBA, its habitats at these SPs are highly degraded, converted to agricultural land (hill rice cultivation). Actually, this issue was reported during the reassessment in 2008 (BirdLife International). Therefore, the degradation of the Dakcheung IBA is well confirmed.

This is a rapid assessment which would not provide details of the ecological values and species. However, it provides and guide where high or low ecological values which the

project can redesign and relocate power plants appropriately. In addition, as to ensure sound power project development, a full biodiversity assessment in the critical habitats with specific survey for key species should be conducted in the near future with ensuring mitigation measures for potential negative impacts are in place prior to the project construction. Consequently, ecological baseline can be obtained for long-term monitoring.

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Annexes

Annex 1. Data Sheet by Sample Plot

Sample Point: 01 Nearest location: Ban Xieng Luang

Forest type/Ecosystem: Fallow/semi-evergreen/coniferous forest ecosystem

Latitude (N)	Longitude (E)	Altitude	Date
1679345	727270	1,225 m a.s.l.	Dec 31, 2020
<p>Initial Field Assessment:</p> <p>Low Moderate High Exceptional (Flora & Fauna)</p> <p>Reason for initial assessment:</p> <p>IBA/KBA, upper semi-evergreen and coniferous forests which would support some important habitats and associated flora and fauna species.</p> <p>Habitat Description:</p> <p>There are fallows, originally from upper semi-evergreen and coniferous forests. The area was degraded today, mainly converted to agricultural land, some old and young fallows. Therefore, the habitat was degraded, loss of forest structure which only some patches of the forest were found. This plot of 500m radius is considered poor ecological status as no original forest remains with low diversity of flora and fauna.</p> <p>Characteristic flora (composition):</p> <p>Mainly a large distribution of fallow, just a few clusters of trees, including pines are found in scatter, thick fallows and hard to get through. As short trees and shrubland which no any specific characteristic flora could be described.</p> <p>Flora species or interest (present or likely to be present):</p> <p><i>Dominance: Mai kor, Mai Meuad, Mai Paek (pinus) (see the list).</i></p> <p><i>Key species: None</i></p>		  	

Native species: None

Fauna species (present or highly likely to be present):

Species/signs of species recorded for:

Key species: None

Other species/native species: some number of small forest birds especially bulbuls and warblers (see the list).

Species of interest likely to be present:

Key species: None

Other species/native species:

Ecosystems Services comments

Barely function anything of particular ecosystem service.



Pinus



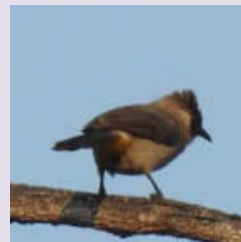
Mai Kor



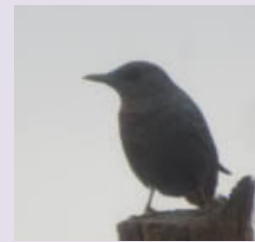
Davison's Leaf Warbler



Black collared Starling



Sooty-h. Bulbul



Blue rock Thrush

List of some flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai Paek	<i>Pinus kesiya</i>	PINACEAE		
2	Mai kham pom	<i>Phyllanthus emblica L.</i>	EUPHORBIACEAE		
3	Mai kor nok	<i>Lithocarpus polystachyus (Wall.) Rehd</i>	FAGACEAE		
4	Mai kor nam	<i>Castanea mollissima Blume</i>	FAGACEAE		
5	Mai meaud	<i>Aporosa tetrapleura Hance</i>	EUPHORBIACEAE		
6	Mai kor houm	<i>Quercus fabrei</i>	FAGACEAE		
7					
8					
9					
10					
11					
12					
13					
14					
15					

List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
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1	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, suitability, report
2	Seua meo	Leopard cat	<i>Prio. bengalensis</i>		L, suitability, report
3	Ka tae	Indochinese ground squirrel	<i>Menetes berdmorei</i>		L, feeding site seen
4	Bang nai	Phayrei's Flying squirrel	<i>Hylopetes sp.</i>		L, suitability, report
5	Nok Eing mong	Black collared Starling	<i>Gracupica nigricollis</i>		L, sighting
6	Nok jib	Divison's Leaf Warbler	<i>Phylloscopus intensor</i>		L, sighting
7	Nok ka in	Blue rock thrush	<i>Monticola solitarus</i>		L, sighting
8	Kai pa	Red junglefowl	<i>Gallus gallus</i>		L, feeding site seen
9	Nok jib	Warbler sp.	<i>Phyloscopus sp.</i>		L, sighting
10	Nok ka thad	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		L, sighting
11	Nok khiew	Common Iora	<i>Aegithina tiphia</i>		L, sighting
12	Nok ka thad dam	Black crested Bulbul	<i>Rubigula flaviventris</i>		L, sighting
13	Nok ka thad dam	Sooty-headed bulbul	<i>Pycnonotus aurigaster</i>		L, sighting

- **Rating of the ecosystem integrity at location (1 = Poor to 5 = excellent)**

Key Parameter	Rating	Justification
Habitat/forest structure	2.0	Mainly fallows, some old and largely young fallows – originally from semi-evergreen forest and partly coniferous forest, the habitat was degraded, loss of forest structure which only some patches of the forests were found.
Flora	2.5	Many tree species would be lost as no diversity of tree species in fallows.
Fauna	1.5	Only a few small mammal and forest birds were reported and sighted.
Ecosystem integrity	2.0	Habitat was degraded, loss of forest structure which only some patches of the forest were found.
Ecosystem status	L+	The ecosystem of this plot is fairly highly degraded, although this sample plot is part of Dakcheung IBA it is nothing of being potential for conservation.

- **Current threats and management**

Largely shifting cultivation has been practiced in the area. This forest area is known as IBA but no any management in place. Although this sample plot is internationally recognized IBA/KBA, the habitat is really degraded so the IBA/KBA value is already lost. While, neither this forest is classified to be part of any conservation area in the country nor any management is in place.

Sample Point: 02

Nearest location: Ban Dak Dor

Forest type/Ecosystem: Fallow/semi-evergreen/coniferous forest ecosystem

Latitude (N)	Longitude (E)	Altitude	Date
1702633	739117	1,268 m a.s.l.	Dec 26, 2020

Initial Field Assessment:

Low Moderate High Exceptional
(Flora & Fauna)

Reason for initial assessment:

Upper semi-evergreen and coniferous forests, it is part of Dakcheung Plateau which would support some important habitat for especially bird community.

Habitat Description:

Fallows were originally from upper semi-evergreen and partly coniferous forests. The area was degraded, mainly converted to agricultural land, some old and young fallows. Therefore, the habitat was degraded which only some patches of the forest were found. This plot of 500m radius is considered poor ecological status as no original forest remains with low diversity of flora and fauna.

Characteristic flora (composition):

Mainly a large fallow distribution, just a few clusters of trees, including some small portion of pines are found in scatter, thick fallow and hard to get through. As short trees and shrubland which no any specific characteristic flora could be described.

Flora species or interest (present or likely to be present):

Dominance: Mai kor, Mai Meuad, Phak koud (see the list).

Key species: None

Native species: None

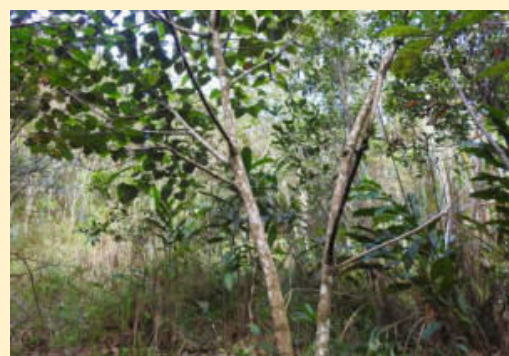
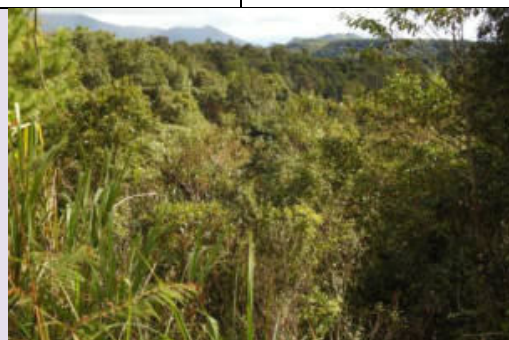
Fauna species (present or highly likely to be present):

Species/signs of species recorded for:

Key species: None

Other species/native species: some number of mammals and forest birds especially bulbul, warbler, prinia, bee-eater (see the list).

Species of interest likely to be present:

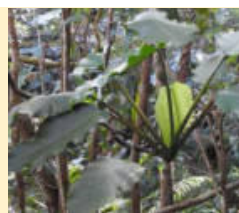


Key species: None

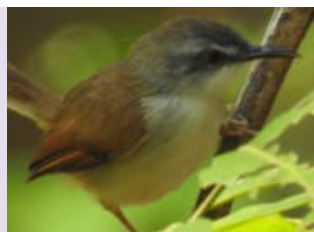
Other species/native species:

Ecosystems Services comments

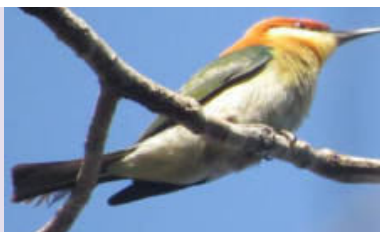
Barely function anything of particular ecosystem service.



Galanga



Rufescent Prinia



Chestnut-headed Bee-Eater

List of some flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai kor nam	<i>Castanea mollissima Blume</i>	FAGACEAE		
2	Mai meaud	<i>Aporosa tetrapleura Hance</i>	EUPHORBIACEAE		
3	Mai Pohou xang	<i>Sterculia lancaviensis Ridl.</i>	MALVACEAE		
4	Mai kham pom	<i>Phyllanthus emblica L.</i>	EUPHORBIACEAE		
5	Mai kor nok	<i>Lithocarpus polystachyus (Wall.) Rehd</i>	FAGACEAE		
6	Mai Paek	<i>Pinus kesiya</i>	PINACEAE		
7	Fak hou xang				
8	Mai Sompoi	<i>Acacia concinna (Willdenow) DC.</i>	MIMOSOIDEAE		
9	Phak koud khok	<i>Cyathea species</i>	PTERYDOPHYTA-CYATHEACEAE		
10					
11					
12					

List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
1	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, suitability, report
2	Seua meo	Leopard cat	<i>Prio. bengalensis</i>		L, suitability
3	Ka tae	Indo. ground squirrel	<i>Menetes berdmorei</i>		L, suitability
4	Bang nai	Phayrei's Flying squirrel	<i>Hylopetes sp.</i>		L, suitability
5	Nou	Rat	<i>Leophodamys</i>		M, feeding site seen
6	Nok Eing mong	Black collared Starling	<i>Gracupica nigricollis</i>		L, sighting
7	Nok jib	Divison's Leaf Warbler	<i>Phylloscopus intensor</i>		L, sighting
8	Nok ka in	Blue rock thrush	<i>Monticola solitarius</i>		L, sighting
9	Kai pa	Red junglefowl	<i>Gallus gallus</i>		L, feeding site seen
10	Nok jib	Warbler sp.	<i>Phylloscopus sp.</i>		L, sighting
11	Nok ka thad dang	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		L, sighting
12	Nok khiew	Common Iora	<i>Aegithina tiphia</i>		L, sighting
12	Nok ka thad dam	Sooty-headed bulbul	<i>Pycnonotus aurigaster</i>		L, sighting
12	Nok ka cheoi	Chestnut-headed Bee-Eater	<i>Merops leschenaulti</i>		L, sighting

- **Rating of the ecosystem integrity at location** (1 = Poor to 5 = excellent)

Key Parameter	Rating	Justification
Habitat/forest structure	1.5	Mainly fallows, some old and young fallows – originally from semi-evergreen forest and coniferous forest, the habitat was degraded, loss of forest structure which only some patches of the forest were found.
Flora	2.5	Some tree species would be lost as low diversity of tree species.
Fauna	1.5	Only a few small mammal and forest birds were reported and sighted.
Ecosystem integrity	1.8	Habitat was degraded, loss of forest structure which only some patches of the forest were found, with some small mammal and forest birds.
Ecosystem status	L	The ecosystem of this plot is degraded, nothing is potential for conservation nor any conservation forest in the area.

- **Current threats and management**

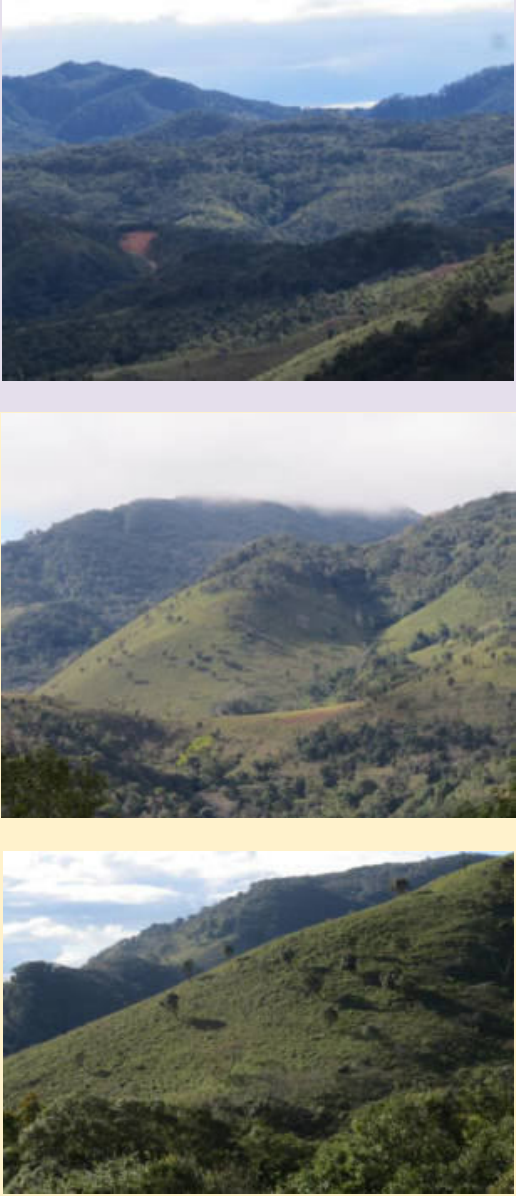
Largely shifting cultivation has been practised and some hunting in the area. Neither this forest is classified to be part of any conservation area nor any management is in place.

Sample Point: 03

Nearest location: Ban Dak Run

Forest type/Ecosystem: Fallow/semi-evergreen forest ecosystem

Latitude (N)	Longitude (E)	Altitude	Date
1704760	736574	1,400 m a.s.l.	Dec 26, 2020
<p>Initial Field Assessment:</p> <p>Low Moderate High Exceptional (Flora & Fauna)</p> <p>Reason for initial assessment:</p> <p>Upper semi-evergreen forest, it is part of Dakcheung plateau and grassland plain which would hold some important habitats for especially bird community.</p> <p>Habitat Description:</p> <p>Fallows were originally from semi-evergreen forest, portion of shrubland and grassland. The area was degraded, mainly converted to agricultural land, some old and young fallows. Therefore, the habitat was degraded, complete loss of forest structure which only some patches of the forest were found. This plot of 500m radius is considered poor ecological status as no original forest remains with low diversity of flora and fauna.</p> <p>Characteristic flora (composition):</p> <p>Mainly a large fallow distribution, just a few clusters of trees are found in scatter. As short trees and shrubland which no any specific characteristic flora could be described.</p> <p>Flora species or interest (present or likely to be present):</p> <p><i>Dominance: Mai kor, Mai Kham pom, Mai Meuad (see the list).</i></p> <p><i>Key species: None</i></p> <p><i>Native species: None</i></p> <p>Fauna species (present or highly likely to be present):</p>			



Species/signs of species recorded for:

Key species: None

Other species/native species: some number of small mammals and small forest birds especially bulbul, bushchat and warbler (see the list). Dropping of civet was seen.

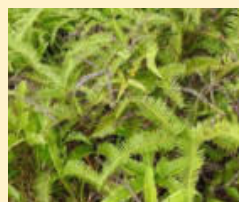
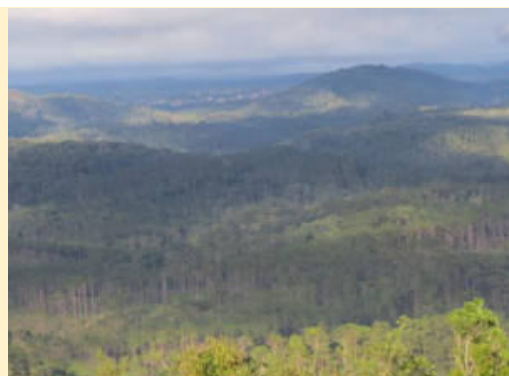
Species of interest likely to be present:

Key species: None

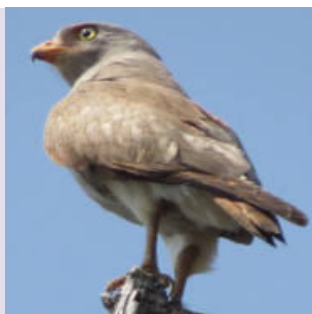
Other species/native species:

Ecosystems Services comments

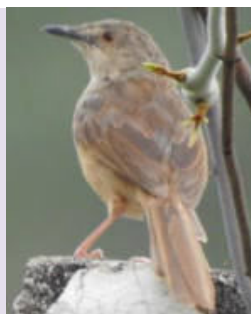
Barely function anything of particular ecosystem service.



Fern



Rufous-winged Buzzard



Plain Prinia



Pied Bushchat

List of some flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai Paek	<i>Pinus kesiya</i>	PINACEAE		
2	Mai kham pom	<i>Phyllanthus emblica L.</i>	EUPHORBIACEAE		
3	Mai kor nok	<i>Lithocarpus polystachyus (Wall.) Rehd</i>	FAGACEAE		
4	Mai kor nam	<i>Castanea mollissima Blume</i>	FAGACEAE		
5	Mai meaud	<i>Aporosa tetrapleura Hance</i>	EUPHORBIACEAE		
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List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
1	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, suitability, report
2	Seua meo	Leopard cat	<i>Prio. bengalensis</i>		L, suitability, report
3	Ngen hang kan	Large Indian Civet	<i>Viverra zibetha</i>		L, dropping seen
4	Bang nai	Phayrei's flying squirrel	<i>Hylopetes sp.</i>		L, suitability, report
5	Nok Eing mong	Black collared Starling	<i>Gracupica nigricollis</i>		L, sighting
6	Nok jib dam	Pied Bushchat	<i>Saxicola caprata</i>		L, sighting
7	Nok ka in	Blue rock thrush	<i>Monticola solitarius</i>		L, suitability
8	Nok jib	Warbler sp.	<i>Phylloscopus sp.</i>		L, sighting
9	Nok ka thad	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		L, sighting
10	Leo hong	Rufous winged Buzzard	<i>Butastur liventer</i>		L, sighting
11	Nok nyot nya	Plain prinia	<i>Prinia inornita</i>		L, sighting
12	Nok ka thad	Sooty-headed bulbul	<i>Pycnonotus aurigaster</i>		L, sighting
13					
14					
15					

- **Rating of the ecosystem integrity at location (1 = Poor to 5 = excellent)**

Key Parameter	Rating	Justification
Habitat/forest structure	1.5	Mainly fallows, some old and young fallows – originally from semi-evergreen forest, the habitat was degraded, complete loss of forest structure which only some patches of the forest were found.
Flora	2.0	Many tree species would be lost as no diversity of tree species in fallows.
Fauna	1.5	Only a few small mammal and forest birds were reported and sighted.
Ecosystem integrity	1.6	Habitat was degraded, loss of forest structure which only some patches of the forest were found.
Ecosystem status	L	The ecosystem of this plot is degraded, nothing is potential for conservation nor any conservation forest in the area.

- **Current threats and management**

Largely shifting cultivation has been practised and some hunting in the area. Neither this forest is classified to be part of any conservation area nor any management is in place. While, neither this forest is classified to be part of any conservation area in the country nor any management is in place.

Sample Point: 04 Nearest location: Ban Dak Run

Forest type/Ecosystem: Montane forest ecosystem

Latitude (N)	Longitude (E)	Altitude	Date
1706786	734181	1,622 m a.s.l.	Dec 29, 2020

Initial Field Assessment:

Low Moderate **High** Exceptional
(Flora & Fauna)

Reason for initial assessment:

Montane forest which would hold important critical habitats of flora and fauna species.

Habitat Description:

There is montane or upper evergreen forest, the forest is not high and considered small size in upper hill at above 1,500 m a.s.l., but taller and larger at foothills. At higher elevation, mosses are covering all parts including soil and rocks. This plot of 500m radius is considered high ecological status as original forest remains largely with high diversity of flora and fauna as some evidences of fauna species were seen.

Characteristic flora (composition):

Basically, neither high tree nor large trees is found at higher elevation, trees are small and short of 8m height and 10cm HBD, and some large and many medium trees are found at lower elevation. There are mosses and lichens.

Flora species or interest (present or likely to be present):

Dominance: Mai kor nam, Mai Kor nok, Mai hing and Mai Meud (see the list).

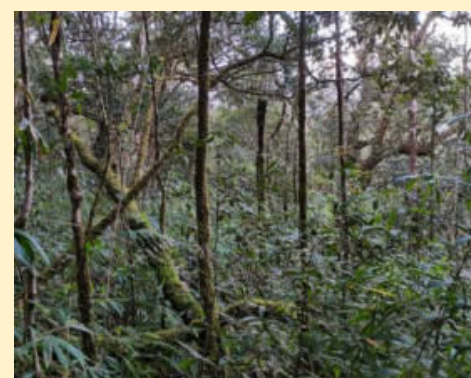
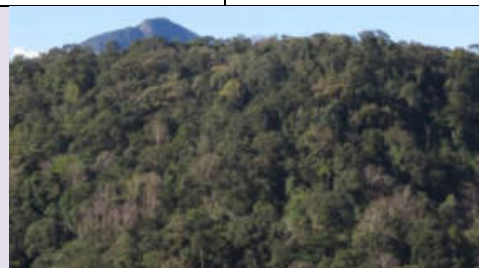
Key species: None, but maybe possible in this area

Native species: likely, it is quite unique habitat at high elevation. Some plant species found cannot be identified.

Fauna species (present or highly likely to be present):

Species/signs of species recorded for:

Key species: Sambar (VU), Bear (VU), Serow (VU)



Other species/native species: Barking Deer, Wild Pig, squirrel, flying squirrel, Red junglefowl and some number of small forest birds especially bulbul, warbler, Iora (see the list).

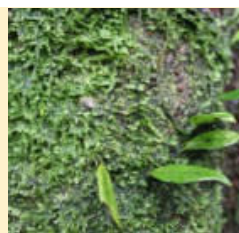
Species of interest likely to be present:

Key species: Douc langur, gibbon, Stump-tailed Macaque etc.,

Other species/native species: Large Indian civet, Leopard cat, other civet species, hog badger, mongoose etc (see the list).

Ecosystems Services comments

Watershed



Mosses



Unknown



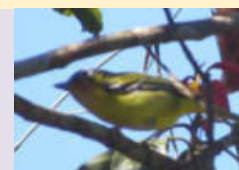
Track of Sambar



Dropping of Serow



Feces of Bear



Common Iora

List of some flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai kor narm	<i>Castanea mollissima Blume</i>	FAGACEAE		
2	Mai kor nok	<i>Lithocarpus polystachyus (Wall.) Rehd</i>	FAGACEAE		
3	Mai kor nam	<i>Castanea mollissima Blume</i>	FAGACEAE		
4	Mai meaud	<i>Aporosa tetrapleura Hance</i>	EUPHORBIACEAE		
5	Mai hing luang	<i>Dacrydium elatum (Roxb.) Wall. ex Hook.</i>	PODOCARPACEAE		
6	Mai Chuang	<i>Cinnamomum iners Reinw. ex Blume</i>	LAURACEAE		
7	Mai khaen hin	<i>Hopea pierrei Hance</i>	DIPTEROCARPCEAE		
8	Boun	<i>Calamus poilarei</i>	CALAMOIDEAE		
9	Wai	<i>Calamus sp.</i>	CALAMOIDEAE		
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List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
1	Kuang	Sambar	<i>Rusa unicolor</i>	VU	M, tracks/dropping seen
2	Nyeuang	Southern serow	<i>Capricornis sumatraensis</i>	VU	H, pile of droppings seen
3	Kha deng	Red-shanked Douc Langur	<i>Pygathrix nemaeus</i>	EN	M, suitability, report
3	Mee kheouy	Asiatic Black Bear	<i>Ursus thibetanus</i>	VU	M, Feces seen
4	Fan	Barking Deer	<i>Muntiacus muntjac</i>		M, tracks seen
5	Mu pa	Wild Pig	<i>Sus scrofa</i>		M, feeding site seen
6	Ngen hang kan	Large Indian Civet	<i>Viverra zibetha</i>		M, dropping seen
7	Ngen Om	Common Palm Civet	<i>Para. hermaphroditus</i>		L, suitability, report
8	Ngen Khor	Binturong	<i>Arctictis binturong</i>	VU	L, suitability, report
9	Mou leung	Hog badger	<i>Arctonyx collaris</i>	VU	L, suitability, report
10	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, suitability, report
11	Seua meo	Leopard cat	<i>Prio. bengalensis</i>		L, suitability, report
12	Ka hok thongdeng	Pallas's Squirrel	<i>Callosiusrus erythraeus</i>		M, feeding site seen

13	Ka tae	Indo. ground squirrel	<i>Menetes berdmorei</i>		M, feeding site seen
14	Bang loua	Giant Flying squirrel	<i>Pet. Philippensis</i>		M, feeding site seen
15	Bang nai	Phayrei's Flying squirrel	<i>Hylopetes sp.</i>		M, suitability, report
16	Nok kang kot	Grey Peacock	<i>Pol. bicalcaratum</i>		L, suitability, report
17	Kai pa	Red junglefowl	<i>Gallus gallus</i>		M, feeding site seen
18	Nok jib	Warbler sp.	<i>Phylloscopus sp.</i>		L, sighting
19	Nok ka thad	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		L, sighting
20	Nok khiew	Common Iora	<i>Aegithina tiphia</i>		L, sighting
21	Nok ka thad	Black crested Bulbul	<i>Rubigula flaviventris</i>		L, sighting
22	Nok hang wi	White-throated Fantail	<i>Rhipidura albicollis</i>		L, sighting

- **Rating of the ecosystem integrity at location (1 = Poor to 5 = excellent)**




Key Parameter	Rating	Justification
Habitat/forest structure	4.0	Original forest remains very good as no any disturbance, no fallow but majority of the habitat is montane forests.
Flora	4.0	Tree species remains as original status with perhaps some endemic species.
Fauna	4.5	Some large animals were identified e.g sambar, serow, Jackal and bears. it is likely highly some number of other globally threatened species.
Ecosystem integrity	4.1	Forest habitat condition remains very good, original montane forest remains largely especially to the northeast of the area with limited human disturbance due to high terrains.
Ecosystem status	H	High value of terrestrial ecosystem for conservation, the northeast forest zone of this plot is highly interesting for further survey.

- **Current threats and management**

Low threat and limited human access due to remotest with very high slope. The area is neither designed for conservation area nor any management in place. It is naturally self-protected from disturbance due to steep slope which is difficult to access specially from the south.

Sample Point: 05 Nearest location: Ban Dak Dor

Forest type/Ecosystem: Fallow/semi-evergreen/coniferous forest ecosystem

Latitude (N)	Longitude (E)	Altitude	Date
1700121	734364	1,268 m a.s.l.	Dec 31, 2020
<p>Initial Field Assessment:</p> <p>Low Moderate High Exceptional (Flora & Fauna)</p> <p>Reason for initial assessment:</p> <p>IBA/KBA, upper semi-evergreen and coniferous forests as part of Dakcheung plateau which would support some important habitats especially for bird community.</p> <p>Habitat Description:</p> <p>There are fallows, originally from upper semi-evergreen and coniferous forests. The area was degraded, mainly converted to agricultural land, some old and young fallows. Therefore, the habitat was degraded, loss of forest structure which only some patches of the forest were found. This plot of 500m radius is considered poor ecological status as no original forest remains and with low diversity of flora and fauna.</p> <p>Characteristic flora (composition):</p> <p>Mainly a large fallow distribution, just a few trees, including pines are found in cluster scatter, thick fallow and hard to get through. As short trees and shrubland which no any specific characteristic flora could be described.</p> <p>Flora species or interest (present or likely to be present):</p> <p><i>Dominance: Mai Paek (pinus), Mai kor, Mai Meuad (see the list).</i></p> <p><i>Key species: None</i></p> <p><i>Native species: None</i></p>		  	

Fauna species (present or highly likely to be present):

Species/signs of species recorded for:

Key species: None

Other species/native species: some number of small forest birds especially bulbul and warbler (see the list).

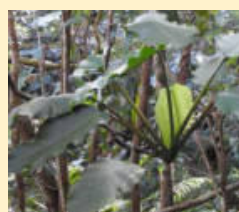
Species of interest likely to be present:

Key species: None

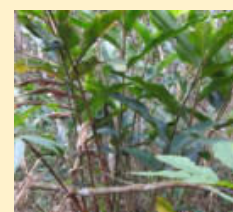
Other species/native species:

Ecosystems Services comments

Barely function anything of particular ecosystem service.



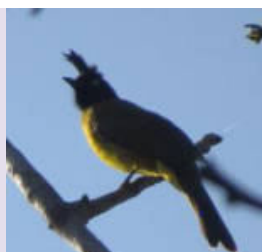
Epiphyte



Garanga



Black-naped Oriole



Black-c. Bulbul

List of some flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai Paek	<i>Pinus kesiya</i>	PINACEAE		
2	Mai kham pom	<i>Phyllanthus emblica L.</i>	EUPHORBIACEAE		
3	Mai kor nok	<i>Lithocarpus polystachyus (Wall.) Rehd</i>	FAGACEAE		
4	Mai kor nam	<i>Castanea mollissima Blume</i>	FAGACEAE		
5	Mai meaud	<i>Aporosa tetrapleura Hance</i>	EUPHORBIACEAE		
6	Mai kor houm	<i>Quercus fabrei</i>	FAGACEAE		
7	Kha pa	<i>Galanga</i>	ZIMGINBERACEAE		
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List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
1	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, suitability, report
2	Seua meo	Leopard cat	<i>Prio. bengalensis</i>		L, suitability, report
3	Ngen	Civet sp.			L, suitability, report
4	Ka tae	Indo. ground squirrel	<i>Menetes berdmorei</i>		L, feeding site seen
5	Nok Eing mong	Black collared Starling	<i>Gracupica nigricollis</i>		L, sighting
6	Nok jib	Divison's Leaf Warbler	<i>Phylloscopus intensor</i>		L, sighting
7	Nok ka in	Blue rock thrush	<i>Monticola solitarus</i>		L, sighting
8	Nok jib	Warbler sp.	<i>Phylloscopus sp.</i>		L, sighting
9	Nok ka thad	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		L, sighting
10	Nok ka thad dam	Sooty-headed bulbul	<i>Pycnonotus aurigaster</i>		L, sighting
11	Nok Ngon dam	Black-naped Oriole	<i>Oriolus chinensis</i>		L, sighting
12	Nok ka thad	Black crested Bulbul	<i>Pycnonotus flaviventris</i>		L, sighting
13					
14					
15					

- **Rating of the ecosystem integrity at location (1 = Poor to 5 = excellent)**

Key Parameter	Rating	Justification
Habitat/forest structure	2.0	Mainly fallows, some old and young fallows – originally from semi-evergreen forest and coniferous forest, the habitat was degraded, loss of forest structure which only some patches of the forest were found.
Flora	2.5	Many tree species would be lost as not diversity of tree species in fallows.
Fauna	1.5	Only a few small mammal and forest birds were reported and sighted.
Ecosystem integrity	2.0	Habitat was degraded, loss of forest structure which only some patches of the forest were found.
Ecosystem status	L+	The ecosystem of this plot is fairly highly degraded, nothing is potential for conservation nor any conservation forest in the area.

- **Current threats and management**

Largely shifting cultivation has been practised and some hunting in the area. Although this sample plot is internationally recognized IBA/KBA, the habitat is really degraded so the IBA/KBA value is already lost. While, neither this forest is classified to be part of any conservation area in the country nor any management is in place.

Sample Point: 06 Nearest location: Ban Dak Yang

Forest type/Ecosystem: Fallow/semi-evergreen/coniferous forest ecosystem

Latitude (N)	Longitude (E)	Altitude	Date
1698537	730495	1,250 m a.s.l.	Dec 29, 2020

Initial Field Assessment:

Low Moderate High Exceptional
(Flora & Fauna)

Reason for initial assessment:

IBA/KBA, upper semi-evergreen and coniferous forests as part of Dakcheung plateau which would support some important forest habitats for fauna species.

Habitat Description:

There are fallows, originally from upper semi-evergreen forest. The area was fairly degraded, mainly converted to agricultural land, some old and young fallows. Therefore, the habitat was considered degraded. This plot of 500m radius is considered fairly poor ecological status as no original forest remains with low diversity of flora and fauna.

Characteristic flora (composition):

Mainly a large fallow distribution, as medium and short trees and shrubland which no any specific characteristic flora could be described. The forest structure has only 1 layer.

Flora species or interest (present or likely to be present):

Dominance: Mai kor ban, Mai kor houm, Mai Meuad (see the list).

Key species: None

Native species: None

Fauna species (present or highly likely to be present):

Species/signs of species recorded for:

Key species: None

Other species/native species: some number of small forest birds especially bulbul and warbler (see the list).



Species of interest likely to be present:

Key species: None

Other species/native species:

Ecosystems Services comments

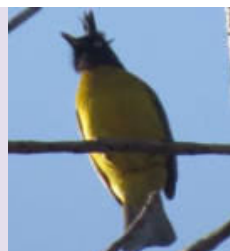
Barely function anything of particular ecosystem service.



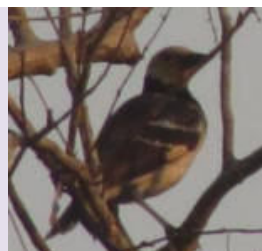
Quercus



Morella



Black c. bulbul



Black collared Starling

List of some flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai Paek	<i>Pinus kesiya</i>	PINACEAE		
2	Mai kham pom	<i>Phyllanthus emblica L.</i>	EUPHORBIACEAE		
3	Mai kor nok	<i>Lithocarpus polystachyus (Wall.) Rehd</i>	FAGACEAE		
4	Mai kor nam	<i>Castanea mollissima Blume</i>	FAGACEAE		
5	Mai meaud	<i>Aporosa tetrapleura Hance</i>	EUPHORBIACEAE		
6	Mai kor houm	<i>Quercus fabrei</i>	FAGACEAE		
7	Mai kor ban	<i>Lithocarpus corneus (Lour.) Rehder</i>	FAGACEAE		
8	Mai kor noy	<i>Morella cerifere (L.) small</i>	MYRICACEAE		
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List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
1	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, suitability, report
2	Seua meo	Leopard cat	<i>Prio. bengalensis</i>		L, suitability, report
3	Ngen	Civet			L, suitability, report
4	Ka tae	Indo. ground squirrel	<i>Menetes berdmorei</i>		L, feeding site seen
5	Bang nai	Phayrei's Flying squirrel	<i>Hylopetes sp.</i>		L, suitability, report
6	Nok Eing mong	Black collared Starling	<i>Gracupica nigricollis</i>		L, sighting
7	Kai pa	Red junglefowl	<i>Gallus gallus</i>		L, feeding site seen
8	Nok jib	Warbler sp.	<i>Phylloscopus sp.</i>		L, sighting
9	Nok ka thad deng	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		L, sighting
10	Nok khiew	Common Iora	<i>Aegithina tiphia</i>		L, sighting
11	Nok ka thad dam	Black crested Bulbul	<i>Rubigula flaviventris</i>		L, sighting
12					
13					

- **Rating of the ecosystem integrity at location** (1 = Poor to 5 = excellent)




Key Parameter	Rating	Justification
Habitat/forest structure	2.0	Mainly fallows, some old and young fallows – originally from semi-evergreen forest and coniferous forest, the habitat was degraded, loss of forest structure which only some patches of the forest were found.
Flora species	2.0	Many tree species would be lost as not diversity of tree species in fallows.
Fauna species	1.5	Only a few small mammal and forest birds were reported and sighted.
Ecosystem integrity	1.8	Habitat was degraded, loss of forest structure which only some patches of the forest were found.
Ecosystem status	L	The ecosystem of this plot is degraded, nothing is potential for conservation nor any conservation forest in the area.

- **Current threats and management**

Largely shifting cultivation has been practised and some hunting in the area. Although this sample plot is internationally recognized IBA/KBA, the habitat is really degraded so the IBA/KBA value is already lost. Meanwhile, neither this forest is classified to be part of any conservation area of the country nor any management is in place.

Sample Point: 07 Nearest location: Ban Nong Bou

Forest type/Ecosystem: Upper Evergreen forest ecosystem

Latitude (N)	Longitude (E)	Altitude	Date
1713605	747567	1,249 m a.s.l.	Dec 25, 2020
<p>Initial Field Assessment:</p> <p>Low Moderate High Exceptional (Flora & Fauna)</p> <p>Reason for initial assessment:</p> <p>Upper evergreen forest and part of The Southern Annamite Mountain Range which would support some critical habitats of flora and fauna species.</p> <p>Habitat Description:</p> <p>There are upper evergreen forest, fallow and small portion of coffee plantation. The forest is not high, just two stories of the canopy as the first layer is thick (90%). The second layer is quite low density and open, there are some rattan, palm leave with quite thick biomass. This plot of 500m radius is considered satisfactory ecological status as original forest remains largely with quite diversity of flora and some evidences of fauna.</p> <p>Characteristic flora (composition):</p> <p>Basically, neither high tree nor large trees, as a few large trees of 20m height and 45cm HBD, and many medium trees of 10m height and 15cm HBD. There are mosses, lichens and epiphytes. Mostly, the trees are stretch and quite small with brightly small dark green leaves.</p> <p>Flora species or interest (present or likely to be present):</p> <p><i>Dominance: Mai kor nam, Mai langdam, Mai Chuang, Mai Khi Mou and Mai Meuad (see the list).</i></p> <p><i>Key species: None, but maybe possible in wider area</i></p>		  	

Native species: None

Fauna species (present or highly likely to be present):

Species/signs of species recorded for:

Key species: *Mai Khaenhin (Hopea sp)*, EN

Other species/native species: Barking Deer, Wild Pig, squirrel, flying squirrel, Red junglefowl and some number of small forest birds especially bulbul, warbler, Iora (see the list).

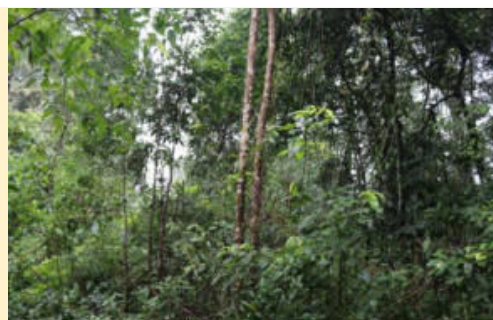
Species of interest likely to be present:

Key species: None

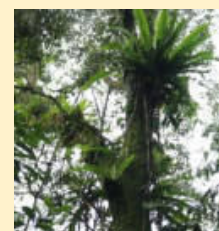
Other species/native species: Large Indian civet, Leopard cat, other civet species, hog badger, mongoose etc (see the list).

Ecosystems Services comments

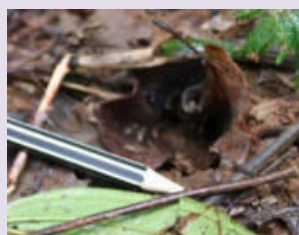
Watershed and some NTFPs



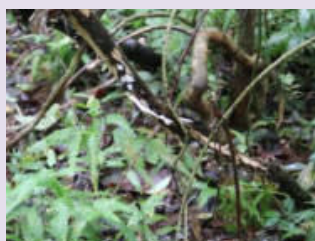
Mosses



Epiphytes



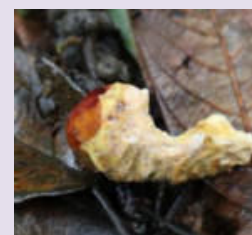
Track of Barking Deer



Feeding sight of ground squirrel



Feeding site of pig



Flying squirrel

List of some flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai Chuang	<i>Cinnamomum iners Reinw. ex Blume</i>	LAURACEAE		
2	Mai khaen hin	<i>Hopea pierrei Hance</i>	DIPTEROCARPACEAE	EN	
3	Mai kor nok	<i>Lithocarpus polystachyus (Wall.) Rehd</i>	FAGACEAE		
4	Mai kor nam	<i>Castanea mollissima Blume</i>	FAGACEAE		
5	Mai meaud	<i>Aporosa tetrapleura Hance</i>	EUPHORBIACEAE		
6	Mai khi mou	<i>Ormosia cambodiana Gagnep.</i>	FABACEAE		
7	Mai lang dam	<i>Diospyros silvatica Roxb</i>	EBENACEAE		
8	Tao mae hang	<i>Caryota mitis Loureiro</i>	PALMAE		
9	Wai	<i>Calamus sp.</i>	CALAMOIDEAE		
10	Boun	<i>Calamus poilareii</i>	CALAMOIDEAE		
11	Phak koud khok	<i>Cyathea species</i>	PTERYDOPHYTA-CYATHEACEAE		
12	Kha pa	<i>Galanga</i>	ZINGIBERACEAE		
13					
14					
15					

List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
1	Fan	Barking Deer	<i>Muntiacus muntjac</i>		M, tracks seen
2	Mu pa	Wild Pig	<i>Sus scrofa</i>		M, feeding site seen
3	Ngen hang kan	Large Indian Civet	<i>Viverra zibetha</i>		M, dropping seen
4	Ngen Om	Common Palm Civet	<i>Para. hermaphroditus</i>		L, suitability, report
5	Ngen Ngor	Binturong	<i>Arctictis binturong</i>	VU	L, suitability, report
6	Mou leung	Hog badger	<i>Arctonyx collaris</i>	VU	L, suitability, report
7	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, suitability, report
8	Seua meo	Leopard cat	<i>Prio. bengalensis</i>		L, suitability, report
9	Ka hok thongdeng	Pallas's Squirrel	<i>Callociusrus erythraeus</i>		M, feeding site seen
10	Ka tae	Indo. ground squirrel	<i>Menetes berdmorei</i>		M, feeding site seen
11	Bang loua	Giant Flying squirrel	<i>Pet. Philippensis</i>		M, feeding site seen
12	Bang nai	Phayrei's Flying squirrel	<i>Hylopetes sp.</i>		M, suitability, report
13	Nok kang kot	Grey Peacock	<i>Pol. bicalcaratum</i>		L, suitability, report
14	Kai pa	Red junglefowl	<i>Gallus gallus</i>		M, feeding site seen
15	Nok jib	Warbler sp.	<i>Phylloscopus sp.</i>		L, sighting
16	Nok ka thad	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		L, sighting
17	Nok khiew	Common Iora	<i>Aegithina tiphia</i>		L, sighting
18	Nok ka thad	Black crested Bulbul	<i>Rubigula flaviventris</i>		L, sighting
19	Nok hang wi	White-throated Fantail	<i>Rhipidura albicollis</i>		L, sighting

- **Rating of the ecosystem integrity at location (1 = Poor to 5 = excellent)**

Key Parameter	Rating	Justification
Habitat/forest structure	3.0	Remains good, but some parts of the sample plot, about 30% was a secondary forest and converted to coffee plantation
Flora	3.5	Tree species remains as original status but some parts of the SP were converted
Fauna	2.5	Only a few medium and some small wildlife species present in the area, probably hardly any globally threatened species.
Ecosystem integrity	3.0	Forest habitat condition remains quite good, original semi-evergreen forest remains quite largely on the northwest, but only some medium and small species of fauna species are present, certainly declined today in quantity.
Ecosystem status	M	Some interesting, but not really since it is quite close to settlement (ca. 3 km to the southeast of Ban Nong Bou).



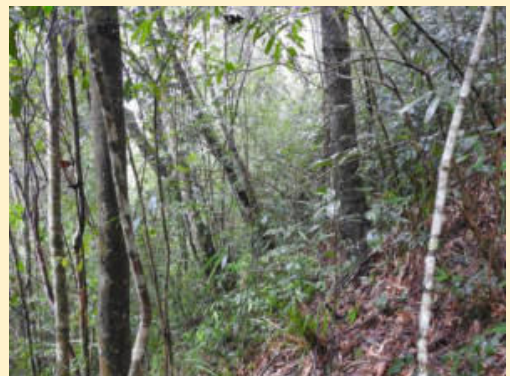
- **Current threats and management**

Only some small portion of coffee plantation and some hunting. Although no any evidence of hunting is found it is reported on this activity in the area. Some non-timber forest products were used for household consumption. This part of the forest for forest management is classified as a protection forest according to a village land use planning. Also, it is part of the Southern Annamite Mountain Range as well as the buffer zone of Biodiversity Conservation Corridor of ADB project.

Sample Point: 08

Nearest location: Ban Dak Kador noy

Forest type/Ecosystem: Upper Evergreen forest ecosystem

Latitude (N)	Longitude (E)	Altitude	Date	
1716544	749978	1,073 m a.s.l.	Dec 26, 2020	
<p>Initial Field Assessment:</p> <p>Low Moderate High Exceptional (Flora & Fauna)</p> <p>Reason for initial assessment:</p> <p>Upper evergreen forest and part of the Southern Annamite Mountain Range which would support some critical habitats of flora and fauna species.</p> <p>Habitat Description:</p> <p>Upper evergreen forest is located in steep slope. This plot of 500m radius is considered satisfactory ecological status as original forest remains largely with quite diversity of flora and some evidences of fauna. The forest is not high, just two stories of the canopy as the first layer is quite thick (70%). The second layer has dominance of bamboo, there are some rattan, palm leaf with some biomass but not thick.</p> <p>Characteristic flora (composition):</p> <p>Basically, neither high tree nor large trees, as a few large trees of 25m height and 50cm HBD, and many medium trees of 12m height and 25cm HBD.</p> <p>Flora species or interest (present or likely to be present):</p> <p><i>Dominance: Mai kor nok, Mai kor hin, Mai langdam, Mai Chuang, Mai Meuad and Mai chuang (see the list).</i></p> <p><i>Key species: Mai Khaenhin (Hopea sp), EN</i></p> <p><i>Native species: None</i></p> <p>Fauna species (present or highly likely to be present):</p>				  

Species/signs of species recorded for:

Key species:

Other species/native species: Barking Deer, Wild Pig, squirrel, flying squirrel, Red junglefowl and some number of small forest birds especially bulbuls, warblers, Iora (see the list).

Species of interest likely to be present:

Key species: Probably Stump-tailed Macaque

Other species/native species: Large Indian civet, Leopard cat, other civet species, hog badger, mongoose etc (see the list).

Ecosystems Services comments

Watershed and some NTFPs



Unknown



Unknown



Feces of Pheasant



Stripe squirrel



Track of B. Deer

List of some flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai Chuang	<i>Cinnamomum iners Reinw. ex Blume</i>	LAURACEAE		
2	Mai khaen hin	<i>Hopea pierrei Hance</i>	DIPTEROCARPCEAE	EN	
3	Mai kor nok	<i>Lithocarpus polystachyus (Wall.) Rehd</i>	FAGACEAE		
4	Mai kor nam	<i>Castanea mollissima Blume</i>	FAGACEAE		
5	Mai meaud	<i>Aporosa tetrapleura Hance</i>	EUPHORBIACEAE		
6	Mai khi mou	<i>Ormosia cambodiana Gagnep.</i>	FABACEAE		
7	Mai lang dam	<i>Diospyros silvatica Roxb</i>	EBENACEAE		
8	Tao mae hang	<i>Caryota mitis Loureiro</i>	PALMAE		
9	Wai	<i>Calamus sp.</i>	CALAMOIDEAE		
10	Boun	<i>Calamus poilarei</i>	CALAMOIDEAE		
11	Phak koud khok	<i>Cyathea species</i>	PTERYDOPHYTA-CYATHEACEAE		
12					
13					
14					
15					

List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
1	Ling sou phab	Rhesus macaque	<i>Macaca mulatta</i>		L, suitability, report
2	Ka dang	Black Giant Squirrel	<i>Ratufa bicolor</i>		L, suitability, report
3	Fan	Barking Deer	<i>Muntiacus muntjac</i>		M, tracks seen
4	Mu pa	Wild Pig	<i>Sus scrofa</i>		M, feeding site seen
5	Ngen	Civet sp.	<i>Viverra</i>		L, suitability, report
6	Ka len	Strip squirrel	<i>Tamiops</i>		L, sighting
7	Ngen Ngor	Binturong	<i>Arctictis binturong</i>	VU	L, suitability, report
8	Mou leung	Hog badger	<i>Arctonyx collaris</i>	VU	L, suitability, report
9	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, suitability, report
10	Seua meo	Leopard cat	<i>Prio. bengalensis</i>		L, suitability, report
11	Ka hok thongdeng	Pallas's Squirrel	<i>Callosiuscus erythraeus</i>		M, feeding site seen
12	Ka tae	Indo. ground squirrel	<i>Menetes berdmorei</i>		M, feeding site seen
13	Bang loua	Giant Flying squirrel	<i>Pet. Philippensis</i>		M, feeding site seen
14	Bang nai	Phayrei's Flying squirrel	<i>Hylopetes sp.</i>		M, suitability, report
15	Kai khoua	Silver Pheasant	<i>Lophura nycthemera</i>		L, suitability, report
16	Nok kang kot	Grey Peacock	<i>Pol. bicalcaratum</i>		L, suitability, report
17	Kai pa	Red junglefowl	<i>Gallus gallus</i>		M, feeding site seen
18	Nok jib	Warbler sp.	<i>Phylloscopus sp.</i>		L, sighting
19	Nok ka thad deng	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		L, sighting
20	Nok khiew	Common lora	<i>Aegithina tiphia</i>		L, sighting
21	Nok ka thad	Black crested Bulbul	<i>Rubigula flaviventris</i>		L, sighting
22	Nok ka thad seak	Stripe-throated Bulbul	<i>Pycnonotus finlaysoni</i>		L, sighting

- **Rating of the ecosystem integrity at location (1 = Poor to 5 = excellent)**

Key Parameter	Rating	Justification
Habitat/forest structure	3.5	Remains good forest habitat with some little disturbance from collecting forest products.
Flora	3.5	Tree species remains as original status
Fauna	3.0	Some few medium and small wildlife species present in the area, probably hardly any globally threatened species. Good sign is the feces of Pheasant seen, quite a large size so it is probably Silver Pheasant.
Ecosystem integrity	3.3	Forest habitat condition remains good, original upper evergreen forest with some signs of fauna species are present.
Ecosystem status	M	Some interesting, but it is quite close to settlement, just upper hill of Ban Dak Ta-ornoy, ca. 700 m away to the west, and in the buffer zone of BCC.




- **Current threats and management**

No any particular threats are identified. It is part of the Southern Annamite Mountain Range as well as the Biodiversity Conservation Corridor of ADB project.

Sample Point: 09

Nearest location: Ban Dak Ta-ok noy

Forest type/Ecosystem: Upper evergreen forest ecosystem

Latitude (N)	Longitude (E)	Altitude	Date	
1718230	751456	1,192 m a.s.l.	Dec 26, 2020	
<p>Initial Field Assessment:</p> <p>Low Moderate High Exceptional (Flora & Fauna)</p> <p>Reason for initial assessment:</p> <p>Upper evergreen forest and part of the Southern Annamite Mountain Range and BCC which would support some critical habitats of flora and fauna species.</p> <p>Habitat Description:</p> <p>Upper evergreen forest, this plot of 500m radius is considered good ecological status as original forest remains mostly with some disturbance from small scale logging. It is quite high and diversity of flora as some evidences and report of important fauna species. The forest is quite high, just two stories of the canopy as the first layer is not really thick (60%). The dominant trees of the canopy are mainly Mai hing “pine <i>Dacrycarpus</i>, 2 species and Mai khaen <i>Hopea</i> species). The second layer is quite low density and open, there are some rattan, palm leave with reasonable biomass.</p> <p>Characteristic flora (composition):</p> <p>Basically, quite high and medium trees, as a number of large trees of 30m height and 60cm HBD, and many small trees of 15m height and 25cm HBD. They are some coniferous (pine) around the plot.</p> <p>Flora species or interest (present or likely to be present):</p> <p><i>Dominance: Mai hing luang, Mai hing deng, Mai khaenhin, Mai wa, Mai kor nam, Mai langdam, Mai Chuang (see the list).</i></p> <p><i>Key species: None, but maybe possible in this area</i></p> <p><i>Native species: Mai Khaenhin (Hopea sp), EN</i></p> <p>Fauna species (present or highly likely to be present):</p>				
				
				

Species/signs of species recorded for:

Key species: Sambar

Other species/native species: Barking Deer, Wild Pig, squirrel, flying squirrel, Red junglefowl and some number of small forest birds especially bulbul, Prinia, warbler (see the list).

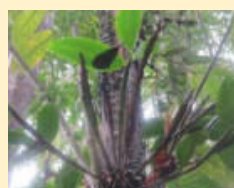
Species of interest likely to be present:

Key species: Yes, possible in wider area from this plot, including Sambar, Pangolin, Douc Langur, Bear, Gibbon etc.

Other species/native species: Spotted Lingsang, Large Indian civet, Leopard cat, other civet species, hog badger, mongoose etc (see the list).

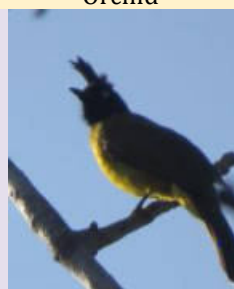
Ecosystems Services comments

Watershed and some NTFPs



Orchid

Local logging



Track of Barking Deer

Feeding sight of wild pig

Black C. Bulbul

List of some flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai Chuang	<i>Cinnamomum iners Reinw. ex Blume</i>	LAURACEAE		
2	Mai khaen hin	<i>Hopea pierrei Hance</i>	DIPTEROCARPCEAE	EN	
3	Mai kor nok	<i>Lithocarpus polystachyus (Wall.) Rehd</i>	FAGACEAE		
4	Mai kor nam	<i>Castanea mollissima Blume</i>	FAGACEAE		
5	Mai hing luang	<i>Dacrydium elatum (Roxb.) Wall. ex Hook.</i>	PODOCARPACEAE		
6	Mai hing deng	<i>Dacrycarpus imbricatus (Blume) de Laub.</i>	PODOCARPACEAE		
7	Mai lang dam	<i>Diospyros silvatica Roxb</i>	EBENACEAE		
8	Kok khor	<i>Palm Livistona saribus</i>	PALMAE		
9	Tao mae hang	<i>Caryota mitis Loureiro</i>	PALMAE		
10	Mai wa	<i>Ficus annulata Blume</i>	MORACEAE		
11	Wai	<i>Calamus sp.</i>	CALAMOIDEAE		
12	Boun	<i>Calamus poilareii</i>	CALAMOIDEAE		
13	Phak koud	<i>Fern</i>	DICKSONIACEAE		
14					
15					

List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
1	Ling	Rhesus macaque	<i>Macaca mulatta</i>		L, suitability, report
2	Ka dang	Black Giant Squirrel	<i>Ratufa bicolor</i>		L, suitability, report
3	Fan	Barking Deer	<i>Muntiacus muntjac</i>		M, tracks seen
4	Mu pa	Wild Pig	<i>Sus scrofa</i>		M, feeding site seen
5	Ngen	Civet sp.	<i>Viverra</i>		L, suitability, report
6	Ka len	Strip squirrel	<i>Tamiops</i>		L, suitability, report
7	Ngen Ngor	Binturong	<i>Arctictis binturong</i>	VU	L, suitability, report
8	Mou leung	Hog badger	<i>Arctonyx collaris</i>	VU	L, suitability, report
9	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, suitability, report
10	Seua meo	Leopard cat	<i>Prio. bengalensis</i>		L, suitability, report
11	Ka hok thongdeng	Pallas's Squirrel	<i>Callociusrus erythraeus</i>		L, suitability, report
12	Ka tae	Indo. ground squirrel	<i>Menetes berdmorei</i>		M, feeding site seen
13	Bang loua	Giant Flying squirrel	<i>Pet. Philippensis</i>		M, feeding site seen
14	Bang nai	Phayrei's Flying squirrel	<i>Hylopetes sp.</i>		M, suitability, report
15	Kai khoua	Silver Pheasant	<i>Lophura nycthemera</i>		L, suitability, report
16	Nok kang kot	Grey Peacock	<i>Pol. bicalcaratum</i>		L, suitability, report
17	Kai pa	Red junglefowl	<i>Gallus gallus</i>		M, feeding site seen
18	Nok jib	Warbler sp.	<i>Phylloscopus sp.</i>		L, sighting
19	Nok ka thad deng	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		L, sighting
20	Nok khiew	Common lora	<i>Aegithina tiphia</i>		L, suitability, report
21	Nok ka thad dam	Black crested Bulbul	<i>Rubigula flaviventris</i>		L, sighting
22	Nok ka thad seak	Stripe-throated Bulbul	<i>Pycnonotus finlaysoni</i>		L, suitability, report
23	Nok thao	White-c. Laughing Thrush	<i>Garrulax leucolophus</i>		L, suitability, report
24	Nok Ngon dam	Black-naped Oriole	<i>Oriolus chinensis</i>		L, sighting





- **Rating of the ecosystem integrity at location (1 = Poor to 5 = excellent)**

Key Parameter	Rating	Justification
Habitat/forest structure	4.0	Remains good forest habitat with some little disturbance from collecting forest products.
Flora	4.0	Tree species remains as original status with important tree species, only some trees (Mai hing) were logged for house construction locally.
Fauna	4.0	Some good number of fauna species present in the area, according to the village report there are some globally threatened species in the area to the north and south of this plot.
Ecosystem integrity	4.0	Forest habitat condition remains very good, original upper evergreen forest and some coniferous (pine) with some signs of fauna species.
Ecosystem status	H	High value of terrestrial ecosystem, especially the wider area away from the road to the north and south and this plot is located in the BCC area.

- **Current threats and management**

Some evidences of small-scale logging and hunting were found, including some non-timber forest products collection. Also, it is part of the Southern Annamite Mountain Range as well as the BCC of ADB project. This section of the BCC is important corridor of the region between the wildlife zones from north to south along the Lao-Vietnam border so it is nationally important forest section.

Sample Point: 10**Nearest location: Ban Dak ta-ok noy****Forest type/Ecosystem: Upper Evergreen forest ecosystem**

Latitude (N)	Longitude (E)	Altitude	Date
1720013	752442	1,160 m a.s.l.	Dec 26, 2020
<p>Initial Field Assessment:</p> <p>Low Moderate High Exceptional (Flora & Fauna)</p> <p>Reason for initial assessment:</p> <p>Upper evergreen forest and as part of the Southern Annamite Mountain Range and BBC which would support some critical habitats of flora and fauna species.</p> <p>Habitat Description:</p> <p>Upper evergreen forest, this plot of 500m radius is considered satisfactory ecological status as original forest remains mostly with some disturbance. It is quite high and diversity of flora as some evidences and report of important fauna species. The forest is quite high, just two stories of the canopy as the first layer is not really thick (60%). The dominant trees of the canopy are mainly Mai hing "pine <i>Dacrycarpus</i> and Mai khaen <i>Hopea</i> species). The second layer is quite density, there are some rattan, palm leave with reasonable biomass.</p> <p>Characteristic flora (composition):</p> <p>Basically, quite high and medium trees, as a number of large trees of 30m height and 60cm HBD, and many small trees of 15m height and 25cm HBD. They are some coniferous (pine) around the plot.</p> <p>Flora species or interest (present or likely to be present):</p> <p><i>Dominance: Mai hing luang, Mai hing deng, Mai khaenhin, Mai wa, Mai kor nam, Mai langdam, Mai Chuang (see the list).</i></p> <p><i>Key species: Mai Khaenhin (Hopea), EN.</i></p> <p><i>Native species: None</i></p> <p>Fauna species (present or highly likely to be present):</p> <p>Species/signs of species recorded for:</p> <p><i>Key species: Sambar</i></p>		   	

Other species/native species: Barking Deer, Wild Pig, squirrel, flying squirrel, Red junglefowl and some number of small forest birds especially bulbul and warbler (see the list).

Species of interest likely to be present:

Key species: Yes, possible in wider area from this plot, including Sambar, Pangolin, Douc Langur, Bear, Gibbon etc.

Other species/native species: Spotted Lingsang, Great Argus, Large Indian civet, Leopard cat, other civet species, hog badger, mongoose etc (see the list).

Ecosystems Services comments

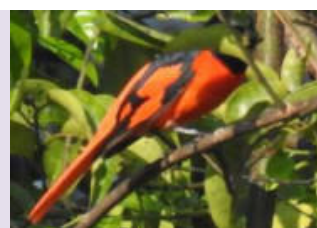
Watershed and some NTFPs



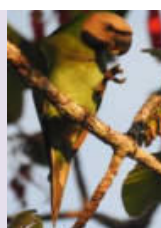
Rattan



Fern



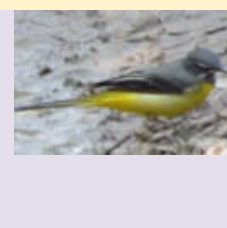
Scarlet Minivet



Blossom h. Parakeet



Great Coucal



Forest Wagtail

List of flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai Chuang	<i>Cinnamomum iners</i> Reinw. ex Blume	LAURACEAE		
2	Mai khaen hin	<i>Hopea pierrei</i> Hance	DIPTEROCARPCEAE	EN	
3	Mai kor nok	<i>Lithocarpus polystachyus</i> (Wall.) Rehd	FAGACEAE		
4	Mai hing luang	<i>Dacrydium elatum</i> (Roxb.) Wall. ex Hook.	PODOCARPACEAE		
5	Mai hing deng	<i>Dacrycarpus imbricatus</i> (Blume) de Laub.	PODOCARPACEAE		
6	Mai kor nam	<i>Castanea mollissima</i> Blume	FAGACEAE		
7	Mai meaud	<i>Aporosa tetrapleura</i> Hance	EUPHORBIACEAE		
8	Mai wa	<i>Ficus annulata</i> Blume	MORACEAE		
9	Mai lang dam	<i>Diospyros silvatica</i> Roxb	EBENACEAE		
10	Tao mae hang	<i>Caryota mitis</i> Loureiro	PALMAE		
11	Wai	<i>Calamus</i> sp.	CALAMOIDEAE		
12	Boun	<i>Calamus poilarei</i>	CALAMOIDEAE		
13	Phak koud khok	<i>Cyathea species</i>	PTERYDOPHYTA-CYATHEACEAE		
14					
15					

List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
1	Kha deng	Red-shanked Douc Langur	<i>Pygathrix nemaus</i>	EN	
2	Kouang	Sambar	<i>Rusa unicolor</i>	VU	M, suitability, report
3	Nyeuang	Southern Serow	<i>Capricornis sumatraensis</i>	VU	L, suitability, report
4	Nyen lai phad kon	Spotted Lingsang	<i>Prionodon pardicolor</i>		L, suitability, report
5	Fan khao nyai	Large antlered Muntjac	<i>Muntiacus vuquangensis</i>	EN	L, suitability, report
6	Fan mor	Annamite Muntjac	<i>Muntiacus truongsongensis</i>		L, suitability, report
7	Ka tai lai sua	Annamite Striped Rabbit	<i>Nesolagus timminsi</i>		L, suitability, report
8	Mee khor	Binturong	<i>Arctictis binturong</i>		L, suitability, report
9	Lin	Pangolin	<i>Manis</i> sp.	CR	L, suitability, report
10	Fan	Barking Deer	<i>Muntiacus muntjac</i>		M, tracks seen
11	Mu pa	Wild Pig	<i>Sus scrofa</i>		M, feeding site seen

12	Ngen hang kan	Large Indian Civet	<i>Viverra zibetha</i>		L, suitability, report
13	Ngen Om	Common Palm Civet	<i>Para. hermaphroditus</i>		L, suitability, report
14	Ngen Ngor	Binturong	<i>Arctictis binturong</i>	VU	L, suitability, report
15	Mou leung	Hog badger	<i>Arctonyx collaris</i>	VU	L, suitability, report
16	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, suitability, report
17	Seua meo	Leopard cat	<i>Prio. bengalensis</i>		L, suitability, report
18	Ka hok thongdeng	Pallas's Squirrel	<i>Callosiuscus erythraeus</i>		L, suitability, report
19	Ka tae	Indo. ground squirrel	<i>Menetes berdmorei</i>		L, suitability, report
20	Bang loua	Giant Flying squirrel	<i>Pet. Philippensis</i>		M, feeding site seen
21	Bang nai	Phayrei's Flying squirrel	<i>Hyloupetes sp.</i>		M, suitability, report
22	Nok woo wao	Great Argus	<i>Argasianus argus</i>		L, suitability, report
23	Kai khoua khao	Silver Pheasant	<i>Lophura nycthemera</i>		L, suitability, report
24	Nok fai	Scarlet Minivet	<i>Pericrocotus flammeus</i>		L, sighting
25	Mok keo	Grey-headed Parakeet	<i>Psittacula finschii</i>		L, suitability, report
26	Mok keo	Blossom-headed Parakeet	<i>Psittacula roseate</i>		L, suitability, report
27	Nok kang kot	Grey Peacock	<i>Polyplectron bicalcaratum</i>		L, sighting
28	Nok kot peud	Great Coucal	<i>Centropus sinensis</i>		L, sighting
29	Nok kadaeb dao	Forest wagtail	<i>Dendronanthus indicus</i>		L, sighting
30	Nok moum	Oriental turtle Dove	<i>Streptopelia orientalis</i>		L, suitability, report
31	Kai pa	Red Junglefowl	<i>Gallus gallus</i>		L, suitability, report
32	Nok jib	Warbler sp.	<i>Phylloscopus sp.</i>		L, sighting
33	Nok ka thaed	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		L, sighting
34	Nok pao	Thick-billed Pigeon	<i>Treron curvirostra</i>		M, sighting
35	Nok ka thaed dam	Black crested Bulbul	<i>Rubigula flaviventris</i>		L, sighting

- **Rating of the ecosystem integrity at location (1 = Poor to 5 = excellent)**

Key Parameter	Rating	Justification
Habitat/forest structure	4.0	Remains good forest habitat with some little disturbance from collecting forest products and hunting.
Flora	4.0	Tree species remains as original status with important tree species, only some trees (Mai hing) were logged for house construction locally.
Fauna	4.5	Some good number of fauna species present in the area, according to the village report there are some globally threatened species in the area to the north and south of this plot.
Ecosystem integrity	4.1	Forest habitat condition remains very good, original upper evergreen forest and some coniferous (pine) with some signs of fauna species.
Ecosystem status	H	High value of terrestrial ecosystem, especially the wider area away from the road to the north and south and this plot is located in the BCC area.

- **Current threats and management**

Some human disturbance as some snares were found, this forest is part of the Southern Annamite Mountain Range as well as the BCC of ADB project as nationally important forest section. This forest section of the BCC is important corridor of the region and nation.

Sample Point: 11

Nearest location: Ban Dak Kong

Forest type/Ecosystem: Bareland/grassland

Latitude (N)	Longitude (E)	Altitude	Date
1691026	728517	1,218 m a.s.l.	Dec 28, 2020

Initial Field Assessment:

Low Moderate High Exceptional
(Flora & Fauna)

Reason for initial assessment:

Grassland, it is part of Dakcheung plateau and grassland plain which would hold some important habitats for especially bird community.

Habitat Description:

Bareland/grassland is located in the semi-evergreen forest range as surrounding the sample plot is degraded semi-evergreen forest, the trees are short and bent, growing in rocky area. The 200 m around the sample plot is completely bareland, outcrop, a lot of small broken rock/stones are found in scatter. This plot of 500m radius is considered very poor ecological status as originally bareland which would be some grasses during wet season.

Characteristic flora (composition):

No any specific characteristic flora could be described.

Flora species or interest (present or likely to be present):

Dominance: None

Key species: None

Native species: None

Fauna species (present or highly likely to be present):

Species/signs of species recorded for:

Key species: None

Other species/native species: Common Kestrel, Rufous-winged Buzzard and Sparrow.

Species of interest likely to be present:

Key species: None

Other species/native species: it is possible for some bird species during wet season such as pipits, prinia, dove, swift, sparrow, eagle etc.



Ecosystems Services comments

Barely function anything of particular ecosystem service.



Asian Brown Flycatcher

List of some flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai kor nok	<i>Lithocarpus polystachyus (Wall.) Rehd</i>	FAGACEAE		
2	Mai khaen hin	<i>Hopea pierrei Hance</i>	DIPTEROCARPCEAE	EN	
3	Mai kor nam	<i>Castanea mollissima Blume</i>	FAGACEAE		
4	Mai meaud	<i>Aporosa tetrapleura Hance</i>	EUPHORBIACEAE		
5	Mai wa	<i>Ficus annulata Blume</i>	MORACEAE		
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List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
1	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, possible passing
2	Nok Eing mong	Black collared Starling	<i>Gracupica nigricollis</i>		L, possible, visiting
3	Nok jib dam	Pied Bushchat	<i>Saxicola caprata</i>		L, possible, visiting
4	Nok ka in	Blue rock thrush	<i>Monticola solitarius</i>		L, possible, visiting
5	Nok jib	Warbler sp.	<i>Phylloscopus sp.</i>		L, possible, visiting
6	Leo nok	Common Kestrel	<i>Falco tinnunculus</i>		L, sighting
7	Leo hong	Rufous winged Buzzard	<i>Butastur liventer</i>		L, suitability
8	Nok nyot nya	Plain prinia	<i>Prinia inornita</i>		L, suitability
9	Nok chap meng	Asian Brown Flycatcher	<i>Muscicapa dauurica)</i>		
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- **Rating of the ecosystem integrity at location** (1 = Poor to 5 = excellent)

Key Parameter	Rating	Justification
Habitat/forest structure	1.0	Bareland, broken rocks found in scatter with some 100 m at foothill where forest was found.
Flora	1.5	Only few trees were found in foothill as some distance from the centre of the sample plot.
Fauna	1.0	Only a few small mammal and forest birds were present and some other would be present. Common kestrel was seen and some few small birds.
Ecosystem integrity	1.1	Very poor
Ecosystem status	L	No any particular ecosystem of this plot can be described.

- **Current threats and management**

Nothing, neither this sample plot is classified to be part of any conservation area in the country nor any management is in place.

Sample Point: 12 Nearest location: Ban Dak Nong

Forest type/Ecosystem: Semi-evergreen forest ecosystem

Latitude (N)	Longitude (E)	Altitude	Date
1691660	722722	1,218 m a.s.l.	Dec 28, 2020
<p>Initial Field Assessment:</p> <p>Low Moderate High Exceptional (Flora & Fauna)</p> <p>Reason for initial assessment:</p> <p>Upper semi-evergreen forests and as part of Dakcheung plateau which would support some important forest habitats for fauna species.</p> <p>Habitat Description:</p> <p>Upper semi-evergreen forest and some young fallow, the habitat condition remains quite good especially to the east. This plot is located in Xiengluang Production Forest. This plot of 500m radius is considered fairly good ecological status as original forest remains with some diversity of flora and fauna.</p> <p>Characteristic flora (composition):</p> <p>Mainly semi-evergreen forest, with mostly medium trees (height 20m and DBH 40m. The forest structure has only 2 layers, the higher layer is highly dominant by Mai kor (Quercus and and Lithocarpus). The lower layer is young tree, and some rattans.</p> <p>Flora species or interest (present or likely to be present):</p> <p><i>Dominance: Mai kor ban, Mai kor houm, Mai Meuad (see the list).</i></p> <p><i>Key species: None</i></p> <p><i>Native species: None</i></p> <p>Fauna species (present or highly likely to be present):</p> <p>Species/signs of species recorded for:</p> <p><i>Key species: None</i></p> <p><i>Other species/native species: Crested Serpent Eagle, Asian Barred Owlet, and some number of small forest birds especially bulbul and warbler (see the list).</i></p>		   	

Species of interest likely to be present:

Key species: None

Other species/native species: Leopard cat, Civets

Ecosystems Services comments

Watershed and NTFPs.



Quercus



Lithocarpus



Crested Serpent Eagle



Asian Barred Owlet

List of some flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai Paek	<i>Pinus kesiya</i>	PINACEAE		
2	Mai kham pom	<i>Phyllanthus emblica L</i>	PHYLLANTHACEAE		
3	Mai kor nok	<i>Lithocarpus polystachyus (Wall.) Rehd</i>	FAGACEAE		
4	Mai kor nam	<i>Castanea mollissima Blume</i>	FAGACEAE		
5	Mai meaud	<i>Aporosa tetrapleura Hance</i>	EUPHORBIACEAE		
6	Mai kor houm	<i>Quercus fabrei</i>	FAGACEAE		
7	Mai kor ban	<i>Lithocarpus corneus (Lour.) Rehder</i>	FAGACEAE		
8	Mai kor noy	<i>Morella cerifere (L.) small</i>	MYRICACEAE		
9	Wai	<i>Calamus sp.</i>	CALAMOIDEAE		
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List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
1	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, suitability, report
2	Seua meo	Leopard cat	<i>Prio. bengalensis</i>		L, suitability, report
3	Ngen	Civet sp.			L, suitability, report
4	Nok khao	Asian Barred Owlet	<i>Glaucidium cuculoides</i>		L, sighting
4	Leo ta luang	Crested Serpent Eagle	<i>Spilornis cheela</i>		L, sighting
4	Ka tae	Indo. ground squirrel	<i>Menetes berdmorei</i>		L, feeding site seen
5	Bang nai	Phayrei's Flying squirrel	<i>Hylopetes sp.</i>		L, feeding site seen
6	Nok Eing mong	Black collared Starling	<i>Gracupica nigricollis</i>		L, sighting
7	Kai pa	Red junglefowl	<i>Gallus gallus</i>		L, feeding site seen
8	Nok jib	Warbler sp.	<i>Phylloscopus sp.</i>		L, sighting
9	Nok ka thad deng	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		L, sighting
10	Nok khiew	Common Iora	<i>Aegithina tiphia</i>		L, sighting

11	Nok ka thad dam	Black crested Bulbul	<i>Rubigula flaviventris</i>		L, sighting
12	Nok keo	Blossom-headed Parakeet	<i>Psittacula roseata</i>		L, suitability, report
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- **Rating of the ecosystem integrity at location (1 = Poor to 5 = excellent)**




Key Parameter	Rating	Justification
Habitat/forest structure	3.0	Semi-evergreen forest with some good condition, new fallow was found on the east but far east is mostly forested.
Flora species	3.5	Many medium tree species remain and some diversity of tree species.
Fauna species	2.5	Some few medium and small wildlife species present in the area, probably hardly any globally threatened species.
Ecosystem integrity	3.0	Forest habitat condition remains quite good, original semi-evergreen forest remains quite largely on the northwest, but only some medium and small species of fauna species are present, certainly declined today in quantity.
Ecosystem status	M	Some interesting, but not really since it is quite close to settlement. The far east section is better and largely forested. It is known Xiengluang Production Forest.

- **Current threats and management**

No particular threat is identified, it is possible for hunting since it is very close to the village (Ban Dak Nong). This sample plot is part of Xiengluang Production Forest which land use planning was conducted with some signs are in place.

Sample Point: 13 Nearest location: Ban Dak Samor/Attapeu

Forest type/Ecosystem: Semi-evergreen forest ecosystem

Latitude (N)	Longitude (E)	Altitude	Date
1688692	724024	1,177 m a.s.l.	Dec 28, 2020
<p>Initial Field Assessment:</p> <p>Low Moderate High Exceptional (Flora & Fauna)</p> <p>Reason for initial assessment:</p> <p>Upper semi-evergreen forests and as part of Dakcheung plateau which would support some important forest habitats for fauna species.</p> <p>Habitat Description:</p> <p>Upper semi-evergreen forest and some young fallow, the habitat condition remains quite good especially to the east. This plot is located in Xiengluang Production Forest. This plot of 500m radius is considered fairly good ecological status as original forest remains with some diversity of flora and fauna.</p> <p>Characteristic flora (composition):</p> <p>Mainly deciduous forest, with mostly medium trees (height 20m and DBH 40m). The forest structure has only 2 layers, the higher layer is highly dominant by Mai kor (Quercus and Lithocarpus). The lower layer is young tree, and some rattans.</p> <p>Flora species or interest (present or likely to be present):</p> <p><i>Dominance: Chuang, Mai Langdom, Mai khaenhin (see the list).</i></p> <p><i>Key species: Mai Khaenhin (EN)</i></p> <p><i>Native species: None</i></p> <p>Fauna species (present or highly likely to be present):</p> <p>Species/signs of species recorded for:</p> <p><i>Key species: None</i></p>			
			
			
			

Other species/native species: Crested Serpent Eagle, Asian Barred Owlet, and some number of small forest birds especially bulbul and warbler (see the list).

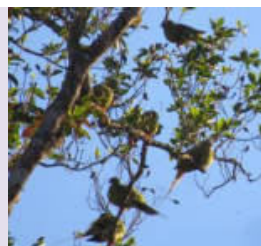
Species of interest likely to be present:

Key species: None

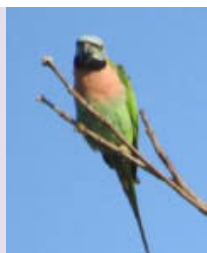
Other species/native species:

Ecosystems Services comments

Watershed and NTFPs.



Pin-tailed G. Pigeon



Blossom-h. Parakeet

List of some flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai Chuang	<i>Cinnamomum iners Reinw. ex Blume</i>	LAURACEAE		
2	Mai kham pom	<i>Phyllanthus emblica L</i>	PHYLLANTHACEAE		
3	Mai Lang dam	<i>Diospyros silvatica Roxb</i>	EBENACEAE		
4	Mai kor nam	<i>Castanea mollissima Blume</i>	FAGACEAE		
5	Mai meaud	<i>Aporosa tetrapleura Hance</i>	EUPHORBIACEAE		
6	Mai Khaenhin	<i>Hopea pierrei Hance</i>	DIPTEROCARPCEAE	EN	
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List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
1	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, suitability, report
2	Seua meo	Leopard cat	<i>Prio. bengalensis</i>		L, suitability, report
3	Ngen	Civet sp.			L, suitability, report
4	Nok khao	Asian Barred Owlet	<i>Glaucidium cuculoides</i>		L, suitability, report
4	Leo ta luang	Crested Serpent Eagle	<i>Spilornis cheela</i>		L, sighting
4	Ka tae	Indo. ground squirrel	<i>Menetes berdmorei</i>		L, feeding site seen
5	Bang nai	Phayrei's Flying squirrel	<i>Hylopetes sp.</i>		L, feeding site seen

6	Nok Eing mong	Black collared Starling	<i>Gracupica nigricollis</i>		L, sighting
7	Kai pa	Red junglefowl	<i>Gallus gallus</i>		L, feeding site seen
8	Nok jib	Warbler sp.	<i>Phylloscopus sp.</i>		L, sighting
9	Nok ka thad deng	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		L, sighting
10	Nok khiew	Common Iora	<i>Aegithina tiphia</i>		L, sighting
11	Nok ka thad dam	Black crested Bulbul	<i>Rubigula flaviventris</i>		L, sighting
12	Nok keo	Blossom-headed Parakeet	<i>Psittacula roseata</i>		L, suitability, report
13	Nok pao hang	Pin-tailed Green Pigeo	<i>Treron apicauda</i>		M, sighting
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- **Rating of the ecosystem integrity at location (1 = Poor to 5 = excellent)**

Key Parameter	Rating	Justification
Habitat/forest structure	3.0	Semi-evergreen forest with some good condition, new fallow was found on the east but far east is mostly forested.
Flora species	3.5	Many medium tree species remain and some diversity of tree species.
Fauna species	2.5	Some few medium and small wildlife species present in the area, probably hardly any globally threatened species.
Ecosystem integrity	3.0	Forest habitat condition remains quite good, original semi-evergreen forest remains quite largely on the northwest, but only some medium and small species of fauna species are present, certainly declined today in quantity.
Ecosystem status	M	Some interesting, but not really since it is quite close to settlement. The far east section is better and largely forested. It is known Xiengluang Production Forest.

- **Current threats and management**

No particular threat is identified, it is possible for hunting since it is very close to the village (Ban Dak Samor). This sample plot is part of Xiengluang Production Forest which land use planning was conducted with some signs are in place.

Sample Point: 14 Nearest location: Ban Dak Samor/Attapeu

Forest type/Ecosystem: Fallow/semi-evergreen forest ecosystem

Latitude (N)	Longitude (E)	Altitude	Date
1685728	723622	1,106 m a.s.l.	Dec 28, 2020

Initial Field Assessment:

Low Moderate High Exceptional
(Flora & Fauna)

Reason for initial assessment:

Upper semi-evergreen forest, it is part of Dakcheung plateau and grassland plain which would hold some important habitats for especially bird community.

Habitat Description:

Fallows were originally from upper semi-evergreen forest, portion of shrubland. The area was degraded, mainly converted to agricultural land, some old and young fallows. A small block of some good forest was in the plot. The habitat was degraded, complete loss of forest structure which only some patches of the forest were found. This plot of 500m radius is considered poor ecological status as no original forest remains with low diversity of flora and fauna.

Characteristic flora (composition):

Mainly a large fallow distribution, just a few clusters of trees are found in scatter. As short trees and shrubland which no any specific characteristic flora could be described.

Flora species or interest (present or likely to be present):

Dominance: Mai kor, Mai Paek, Mai En-ar, Mai Kham pom, Mai Meuad (see the list).

Key species: None

Native species: None

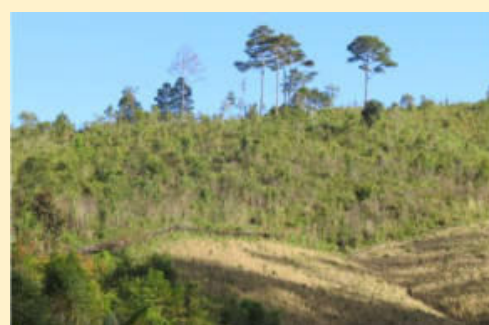
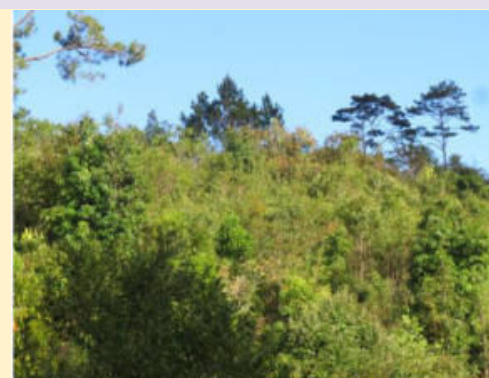
Fauna species (present or highly likely to be present):

Species/signs of species recorded for:

Key species: None

Other species/native species: some number of small mammals and small forest birds especially bulbul, bushchat and warbler (see the list).

Species of interest likely to be present:



Key species: None

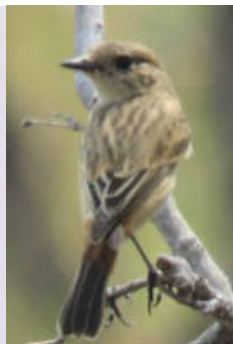
Other species/native species:

Ecosystems Services comments

Barely function anything of particular ecosystem service.



Dark-side Flycatcher



Grey Bushchat

List of some flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai Paek	<i>Pinus kesiya</i>	PINACEAE		
2	Mai wa	<i>Ficus annulata</i> Blume	MORACEAE		
3	Mai en-ar	<i>Melastoma normale</i> D. Don	MELASTOMATACEAE		
4	Mai kham pom	<i>Phyllanthus emblica</i> L	PHYLLANTHACEAE		
5	Mai kor nok	<i>Lithocarpus polystachyus</i> (Wall.) Rehd	FAGACEAE		
6	Mai kor nam	<i>Castanea mollissima</i> Blume	FAGACEAE		
7	Mai meaud	<i>Aporosa tetrapleura</i> Hance	EUPHORBIACEAE		
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List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
1	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, suitability, report
2	Nok khao	Asian Barred Owlet	<i>Glaucidium cuculoides</i>		L, suitability, report
3	Bang nai	Phayrei's Flying squirrel	<i>Hylopetes</i> sp.		L, feeding site seen
4	Nok Eing mong	Black collared Starling	<i>Gracupica nigricollis</i>		L, sighting
5	Nok jib	Warbler sp.	<i>Phylloscopus</i> sp.		L, suitability, report
6	Nok ka thad deng	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		L, sighting
7	Nok ka thad dam	Black crested Bulbul	<i>Rubigula flaviventris</i>		L, sighting
8	Nok jib moun	Dark-side Flycatcher	<i>Muscicapa sibirica</i>		L, sighting
9	Nok tor	Grey Bushchat	<i>Saxicola ferreus</i>		L, sighting
10	Leo deng	Rufous-winged Buzzard	<i>Butastur liventer</i>		L, suitability, report
11	Leo	Eagle sp.			L, suitability, report
12					
13					

- **Rating of the ecosystem integrity at location** (1 = Poor to 5 = excellent)




Key Parameter	Rating	References
Habitat/forest structure	2.0	Fallow/Semi-evergreen forest with some reasonable condition, new fallow was found on the east but far east is mostly forested.
Flora species	2.5	Many medium tree species remain and some diversity of tree species.
Fauna species	1.5	Some few medium and small wildlife species present in the area, probably hardly any globally threatened species.
Ecosystem integrity	2.0	Forest habitat condition remains quite good, original semi-evergreen forest remains quite largely on the northwest, but only some medium and small species of fauna species are present, certainly declined today in quantity.
Ecosystem status	L+	It is quite close to settlement.

- **Current threats and management**

No particular threat is identified, it is possible for hunting since it is very close to the village (Ban Dak Samor). This sample plot is part of Xiengluang Production Forest which land use planning was conducted with some signs are in place.

Sample Point: 15 Nearest location: Ban Dak Run

Forest type/Ecosystem: Coniferous forest/grassland ecosystem

Latitude (N)	Longitude (E)	Altitude	Date
1705564	741550	1,254 m a.s.l.	Dec 28, 2020
<p>Initial Field Assessment:</p> <p>Low Moderate High Exceptional (Flora & Fauna)</p> <p>Reason for initial assessment:</p> <p>Grassland/coniferous, it is part of Dakcheung plateau with pattern of grassland plain in coniferous landscape which would hold some important habitats for especially bird community.</p> <p>Habitat Description:</p> <p>Grassland is located in the coniferous forest range as surrounding the sample plot. This plot of 500m radius is considered very poor ecological status but it would support some important habitat of grass birds during wet season.</p> <p>Characteristic flora (composition):</p> <p>No any specific characteristic flora could be described.</p> <p>Flora species or interest (present or likely to be present):</p> <p><i>Dominance: None</i></p> <p><i>Key species: None</i></p> <p><i>Native species: None</i></p> <p>Fauna species (present or highly likely to be present):</p> <p>Species/signs of species recorded for:</p> <p><i>Key species: None</i></p>			
			
			
			

Other species/native species: Rock Thrush and Warbler.

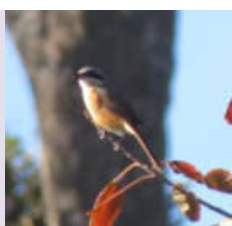
Species of interest likely to be present:

Key species: None

Other species/native species: it is possible for some bird species during wet season such as pipits, prinia, swift etc.

Ecosystems Services comments

Barely function anything of particular ecosystem service.



Brown Shrike



Asian Brown Flycatcher

List of some flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai Paek	<i>kesiya royle ex Gordon</i>	PINACEAE		
2	Phak koud khok	<i>Cyathea species</i>	PTERYDOPHYTA-CYATHEACEAE		
3	Mai kor nam	<i>Castanea mollissima Blume</i>	FAGACEAE		
4	Mai meaud	<i>Aporosa tetrapleura Hance</i>	EUPHORBIACEAE		
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List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
1	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, suitability, report
2	Nok khao	Asian Barred Owlet	<i>Glaucidium cuculoides</i>		L, suitability, report
3	Nok Eing mong	Black collared Starling	<i>Gracupica nigricollis</i>		L, sighting
4	Nok jib	Warbler sp.	<i>Phylloscopus sp.</i>		L, sighting
5	Nok ka thad deng	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		L, sighting
6	Nok ka thad dam	Black crested Bulbul	<i>Rubigula flaviventris</i>		L, sighting
7	Nok Nyot Nya	Prinia	<i>Prinia sp.</i>		L, suitability, report

8	Nok long deun	Pipit	<i>Anthus sp.</i>		L, suitability, report
9	Nok la	Brown shrike	<i>Lanius cristatus</i>		L, sighting
10	Nok chap meng	Asian brown Flycatcher	<i>Muscicapa dauurica</i>		L, sighting
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- **Rating of the ecosystem integrity at location (1 = Poor to 5 = excellent)**

Key Parameter	Rating	Justification
Habitat/forest structure	1.0	Grassland, surrounding of coniferous forest.
Flora species	1.5	Only few trees were found in foothill as some distance from the centre of the sample plot.
Fauna species	1.0	Only a few small birds were present and some other would be present, it is just close to the settlement.
Ecosystem integrity	1.1	Very poor
Ecosystem status	L	No any particular ecosystem value of this plot can be described.

- **Current threats and management**

Nothing, no any management is in place, because of neither particular threat nor available wildlife to be hunted since it is very close to the village (Ban Dak run).

Sample Point: 16 Nearest location: Ban Dak Ben

Forest type/Ecosystem: Semi-evergreen/coniferous forest ecosystem

Latitude (N)	Longitude (E)	Altitude	Date
1692737	732667	1,213 m a.s.l.	Dec 28, 2020

Initial Field Assessment:

Low Moderate High Exceptional
(Flora & Fauna)

Reason for initial assessment:

Upper semi-evergreen and coniferous forests as part of Southern Dakcheung plateau which would support some important forest habitats for fauna species.

Habitat Description:

There are some patterns of fallows, originally from upper semi-evergreen forest. The area was highly degraded, mainly converted to agricultural land, some old and young fallows. Therefore, the habitat was considered degraded, become shrubland. This plot of 500m radius is considered poor ecological status as very few patches of original forest remains with very low diversity of flora and fauna.

Characteristic flora (composition):

Mainly a large fallow distribution, as medium and short trees and shrubland which no any specific characteristic flora could be described. The forest structure has only 1 layer.

Flora species or interest (present or likely to be present):

Dominance: Mai kor ban, Mai kor houn, Mai Meuad (see the list).

Key species: None

Native species: None

Fauna species (present or highly likely to be present):

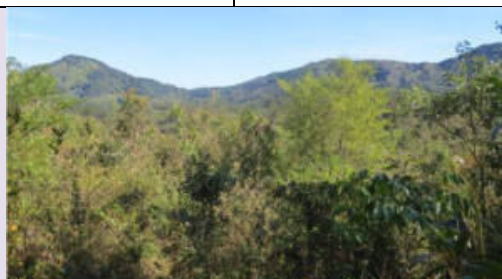
Species/signs of species recorded for:

Key species: None

Other species/native species: some number of small forest birds especially bulbul and warbler (see the list).

Species of interest likely to be present:

Key species: None



Other species/native species:

Ecosystems Services comments

Barely function anything of particular ecosystem service.



Leafbird

List of some flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai kor nam	<i>Castanea mollissima Blume</i>	FAGACEAE		
2	Mai dok	<i>Melastonia melabathricum</i>	MELASTOMATACE		
3	Mai meaud	<i>Aporosa tetrapleura Hance</i>	EUPHORBIACEAE		
4	Mai Pohou xang	<i>Sterculia lancaviensis Ridl.</i>	MALVACEAE		
5	Mai kham pom	<i>Phyllanthus emblica L.</i>	EUPHORBIACEAE		
6	Mai kor nok	<i>Lithocarpus polystachyus</i>	FAGACEAE		
7	Mai Paek	<i>Pinus kesiya</i>	PINACEAE		
8	Mai En-ar	<i>Melastoma normale</i>	MELASTOMATACE		
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List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
1	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, suitability, report
2	Seua meo	Leopard cat	<i>Prio. bengalensis</i>		L, suitability
3	Ka tae	Indo. ground squirrel	<i>Menetes berdmorei</i>		L, suitability
4	Bang nai	Phayrei's Flying squirrel	<i>Hylopetes sp.</i>		L, suitability
5	Nou	Rat	<i>Leophodamys</i>		M, feeding site seen
6	Nok Eing mong	Black collared Starling	<i>Gracupica nigricollis</i>		L, sighting
7	Nok jib	Divison's Leaf Warbler	<i>Phylloscopus intensor</i>		L, sighting
8	Kai pa	Red junglefowl	<i>Gallus gallus</i>		M, suitability
9	Nok jib	Warbler sp.	<i>Phyloscopus sp.</i>		L, sighting
10	Nok ka thad dang	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		L, sighting
11	Nok khiew tong	Leafbird	<i>Chloropsis</i>		L, sighting
12	Nok ka thad dam	Sooty-headed bulbul	<i>Pycnonotus aurigaster</i>		L, sighting
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- **Rating of the ecosystem integrity at location** (1 = Poor to 5 = excellent)

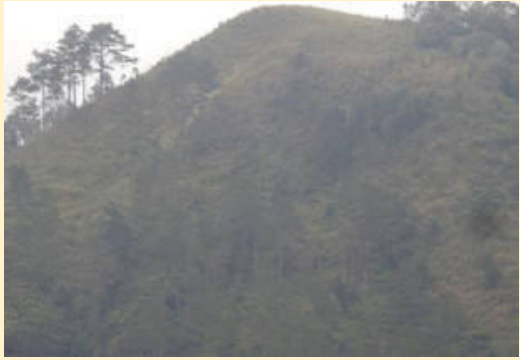

Key Parameter	Rating	Justification
Habitat/forest structure	2.0	Forest habitat condition remains fair, some large portion of fallows, some old and young fallows – originally from semi-evergreen forest and coniferous forest.
Flora	2.5	Some flora species would be lost as low diversity of tree species.
Fauna	2.0	Some small mammal and forest birds are present, some were reported and sighted. Probably some medium mammal species, at least Wild Pig and Barking Deer.
Ecosystem integrity	2.1	Some portions of the habitats were degraded but some fauna species are present.
Ecosystem status	L+	The ecosystem of this plot is degraded, nothing is potential for conservation nor any conservation forest in the area.

- **Current threats and management**

Nothing, neither this sample plot is classified to be part of any conservation area in the country nor any management is in place.

Sample Point: 17 Nearest location: Ban Dak Bang

Forest type/Ecosystem: Coniferous forest ecosystem

Latitude (N)	Longitude (E)	Altitude	Date
1695867	733548	1,225 m a.s.l.	Dec 31, 2020
<p>Initial Field Assessment:</p> <p>Low Moderate High Exceptional (Flora & Fauna)</p> <p>Reason for initial assessment:</p> <p>Upper semi-evergreen and coniferous forests as part of Dakcheung plateau which would support some important forest habitats for fauna species.</p> <p>Habitat Description:</p> <p>There are degraded pine forest and fallows were converted to agricultural land originally from upper semi-evergreen forest. Therefore, the habitat was considered highly degraded. This plot of 500m radius is considered fairly poor ecological status as only some forest remains in lower part of the mountain but with low diversity of flora and fauna.</p> <p>Characteristic flora (composition):</p> <p>Mainly a large fallow distribution, as medium and short trees and shrubland which no any specific characteristic flora could be described. The forest structure has only 1 layer and 2 layers for the upper semi-evergreen which was found in foothills.</p> <p>Flora species or interest (present or likely to be present):</p> <p><i>Dominance: Pine, Mai kor, Mai Meuad (see the list).</i></p> <p><i>Key species: None</i></p> <p><i>Native species: None</i></p> <p>Fauna species (present or highly likely to be present):</p> <p>Species/signs of species recorded for:</p> <p><i>Key species: None</i></p> <p><i>Other species/native species: some number of small forest birds especially bulbul, Oriole and warblers (see the list).</i></p> <p>Species of interest likely to be present:</p> <p><i>Key species: None</i></p>		   	

Other species/native species:

Ecosystems Services comments

Barely function anything of particular ecosystem service.



Black-naped Oriole

List of some flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai kor nam	<i>Castanea mollissima Blume</i>	FAGACEAE		
2	Mai meaud	<i>Aporosa tetrapleura Hance</i>	EUPHORBIACEAE		
3	Mai Pohou xang	<i>Sterculia lancaviensis Ridl.</i>	MALVACEAE		
4	Mai kham pom	<i>Phyllanthus emblica L.</i>	EUPHORBIACEAE		
5	Mai kor nok	<i>Lithocarpus polystachyus (Wall.) Rehd</i>	FAGACEAE		
6	Mai Paek	<i>Pinus kesiya</i>	PINACEAE		
7	Fak hou xang				Epiphyte
8	Mai Sompoi	<i>Acacia concinna (Willdenow) DC.</i>	MIMOSOIDEAE		
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List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
1	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, suitability, report
2	Ka tae	Indo. ground squirrel	<i>Menetes berdmorei</i>		L, suitability
3	Bang nai	Phayrei's Flying squirrel	<i>Hylopetes sp.</i>		L, suitability
4	Nou	Rat	<i>Leopodomys</i>		L, suitability
5	Nok jib	Divison's Leaf Warbler	<i>Phylloscopus intensor</i>		L, sighting
6	Nok ka in	Blue rock thrush	<i>Monticola solitarius</i>		L, suitability
7	Kai pa	Red junglefowl	<i>Gallus gallus</i>		L, suitability
8	Nok jib	Warbler sp.	<i>Phylloscopus sp.</i>		L, sighting
9	Nok ka thad dang	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		L, sighting
10	Nok Ngon dam	Black-naped Oriole	<i>Oriolus chinensis</i>		L, suitability, report
11	Nok ka thad dam	Sooty-headed bulbul	<i>Pycnonotus aurigaster</i>		L, sighting
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- **Rating of the ecosystem integrity at location** (1 = Poor to 5 = excellent)

Key Parameter	Rating	Justification
Habitat/forest structure	1.5	Forest habitat condition remains poor, mainly pine forest, while some portions of fallows were found in lower hill.
Flora	2.0	Some flora species would be lost as low diversity of tree species but quite better in lower foothill.
Fauna	1.5	Some small mammal and forest birds are present as reported and sighted. Hardly any even medium mammal is present.
Ecosystem integrity	1.5	Large portion of the habitat was degraded, but only small fauna species are present.
Ecosystem status	L	The ecosystem of this plot is highly degraded, nothing is potential for conservation nor any conservation forest in the area.

- **Current threats and management**

Nothing, neither this sample plot is classified to be part of any conservation area in the country nor any management is in place.

Sample Point: 18 Nearest location: Ban Dak Ben

Forest type/Ecosystem: Semi-evergreen/coniferous forest ecosystem

Latitude (N)	Longitude (E)	Altitude	Date
1692456	734510	1,228 m a.s.l.	Dec 28, 2020

Initial Field Assessment:

Low Moderate High Exceptional
(Flora & Fauna)

Reason for initial assessment:

Upper semi-evergreen forest and some patterns of coniferous forest as part of Southern Dakcheung plateau which would support some important forest habitats for fauna species.

Habitat Description:

There are fallows, originally from upper semi-evergreen forest and pattern of coniferous forest. The area was fairly degraded from converting to agricultural land, some old and young fallows. This plot of 500m radius is considered fairly poor ecological status as no particular important forest remains and with low diversity of flora and fauna.

Characteristic flora (composition):

Large fallow distribution, as medium and short trees which no any specific characteristic flora could be described. The forest structure has only 1 layer.

Flora species or interest (present or likely to be present):

Dominance: Mai Meuad, Mai kor ban, Mai kor houn, Mai Paek (see the list).

Key species: None

Native species: None

Fauna species (present or highly likely to be present):

Species/signs of species recorded for:

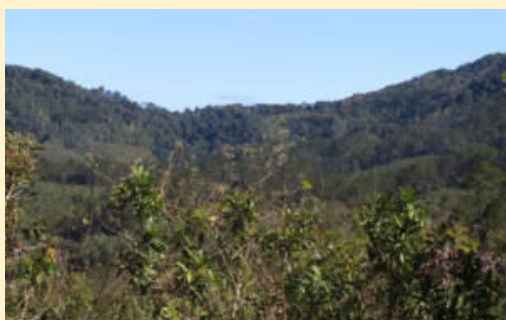
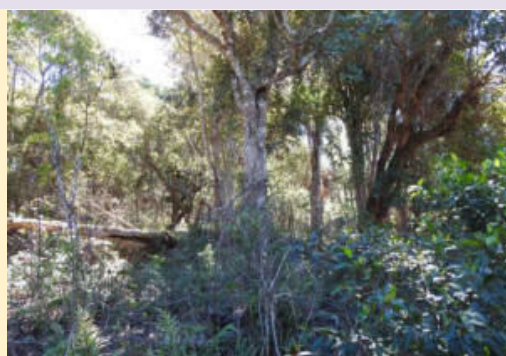
Key species: None

Other species/native species: some number of small forest birds (see the list).

Species of interest likely to be present:

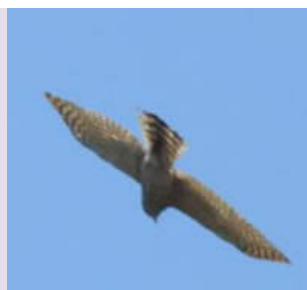
Key species: None

Other species/native species:



Ecosystems Services comments

Barely function anything of particular ecosystem service.



Rufous-winged Buzzard

List of some flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai meaud	<i>Aporosa tetrapleura Hance</i>	EUPHORBIACEAE		
2	Mai kor nam	<i>Castanea mollissima Blume</i>	FAGACEAE		
3	Mai meaud	<i>Aporosa tetrapleura Hance</i>	EUPHORBIACEAE		
4	Mai kor noy	<i>Morella cerifere (L.) small</i>	MYRICACEAE		
5	Mai kor nok	<i>Lithocarpus polystachyus (Wall.) Rehd</i>	FAGACEAE		
6	Mai Paek	<i>Pinus kesiya</i>	PINACEAE		
7	Fak hou xang				
8	Mai Sompoi	<i>Acacia concinna (Willdenow) DC.</i>	MIMOSOIDEAE		
9	Phak koud khok	<i>Cyathea species</i>	PTERYDOPHYTA-CYATHEACEAE		
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List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
1	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, suitability, report
2	Seua meo	Leopard cat	<i>Prio. bengalensis</i>		L, suitability
3	Ka tae	Indo. ground squirrel	<i>Menetes berdmorei</i>		L, suitability
4	Bang nai	Phayrei's Flying squirrel	<i>Hylopetes sp.</i>		L, suitability
5	Nou	Rat	<i>Leophodamys</i>		M, feeding site seen
6	Fan	Barking Dear	<i>Muntiacus Muntjak</i>		L, suitability, report
7	Kai	Mouse Deer	<i>Tragulus kanchil</i>		L, suitability, report
8	Mu Pa	Wild Pig	<i>Sus scrofa</i>		L, tracks seen
9	Kai pa	Red junglefowl	<i>Gallus gallus</i>		L, feeding site seen
10	Nok jib	Warbler sp.	<i>Phylloscopus sp.</i>		L, sighting
11	Nok ka thad dang	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		L, sighting
12	Leo deng	Rufous-winged Buzzard	<i>Butastur liventer</i>		L, sighting
13	Nok ka thad dam	Sooty-headed bulbul	<i>Pycnonotus aurigaster</i>		L, sighting
14	Nok ka cheoi	Chestnut-headed Bee-eater	<i>Merops leschenaulti</i>		L, sighting
15					

- **Rating of the ecosystem integrity at location (1 = Poor to 5 = excellent)**

Key Parameter	Rating	Justification
Habitat/forest structure	2.0	Forest habitat condition remains fairly poor, some proportions of fallows - old and young fallows - originally from semi-evergreen forest and coniferous forest.
Flora	2.5	Some flora species would be lost as low diversity of tree species.
Fauna	2.5	Some small mammal and forest birds are present, some were reported and sighted. Probably some medium mammal species, at least Wild Pig and Barking Deer.
Ecosystem integrity	2.3	Some portions of the habitats were degraded but some fauna species are present.
Ecosystem status	L+	The ecosystem of this plot is degraded, nothing is potential for conservation nor any conservation forest in the area.

- **Current threats and management**

Nothing, neither this sample plot is classified to be part of any conservation area in the country nor any management is in place.

Sample Point: 19 Nearest location: Ban Dak Kong

Forest type/Ecosystem: Shrubland/coniferous forest ecosystem

Latitude (N)	Longitude (E)	Altitude	Date
1688539	730871	1,198 m a.s.l.	Dec 28, 2020

Initial Field Assessment:

Low Moderate High Exceptional
(Flora & Fauna)

Reason for initial assessment:

Shrubland with rocky plain is located in the upper semi-evergreen forests and as part of Dakcheung plateau which would support some important forest habitats for fauna species.

Habitat Description:

As shrubland with largely rocky plain and pine trees in Upper semi-evergreen forest landscape. This plot of 500m radius is considered poor ecological status, it is quite good flora species but fewer number of fauna species.

Characteristic flora (composition):

Semi-evergreen forest, with mostly medium trees (height 7m and DBH 25m. Just medium and small trees, the forest structure has only 1 layer, the higher layer is highly dominant by Mai Meud and Mai san).

Flora species or interest (present or likely to be present):

Dominance: Mai san, Mai kor, Mai Meud (see the list).

Key species: None

Native species: None

Fauna species (present or highly likely to be present):

Species/signs of species recorded for:

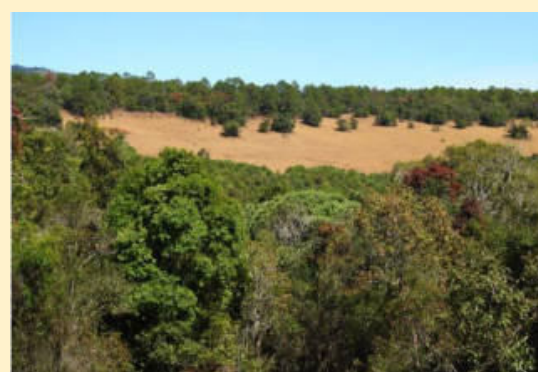
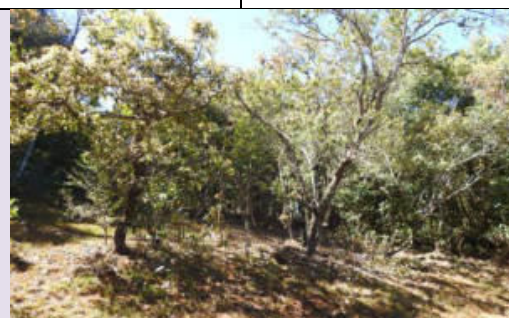
Key species: None

Other species/native species: Crested Serpent Eagle, Asian Barred Owlet, and some number of small forest birds especially bulbul and warbler (see the list).

Species of interest likely to be present:

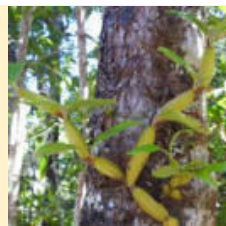
Key species: None

Other species/native species:



Ecosystems Services comments

Watershed and NTFPs.



Orchid



Black-n. Woodpecker

List of some flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai Meud er	<i>Memecylon edule Roxb</i>	EUPHORBIACEAE		
2	Mai kham pom	<i>Phyllanthus emblica L</i>	PHYLLANTHACEAE		
3	Mai kor nok	<i>Lithocarpus polystachyus</i>	FAGACEAE		
4	Mai kor nam	<i>Castanea mollissima Blume</i>	FAGACEAE		
5	Mai meaud	<i>Aporosa tetrapleura Hance</i>	EUPHORBIACEAE		
6	Mai kor houm	<i>Quercus fabrei</i>	FAGACEAE		
7	Mai kor noy	<i>Morella cerifere (L.) small</i>	MYRICACEAE		
8	Mai san	<i>Dillenia turbinata Finet&Gagnep</i>	DILLNIACEAE		
9	Mai Paek	<i>Pinus kesiya</i>	PINACEAE		
10	Dok Pheung	<i>Epiphytic orchid</i>	ORCHIDACEAE		Variety
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List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
1	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, suitability, report
2	Seua meo	Leopard cat	<i>Prio. bengalensis</i>		L, suitability, report
3	Nok khao	Asian Barred Owlet	<i>Glaucidium cuculoides</i>		L, suitability, report
4	Leo ta luang	Crested Serpent Eagle	<i>Spilornis cheela</i>		L, suitability, report
5	Nok Eing mong	Black collared Starling	<i>Gracupica nigricollis</i>		L, suitability, report
6	Nok jib	Warbler sp.	<i>Phyloscopus sp.</i>		L, sighting
7	Nok ka thad deng	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		L, sighting
8	Nok sai Ngon dam	Black-naped Woodpecker	<i>Picus querini</i>		L, sighting
9	Nok ka thad dam	Black crested Bulbul	<i>Rubigula flaviventris</i>		L, sighting

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- **Rating of the ecosystem integrity at location (1 = Poor to 5 = excellent)**



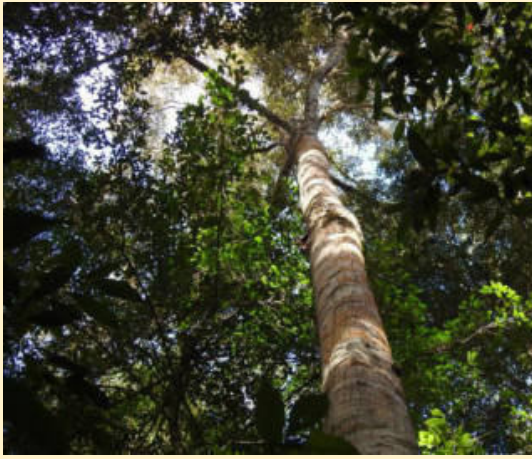
Key Parameter	Rating	Justification
Habitat/forest structure	1.0	Shrubland, as part of semi-evergreen forest and surrounding with coniferous community and some. Trees are short and quite density with some open space (rocky/bareland) within the plot. Largely bare rock plain on southwest.
Flora	2.5	Some number of trees were found, mostly small and bush trees.
Fauna	1.0	Only a few small mammal and forest birds were present and some other would be present.
Ecosystem integrity	1.5	Very poor
Ecosystem status	L	No any particular ecosystem value of this plot can be described.

- **Current threats and management**

Nothing, neither this sample plot is classified to be part of any conservation area in the country nor any management is in place.

Sample Point: 20 Nearest location: Ban Dak Beun

Forest type/Ecosystem: Semi-evergreen forest ecosystem

Latitude (N)	Longitude (E)	Altitude	Date
1713727	722583	1,409 m a.s.l.	Dec 27, 2020
<p>Initial Field Assessment:</p> <p>Low Moderate High Exceptional (Flora & Fauna)</p> <p>Reason for initial assessment:</p> <p>Upper semi-evergreen forests and as part of protection forest known Namdae which would support some important forest habitats for fauna species.</p> <p>Habitat Description:</p> <p>Upper semi-evergreen forest, the habitat condition remains very good. This plot of 500m radius is considered good ecological status as original forest remains with some diversity of flora and fauna.</p> <p>Characteristic flora (composition):</p> <p>The semi-evergreen forest, with mostly medium trees and some large trees (height 25m and DBH 80m. The forest structure has only 3 layers, the higher layer is highly dominant by Mai Chuang, Mai kor (Quercus and and Lithocarpus). The second layer is young trees, and some rattans and palmae in the lower layer.</p> <p>Flora species or interest (present or likely to be present):</p> <p><i>Dominance: Mai Chuang, Mai kor, Mai khaenhin, Tao maehang (palm) (see the list).</i></p> <p><i>Key species: Mai Khaenhin (Hopea, EN)</i></p> <p><i>Native species: None</i></p> <p>Fauna species (present or highly likely to be present):</p> <p>Species/signs of species recorded for:</p> <p><i>Key species: None</i></p>		  	

Other species/native species: Crested Serpent Eagle, Asian Barred Owlet, and some number of small forest birds especially bulbul and warbler, Minivet, flycatcher, stonechat (see the list).

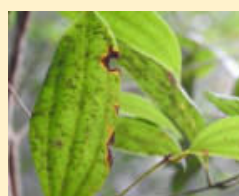
Species of interest likely to be present:

Key species: Pangolin

Other species/native species: Silver Pheasant

Ecosystems Services comments

Watershed and NTFPs.



Cinnamomum



Green b. Malkoha

List of some flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai Chuang	<i>Cinnamomum iners Reinw. ex Blume</i>	LAURACEAE		
2	Mai khaen hin	<i>Hopea pierrei Hance</i>	DIPTEROCARPCEAE	EN	
3	Mai kor nok	<i>Lithocarpus polystachyus (Wall.) Rehd</i>	FAGACEAE		
4	Mai kor nam	<i>Castanea mollissima Blume</i>	FAGACEAE		
5	Mai meaud	<i>Aporosa tetrapleura Hance</i>	EUPHORBIACEAE		
6	Mai khi mou	<i>Ormosia cambodiana Gagnep.</i>	FABACEAE		
7	Mai lang dam	<i>Diospyros silvatica Roxb</i>	EBENACEAE		
8	Tao mae hang	<i>Caryota mitis Loureiro</i>	PALMAE		
9	Wai noy	<i>Calamus sp.</i>	CALAMOIDEAE		
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List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
1	Lin	Pangolin		CR	L, suitability, report
2	Seua meo	Leopard cat	<i>Prio. bengalensis</i>		L, suitability, report
3	Ngen	Civet sp.			L, suitability, report
4	Nok khao	Asian Barred Owlet	<i>Glaucidium cuculoides</i>		L, sighting
4	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, suitability, report
4	Ka tae	Indo. ground squirrel	<i>Menetes berdmorei</i>		L, feeding site seen
5	Bang nai	Phayrei's Flying squirrel	<i>Hylopetes sp.</i>		L, feeding site seen
6	Leo ta luang	Crested Serpent Eagle	<i>Spilornis cheela</i>		L, sighting
7	Nok bang hok	Green billed Malkoha	<i>Phaenicophaeus tristis</i>		L, sighting
8	Nok jib	Stonechat			
9	Kai pa	Red junglefowl	<i>Gallus gallus</i>		L, feeding site seen
10	Nok jib	Warbler sp.	<i>Phyloscopus sp.</i>		L, sighting
11	Nok ka thad deng	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		L, sighting
12	Nok khiew	Common Iora	<i>Aegithina tiphia</i>		L, sighting
13	Nok ka thad dam	Black crested Bulbul	<i>Rubigula flaviventris</i>		L, sighting
14	Nok keo	Blossom-headed Parakeet	<i>Psittacula roseata</i>		L, suitability, report
15	Nok fai	Scarlet Mivinet	<i>Pericrocotus speciosus</i>		L, suitability, report
16	Nok Chap meng	Flycatcher			L, suitability, report
17					

- **Rating of the ecosystem integrity at location (1 = Poor to 5 = excellent)**

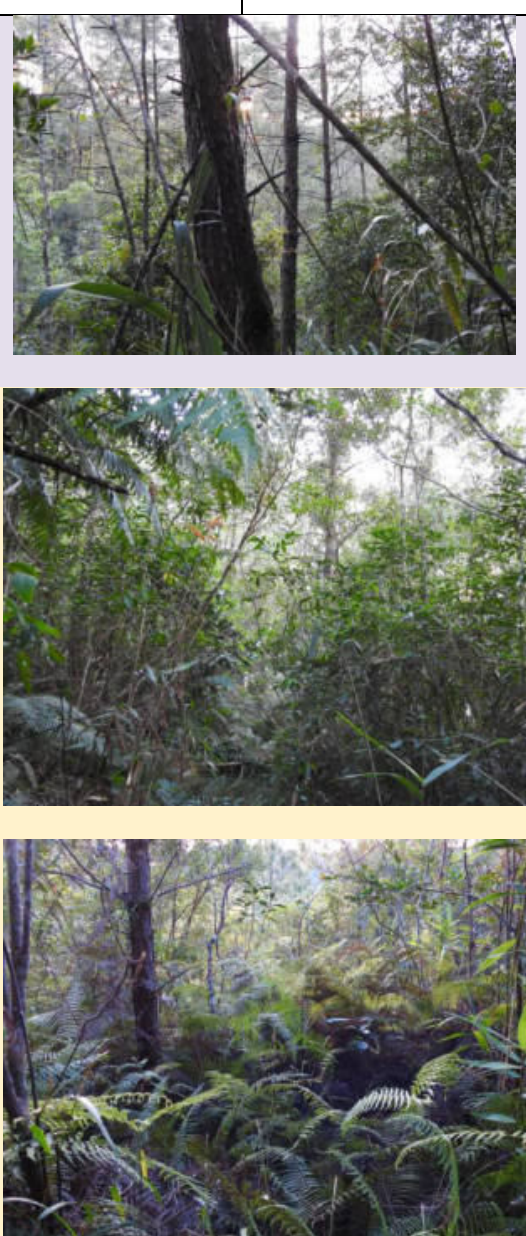
Key Parameter	Rating	Justification
Habitat/forest structure	4.0	Forest habitat condition remains originally good. This plot is located at higher slope. It has 3 layers of canopy.
Flora	4.0	Flora species remains as original status and some diverse.
Fauna	3.0	Some few medium and small wildlife species would be present in the area, probably some globally threatened species.
Ecosystem integrity	3.6	Forest habitat condition remains good, original semi-evergreen forest remains largely, with some probably medium and small species of fauna species are present.
Ecosystem status	M+	Some interesting especially for flora species, and this plot is part of Namdae Protection Forest.

- **Current threats and management**

The forest in this sample plot has been protected as part of Namdae protection forest. Neither any threats nor hunters were found.

Sample Point: 21 Nearest location: Ban Dak Sieng

Forest type/Ecosystem: Semi-evergreen forest ecosystem/Coniferous

Latitude (N)	Longitude (E)	Altitude	Date
1706127	725221	1,145 m a.s.l.	Dec 30, 2020
<p>Initial Field Assessment:</p> <p>Low Moderate High Exceptional (Flora & Fauna)</p> <p>Reason for initial assessment:</p> <p>Upper semi-evergreen and coniferous forests which would support some important forest habitats for fauna species.</p> <p>Habitat Description:</p> <p>There are largely fallows, originally from upper semi-evergreen forest. The area was degraded, mainly converted to agricultural land, some old and young fallows. Therefore, the habitat was considered fairly degraded. This plot of 500m radius is considered fairly poor ecological status as no original forest remains with low diversity of flora and fauna.</p> <p>Characteristic flora (composition):</p> <p>Mainly a large fallow distribution, as medium and short trees and shrubland which no any specific characteristic flora could be described. The forest structure has only 1 layer.</p> <p>Flora species or interest (present or likely to be present):</p> <p><i>Dominance: Mai Paek, Mai kor ban, Mai kor houm, Mai Meuad (see the list).</i></p> <p><i>Key species: None</i></p> <p><i>Native species: None</i></p> <p>Fauna species (present or highly likely to be present):</p> <p>Species/signs of species recorded for:</p>			

Key species: None

Other species/native species: some number of small mammal (rats) small forest birds especially bulbul and warbler (see the list).

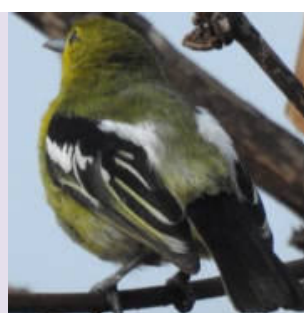
Species of interest likely to be present:

Key species: Pangolin

Other species/native species:

Ecosystems Services comments

Barely function anything of particular ecosystem service.



Common Iora



Striped t. Bulbul

List of some flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai kor nam	<i>Castanea mollissima Blume</i>	FAGACEAE		
2	Mai meaud	<i>Aporosa tetrapleura Hance</i>	EUPHORBIACEAE		
3	Mai kham pom	<i>Phyllanthus emblica L.</i>	EUPHORBIACEAE		
4	Mai kor nok	<i>Lithocarpus polystachyus (Wall.) Rehd</i>	FAGACEAE		
5	Mai Paek	<i>Pinus kesiya</i>	PINACEAE		
6	Fak hou xang				Epiphyte
7	Phak koud khok	<i>Cyathea species</i>	PTERYDOPHYTA-CYATHEACEAE		
8					
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12					
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List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
1	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, suitability, report
2	Seua meo	Leopard cat	<i>Prio. bengalensis</i>		L, suitability

3	Ka tae	Indo. ground squirrel	<i>Menetes berdmorei</i>		L, suitability
4	Bang nai	Phayrei's Flying squirrel	<i>Hylopetes sp.</i>		L, suitability
5	Nou	Rat	<i>Leophodamys</i>		M, feeding site seen
6	Kai pa	Red junglefowl	<i>Gallus gallus</i>		L, feeding site seen
7	Nok jib	Warbler sp.	<i>Phyloscopus sp.</i>		L, sighting
8	Nok ka thad dang	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		L, sighting
9	Nok khiew	Common Iora	<i>Aegithina tiphia</i>		L, sighting
10	Nok ka thad dam	Sooty-headed bulbul	<i>Pycnonotus aurigaster</i>		L, sighting
11	Nok ka cheoi	Chestnut-headed Bee-eater	<i>Merops leschenaulti</i>		L, sighting
12	Nok ka thaeb	Stripe-throated Bulbul	<i>Pycnonotus finlaysoni</i>		L, sighting
13					
14					

- **Rating of the ecosystem integrity at location (1 = Poor to 5 = excellent)**

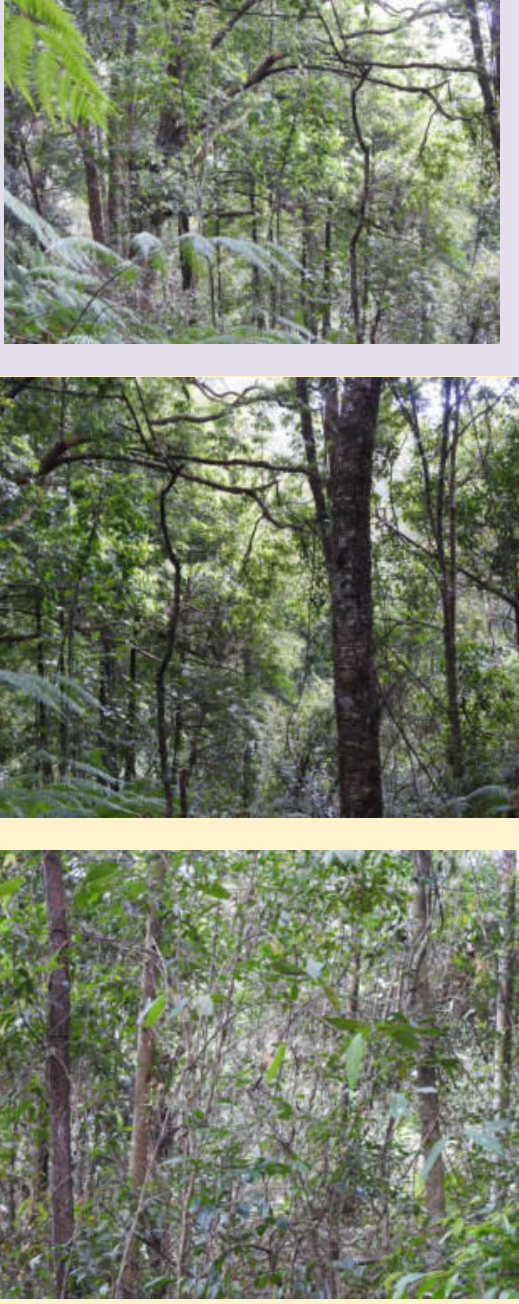
Key Parameter	Rating	Justification
Habitat/forest structure	2.5	As old fallow, the habitat condition remains quite fair, but some parts of the sample plot, about 60% was a secondary forest with some pine tree species.
Flora	3.0	Tree species remains as pretty fair status and not diverse, and a majority part of it was converted to agricultural land.
Fauna	2.0	Some few small wildlife species were present and some other would be present in the area, probably some few globally threatened species e.g pangolin was reported.
Ecosystem integrity	2.5	Forest habitat condition remains quite fair, originally from semi-evergreen forest, with some small species of fauna species are present, certainly declined today in quantity.
Ecosystem status	L+	Nothing is interesting, no importance of ecological value remains.

- **Current threats and management**

No any threats nor hunters were found. Also, neither this sample plot is classified to be part of any conservation area in the country nor any management is in place. Most part of this become degraded, large fallows.

Sample Point: 22 Nearest location: Ban Dak Sieng

Forest type/Ecosystem: Semi-evergreen forest ecosystem

Latitude (N)	Longitude (E)	Altitude	Date
1707135	723518	1,232 m a.s.l.	Dec 30, 2020
<p>Initial Field Assessment:</p> <p>Low Moderate High Exceptional (Flora & Fauna)</p> <p>Reason for initial assessment:</p> <p>Upper semi-evergreen and coniferous forests which would support some important forest habitats for fauna species.</p> <p>Habitat Description:</p> <p>There are some fallows, originally from upper semi-evergreen forest. The area was fairly degraded, mainly converted to agricultural land, some old and young fallows. Therefore, the habitat was considered fairly degraded. This plot of 500m radius is considered fairly poor ecological status as no original forest remains with low diversity of flora and fauna.</p> <p>Characteristic flora (composition):</p> <p>Mainly a large fallow distribution, as medium and short trees and shrubland which no any specific characteristic flora could be described. The forest structure has only 1 layer.</p> <p>Flora species or interest (present or likely to be present):</p> <p><i>Dominance: Mai Paek, Mai kor ban, Mai kor houn, Mai Meuad (see the list).</i></p> <p><i>Key species: None</i></p> <p><i>Native species: None</i></p> <p>Fauna species (present or highly likely to be present):</p> <p>Species/signs of species recorded for:</p>			

Key species: Pangolin

Other species/native species: some number of small mammals and small forest birds especially bulbul and warbler (see the list).

Species of interest likely to be present:

Key species: None

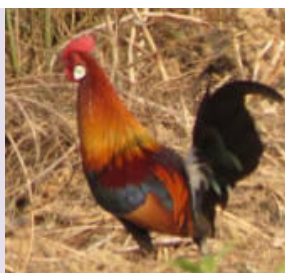
Other species/native species:

Ecosystems Services comments

Barely function anything of particular ecosystem service.



Lithocarpus



Red Junglefowl

List of some flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai kor nam	<i>Castanea mollissima Blume</i>	FAGACEAE		
2	Mai meaud	<i>Aporosa tetrapleura Hance</i>	EUPHORBIACEAE		
3	Mai kham pom	<i>Phyllanthus emblica L.</i>	EUPHORBIACEAE		
4	Mai kor nok	<i>Lithocarpus polystachyus (Wall.) Rehd</i>	FAGACEAE		
5	Mai Paek	<i>Pinus kesiya</i>	PINACEAE		
6	Fak hou xang				
7	Phak koud khok	<i>Cyathea species</i>	PTERYDOPHYTA-CYATHEACEAE		
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List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
1	Mu Pa	Wild Pig	<i>Sus Scrofa</i>		M, sighting
2	Fan	Barking Deer	<i>Muntiacus muntjak</i>		M, tracks seen
3	Kao	Mouse Deer	<i>Tragulus kanchil</i>		L, suitability
4	Seua meo	Leopard cat	<i>Prio. bengalensis</i>		L, suitability
5	Ka tae	Indo. ground squirrel	<i>Menetes berdmorei</i>		L, suitability
6	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, suitability, report
7	Bang nai	Phayrei's Flying squirrel	<i>Hylopetes sp.</i>		M, feeding site seen
8	Nou	Rat	<i>Leophodamys</i>		M, feeding site seen
9	Kai pa	Red junglefowl	<i>Gallus gallus</i>		M, sighting
10	Nok jib	Warbler sp.	<i>Phyloscopus sp.</i>		L, sighting
11	Nok ka thad dang	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		L, sighting
12	Nok khiew	Common Iora	<i>Aegithina tiphia</i>		L, suitability
13	Nok ka thad dam	Sooty-headed bulbul	<i>Pycnonotus aurigaster</i>		L, sighting
14	Nok ka thaeb	Stripe-throated Bulbul	<i>Pycnonotus finlaysoni</i>		L, sighting
15	Nok chab meng	Verditer flycatcher	<i>Eumyias thalassinus</i>		L, sighting
16	Nok fai	Scarlet Mivinet	<i>Pericrocotus speciosus</i>		L, suitability, report
17	Nok Chap meng	Flycatcher			L, suitability, report

- **Rating of the ecosystem integrity at location (1 = Poor to 5 = excellent)**


Key Parameter	Rating	Justification
Habitat/forest structure	3.0	As old fallow, the habitat condition remains quite fair, but some parts of the sample plot, about 40% was a secondary forest with some pine tree species.
Flora	3.0	Flora species remains as pretty fair status and not diverse, and a majority part of it was converted to agricultural land.
Fauna	2.0	Some few small wildlife species were present and some other would be present in the area, probably some few globally threatened species e.g pangolin was reported.
Ecosystem integrity	2.6	Forest habitat condition remains quite fair, originally from semi-evergreen forest, with some small species of fauna species are present, certainly declined today in quantity.
Ecosystem status	L+	Nothing is interesting, no importance of ecological value remains.

- **Current threats and management**

One snare line was found, the purpose was for catching pangolin. However, neither this sample plot is classified to be part of any conservation area in the country nor any management is in place. Some parts of this were converted to upper agricultural land, fallows.

Sample Point: 23 Nearest location: Ban Prao

Forest type/Ecosystem: Semi-evergreen forest ecosystem

Latitude (N)	Longitude (E)	Altitude	Date
1713050	726162	1,238 m a.s.l.	Dec 27, 2020
<p>Initial Field Assessment:</p> <p>Low Moderate High Exceptional (Flora & Fauna)</p> <p>Reason for initial assessment:</p> <p>Upper semi-evergreen forests which would support some important forest habitats for fauna species.</p> <p>Habitat Description:</p> <p>Upper semi-evergreen forest with some fallows, the habitat condition remains fairly poor. This plot is located close to Namdae Protection Forest. This plot of 500m radius is considered fair ecological status but a lot of disturbance with coffee plantation under neath with low diversity of flora and fauna.</p> <p>Characteristic flora (composition):</p> <p>Fallows and block of Upper semi-evergreen forest, with mostly medium trees and some large trees (height 35m and DBH 80m). The forest structure has 3 layers, the higher layer is highly dominant by Mai Khaenhin, Mai hai (fig), Mai Chuang. The lower layer is young tree, and coffee trees.</p> <p>Flora species or interest (present or likely to be present):</p> <p><i>Dominance:</i></p> <p><i>Key species: Mai Khaenhin (Hopea, EN)</i></p> <p><i>Native species: None</i></p>			

Fauna species (present or highly likely to be present):

Species/signs of species recorded for:

Key species: None

Other species/native species: Asian Barred Owlet, and some number of small forest birds especially bulbul and warbler (see the list).

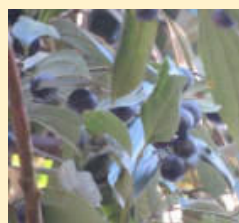
Species of interest likely to be present:

Key species: None

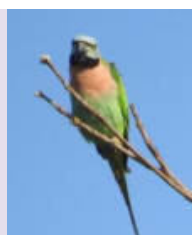
Other species: Monkey, (see the list).

Ecosystems Services comments

Watershed and NTFPs.



Cinnamomum



Red b. Parakeet

List of some flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai kham pom	<i>Phyllanthus emblica L</i>	PHYLLANTHACEAE		
2	Mai kor nok	<i>Lithocarpus polystachyus (Wall.) Rehd</i>	FAGACEAE		
3	Mai kor nam	<i>Castanea mollissima Blume</i>	FAGACEAE		
4	Mai meaud	<i>Aporosa tetrapleura Hance</i>	EUPHORBIACEAE		
5	Mai kor houm	<i>Quercus fabri</i>	FAGACEAE		
6	Mai kor ban	<i>Lithocarpus corneus (Lour.) Rehder</i>	FAGACEAE		
7	Mai kor noy	<i>Morella cerifere (L.) small</i>	MYRICACEAE		
8	Wai	<i>Calamus sp.</i>	CALAMOIDEAE		
9	Mai langdam	<i>Diospyros silvatica Roxb</i>	EBENACEAE		
10	Mai khaenhin	<i>Hopea pierrei Hance</i>	DIPTEROCARPCEAE	EN	
11	Mai hai	<i>Ficus benjamina</i>	MORACEAE		
12	Mai Mak Ngieo	<i>Nephelium hypoleucum Kurz</i>	SAPINDACEAE		
13					
14					
15					

List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
1	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, suitability, report
2	Seua meo	Leopard cat	<i>Prio. bengalensis</i>		L, suitability, report
3	Ngen	Civet sp.			L, suitability, report
4	Nok khao	Asian Barred Owlet	<i>Glaucidium cuculoides</i>		L, suitability, report
4	Leo ta luang	Crested Serpent Eagle	<i>Spilornis cheela</i>		L, suitability, report
4	Ka tae	Indo. ground squirrel	<i>Menetes berdmorei</i>		L, suitability, report
5	Bang nai	Phayrei's Flying squirrel	<i>Hylopetes sp.</i>		L, suitability, report
6	Nok Eing mong	Black collared Starling	<i>Gracupica nigricollis</i>		L, sighting
7	Kai pa	Red junglefowl	<i>Gallus gallus</i>		L, feeding site seen
8	Nok jib	Warbler sp.	<i>Phylloscopus sp.</i>		L, sighting
9	Nok ka thad deng	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		L, sighting
10	Nok ka thad dam	Black crested Bulbul	<i>Rubigula flaviventris</i>		M, sighting
11	Nok keo	Red-breasted Parakeet	<i>Psittacula alexandri</i>		L, sighting
12					
13					
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15					

- **Rating of the ecosystem integrity at location (1 = Poor to 5 = excellent)**

Key Parameter	Rating	Justification
Habitat/forest structure	2.5	Forest habitat condition remains some fairly poor, but a majority of the sample plot is secondary forest. Only one block of the forest where high trees were found but coffee plantation was underneath so the habitat was modified largely.
Flora	3.0	Fauna species remains pretty fair but a major part of the plot was converted to agricultural land, including coffee plantation.
Fauna	2.0	Some few small wildlife species are present in the area, it is just by the village so probably hardly any globally threatened species present.
Ecosystem integrity	2.5	Forest habitat condition remains quite fairly poor, small portion of original semi-evergreen forest remains, with some few small fauna species are present, it is close to Ban Prao, certainly declined today in quantity.
Ecosystem status	L+	No any interesting and potential for biodiversity value since it is just by the village as only 2 km from Ban Prao. However, this plot is part of Namdae Protection Forest.

- **Current threats and management**

Nothing, neither this sample plot is classified to be part of any conservation area in the country nor any management is in place.

Sample Point: 24 Nearest location: Ban Dak Sieng

Forest type/Ecosystem: Semi-evergreen forest ecosystem/Coniferous

Latitude (N)	Longitude (E)	Altitude	Date
1713321	727587	1,316 m a.s.l.	Dec 27, 2020

Initial Field Assessment:

Low **Moderate** High Exceptional
(Flora & Fauna)

Reason for initial assessment:

Upper semi-evergreen forests and coniferous forest which would support some important forest habitats for fauna species.

Habitat Description:

Upper semi-evergreen forest and coniferous forest with some patterns of fallows, the habitat condition remains quite good especially to the east. This plot of 500m radius is considered fairly good ecological status as original forest remains with some diversity of flora and fauna.

Characteristic flora (composition):

Mainly semi-evergreen forest, with mostly medium trees (height 7-15m and DBH 30-40m. The forest structure has only 2 layers, the higher layer is highly dominant by Mai kor (Quercus and Lithocarpus) and some pine tree. The lower layer is young tree, and some rattans.

Flora species or interest (present or likely to be present):

Dominance: Mai kor ban, Mai kor houm, pine (see the list).

Key species: None

Native species: None

Fauna species (present or highly likely to be present):

Species/signs of species recorded for:

Key species: None

Other species/native species: Asian Barred Owlet, and some number of small forest birds especially bulbul, flycatcher, stonechats, and warbler (see the list).

Species of interest likely to be present:

Key species: None

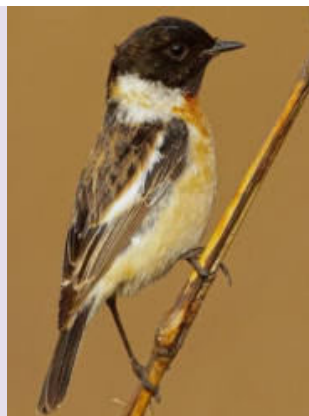
Other species/native species: .



Pandom Wangi

Ecosystems Services comments

Watershed and NTFPs.



Eastern Stonechat

List of some flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai Paek	<i>Pinus kesiya</i>	PINACEAE		
2	Mai kham pom	<i>Phyllanthus emblica L</i>	PHYLLANTHACEAE		
3	Mai kor nok	<i>Lithocarpus polystachyus (Wall.) Rehd</i>	FAGACEAE		
4	Mai kor nam	<i>Castanea mollissima Blume</i>	FAGACEAE		
5	Mai meaud	<i>Aporosa tetrapleura Hance</i>	EUPHORBIACEAE		
6	Mai kor houm	<i>Quercus fabrei</i>	FAGACEAE		
7	Mai kor ban	<i>Lithocarpus corneus (Lour.) Rehder</i>	FAGACEAE		
8	Mai kor noy	<i>Morella cerifere (L.) small</i>	MYRICACEAE		
9	Wai	<i>Calamus sp.</i>	CALAMOIDEAE		
10	Teuy	<i>Pandom wangi</i>	FABACEAE		
11					
12					

List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
1	Mu Pa	Wild Pig	<i>Sus Scrofa</i>		M, sighting
2	Seua meo	Leopard cat	<i>Prio. bengalensis</i>		L, suitability
3	Ka tae	Indo. ground squirrel	<i>Menetes berdmorei</i>		L, suitability
4	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, suitability, report
5	Bang nai	Phayrei's Flying squirrel	<i>Hylopetes sp.</i>		L, suitability, report
6	Nou	Rat	<i>Leophodamys</i>		M, feeding site seen
7	Kai pa	Red junglefowl	<i>Gallus gallus</i>		L, suitability
8	Nok jib	Warbler sp.	<i>Phylloscopus sp.</i>		L, sighting
9	Nok ka thad dang	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		L, suitability, report
10	Nok ka thad	Ashy Bulbul	<i>Hemixos flavala</i>		L, sighting
11	Nok ka thad dam	Sooty-headed bulbul	<i>Pycnonotus aurigaster</i>		L, sighting
12	Nok chab meng	Verditer flycatcher	<i>Eumyias thalassinus</i>		L, sighting
13	Nok fai	Scarlet Mivinet	<i>Pericrocotus speciosus</i>		L, sighting
14	Nok Chap meng	Flycatcher			L, sighting
15	Nok pit	Eastern stonechat	<i>Saxicola maurus</i>		L, sighting

- Rating of the ecosystem integrity at location (1 = Poor to 5 = excellent)

Key Parameter	Rating	Justification
Habitat/forest structure	3.0	Forest habitat condition remains quite good, but some parts of the sample plot were a secondary forest (ca. 10%). This plot is located at higher slope. It has 2 layers of canopy, with some pine tree species.
Flora	3.0	Flora species remains as pretty original status but not diverse, and some parts of it were converted to agricultural land especially on north.
Fauna	3.5	Some few small wildlife species are present and would be present in the area, probably some globally threatened species especially toward on southeast.
Ecosystem integrity	3.1	Forest habitat condition remains quite good, original semi-evergreen forest remains quite largely, with some small species of fauna species are present, it is quite close to Ban Prao and by the road to Ban Prao, certainly declined today in quantity.
Ecosystem status	M	Some interesting, but not really since it has some pine community which would not provide principally high number of flora and fauna species. However, this plot is part of Namdae Protection Forest.

- **Current threats and management**

Nothing, neither this sample plot is classified to be part of any conservation area in the country nor any management is in place.

Sample Point: 25 Nearest location: Ban Dak Sa

Forest type/Ecosystem: Secondary forest/Semi-evergreen forest ecosystem

Latitude (N)	Longitude (E)	Altitude	Date
1714487	731717	1,278 m a.s.l.	Dec 27, 2020

Initial Field Assessment:

Low Moderate High Exceptional
(Flora & Fauna)

Reason for initial assessment:

Upper semi-evergreen forests and as part of Dakcheung plateau which would support some important forest habitats for fauna species.

Habitat Description:

As largely fallows, highly degraded forest. This plot of 500m radius is considered poor ecological status as no original forest remains with poor diversity of flora and fauna.

Characteristic flora (composition):

Just fallow, mainly distribution of Mai dok (*Melastonia melabathricum*).

Flora species or interest (present or likely to be present):

Dominance: Mai dok (Melastonia melabathricum), ferns.

Key species: None

Native species: None

Fauna species (present or highly likely to be present):

Species/signs of species recorded for:

Key species: None

Other species/native species: Some number of small forest birds especially bulbul and warbler (see the list).

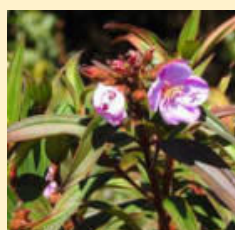
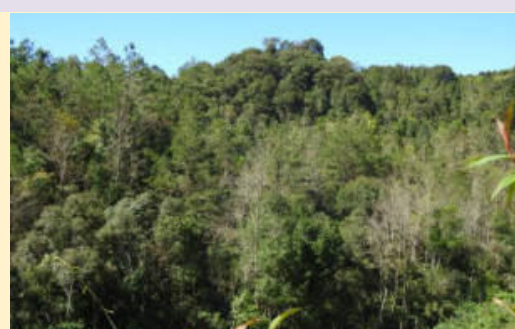
Species of interest likely to be present:

Key species: None

Other species/native species:

Ecosystems Services comments

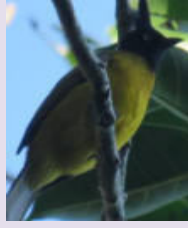
Barely function anything of particular ecosystem service.



Melastonia melabathricum



Sooty h. Bulbul



Black c. Bulbul

List of some flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai Paek	<i>Pinus kesiya</i>	PINACEAE		
2	Mai dok	<i>Melastonia melabathricum</i>	MELASTOMATACE		
3	Mai kor nok	<i>Lithocarpus polystachyus (Wall.) Rehd</i>	FAGACEAE		
4	Mai kor noy	<i>Morella cerifere (L.) small</i>	MYRICACEAE		
5	Mai meaud	<i>Aporosa tetrapleura Hance</i>	EUPHORBIACEAE		
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List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
1	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, suitability, report
2	Seua meo	Leopard cat	<i>Prio. bengalensis</i>		L, suitability, report
3	Nok ka thad dam	Sooty-headed Bulbul	<i>Pycnonotus aurigaster</i>		M, sighting
4	Nok khao	Asian Barred Owlet	<i>Glaucidium cuculoides</i>		L, suitability, report
4	Kai pa	Red junglefowl	<i>Gallus gallus</i>		L, feeding site seen
4	Nok jib	Warbler sp.	<i>Phylloscopus sp.</i>		L, sighting
5	Nok ka thad	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		L, sighting
6	Nok khiew	Common Iora	<i>Aegithina tiphia</i>		L, sighting
7	Nok ka thad	Black crested Bulbul	<i>Rubigula flaviventris</i>		L, sighting
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- **Rating of the ecosystem integrity at location** (1 = Poor to 5 = excellent)

Key Parameter	Rating	Justification
Habitat/forest structure	1.0	Fallow with surrounding of semi-evergreen forest and some coniferous community. The center point of the plot was a young fallow.
Flora	2.0	Only some few flora species were found in the area and more in some distance on north from the centre of the sample plot where presence of some semi-evergreen forest.
Fauna	2.0	Only a few small mammal and forest birds are present and would be present.
Ecosystem integrity	1.6	Poor
Ecosystem status	L	No any particular ecosystem value of this plot can be described.

- **Current threats and management**

Nothing, neither this sample plot is classified to be part of any conservation area in the country nor any management is in place.

Sample Point: 26 Nearest location: Ban Dak Sieng

Forest type/Ecosystem: Semi-evergreen forest ecosystem/Coniferous

Latitude (N)	Longitude (E)	Altitude	Date
1707366	727211	1,286 m a.s.l.	Dec 29, 2020

Initial Field Assessment:

Low **Moderate** High Exceptional
(Flora & Fauna)

Reason for initial assessment:

Upper semi-evergreen forests and some coniferous which would support some important forest habitats for fauna species.

Habitat Description:

Upper semi-evergreen forest and some patterns of fallows, the habitat condition remains quite good. This plot of 500m radius is considered fairly good ecological status as original forest remains partly with some diversity of flora and fauna.

Characteristic flora (composition):

Mainly semi-evergreen forest, with mostly medium and some large trees. The trees are quite high (height 35m and DBH 60m). The forest structure has only 2 layers, the higher layer is highly dominant by Mai kor (Quercus and and Lithocarpus) and pines.

Flora species or interest (present or likely to be present):

Dominance: Mai kor, Mai pine, Mai san (see the list).

Key species: None

Native species: None

Fauna species (present or highly likely to be present):

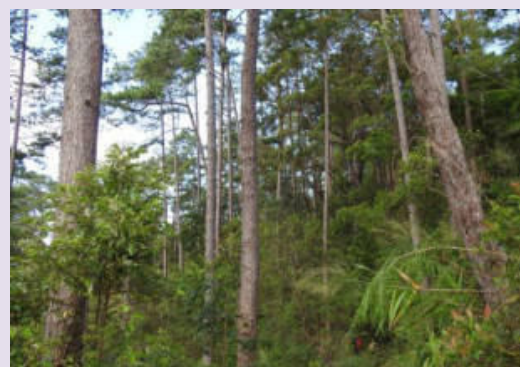
Species/signs of species recorded for:

Key species: None

Other species/native species: some number of small mammals and forest birds especially bulbul, flycatchers, barbets, bushchats and warblers (see the list).

Species of interest likely to be present:

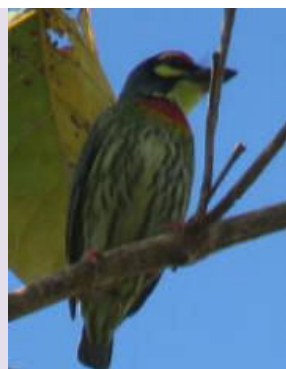
Key species: None



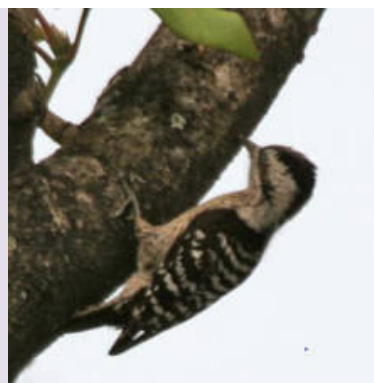
Other species/native species: Silver pheasant, hornbill (see the list).

Ecosystems Services comments

Watershed and NTFPs.



Coppersmith Barbet



Grey-c. Woodpecker

List of some flora species at the sample plot

No	Local Name	Scientific Name	Family Name	IUCN RedList	Remarks
1	Mai Paek	<i>Pinus kesiya</i>	PINACEAE		
2	Mai kor nok	<i>Lithocarpus polystachyus (Wall.) Rehd</i>	FAGACEAE		
3	Mai kor nam	<i>Castanea mollissima Blume</i>	FAGACEAE		
4	Mai meaud	<i>Aporosa tetrapleura Hance</i>	EUPHORBIACEAE		
5	Mai kor houm	<i>Quercus fabrei</i>	FAGACEAE		
6	Mai kor ban	<i>Lithocarpus corneus (Lour.) Rehder</i>	FAGACEAE		
7	Mai kor noy	<i>Morella cerifere (L.) small</i>	MYRICACEAE		
8	Phak koud khok	<i>Cyathea species</i>	PTERYDOPHYTA-CYATHEACEAE		
9					
10					
11					
12					
13					
14					
15					

List of some fauna species at the sample plot

No	Local Name	Common Name	Scientific Name	IUCN RedList	Remarks
1	Kai khao	Silver pheasant	<i>Lophura nycthemera</i>		L, suitability, report
2	Chon phon	Small Asian Mongoose	<i>Herpestes javanicus</i>		L, sighting
3	Seua meo	Leopard cat	<i>Prio. bengalensis</i>		L, feces seen
4	Ngen	Civet sp.			L, suitability, report
4	Nok khao	Asian Barred Owlet	<i>Glaucidium cuculoides</i>		L, sighting
4	Leo ta luang	Crested Serpent Eagle	<i>Spilornis cheela</i>		L, sighting
5	Ka tae	Indo. ground squirrel	<i>Menetes berdmorei</i>		L, feeding site seen
6	Bang nai	Phayrei's Flying squirrel	<i>Hylopetes sp.</i>		L, suitability, report
7	Kai pa	Red junglefowl	<i>Gallus gallus</i>		L, feeding site seen
8	Nok jib	Warbler sp.	<i>Phylloscopus sp.</i>		L, sighting
9	Nok ka thad deng	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		L, sighting
10	Nok kadok	Coppersmith Barbet	<i>Magalima haemacephala</i>		L, sighting
11	Nok ka thad dam	Black crested Bulbul	<i>Rubigula flaviventris</i>		L, sighting

12	Nok keo	Blossom-headed Parakeet	<i>Psittacula roseata</i>		L, suitability, report
13	Nok kadok	Grey-caped Woodpecker	<i>Yungipicus canicapillus</i>		L, sighting
14	Fan	Barking Deer	<i>Muntiacus muntjac</i>		L, tracks seen
15	Pu Pa	Wild Pig	<i>Sus scrofa</i>		L, sighting
16	Ngen hang kan	Large Indian Civet	<i>Viverra zibetha</i>		L, suitability, report
17	Ngen om	Common Palm Civet	<i>Para. hermaphroditus</i>		L, suitability, report

- **Rating of the ecosystem integrity at location (1 = Poor to 5 = excellent)**

Key Parameter	Rating	Justification
Habitat/forest structure	3.5	Forest habitat condition remains quite good, but some parts of the sample plot was slashed to agricultural land (fallow). It has 2 layers of canopy, with some pine tree species.
Flora	3.5	Flora species remains as pretty good status except some parts were fallow, also quite mixed with some pine community.
Fauna	3.5	Only a few medium and small wildlife species are present in the area, probably some globally threatened species such as pangolin (it was reported), and highly possible away to on east from this plot due to habitat suitability, also Red-shanked Douc Langur and Gibbon were reported.
Ecosystem integrity	3.5	Forest habitat condition remains quite good, original semi-evergreen forest remains quite largely, with some medium and small species of fauna species are present, certainly declined today in quantity.
Ecosystem status	M+	Some interesting in further northeast from the plot, it has some pine community which would not principally provide high number of flora and fauna species.

- **Current threats and management**

Nothing, neither this sample plot is classified to be part of any conservation area in the country nor any management is in place.