Environmental and Social Impact Assessment – Volume 2

Environmental and Social Baseline Phu Lac 2 Wind Farm Project

TBW

Thuan Binh Wind Power Joint Stock Company

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Environmental and Social Impact Assessment – Volume 2

Environmental and Social Baseline Phu Lac 2 Wind Farm Project

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Acronyms and Abbreviations

Name	Description
AIDS	Acquired Immunodeficiency Syndrome
AoI	Area of Influence
BaU	Business as Usual
CMS	Central Monitoring System
CO2	Carbon Dioxide
CSR	Compensation, Support and Resettlement
DMS	Detailed Measurement Survey
DoNRE	Department of Natural Resources and Environment
DWT	Deadweight tonnage
EAA	Ecologically Appropriate Area
EAAA	Ecological Appropriate Area for Analysis
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EOR	Energy Outlook Report
EPC	Engineering, Procurement, and Construction
EPFIs	Equator Principle Financial Institutions
EPP	Environmental Protection Plan
EPs	Equator Principles
ERM	Environmental Resource Management
ES	Ecosystem Services
ESHIA	Environment Social Health Impact Assessment
ESIA	Environmental and Social Impact Assessment
ESMP	Environment and Social Management Plan, Health and Safety
FDI	Foreign Direct Investment
FGD	Focus Group Discussion
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIIP	Good International Industry Practice
GN	Guidance Notes
GRDP	Gross Regional Domestic Product
HDI	Human Development Index
HIV	Human Immunodeficiency Virus Infection
Hz	hertz
IA	Impact Assessment
IDI	In-depth Interview
IFC PS	International Finance Corporation – Performance Standard
ISO	International Organisation for Standardisation
IUCN	International Union for Conservation of Nature

kg	kilogram
km	kilometre
kV	Kilovolt
LEP	Law on Environment Protection
LURC	Land Use Right Certificate
m	metre
m/s	metre per second
m2	square metre
MES	Millennium Ecosystem Service Assessment
MoNRE	Ministry of Natural Resources and Environment
MW	megawatt
NGO	Non-governmental Organisation
NTFP	Non-timber forest product
OHS	Occupational Health and Safety
POP	Persistent Organic Pollutants
RE	Renewable Energy
SCADA	Supervisory Control and Data Acquisition
SEA	Strategic Environmental Assessment
SPS	Safeguard Policy Statement
TCFD	Task-force on Climate- related Financial Disclosures
TPES	Total Primary Energy Supply
UNFCC	United Nation Framework Convention on Climate Change
VND	Vietnam Dong
WPP	Wind Power Project
WRI	World Resource Institute

7. ENVIRONMENT BASELINE

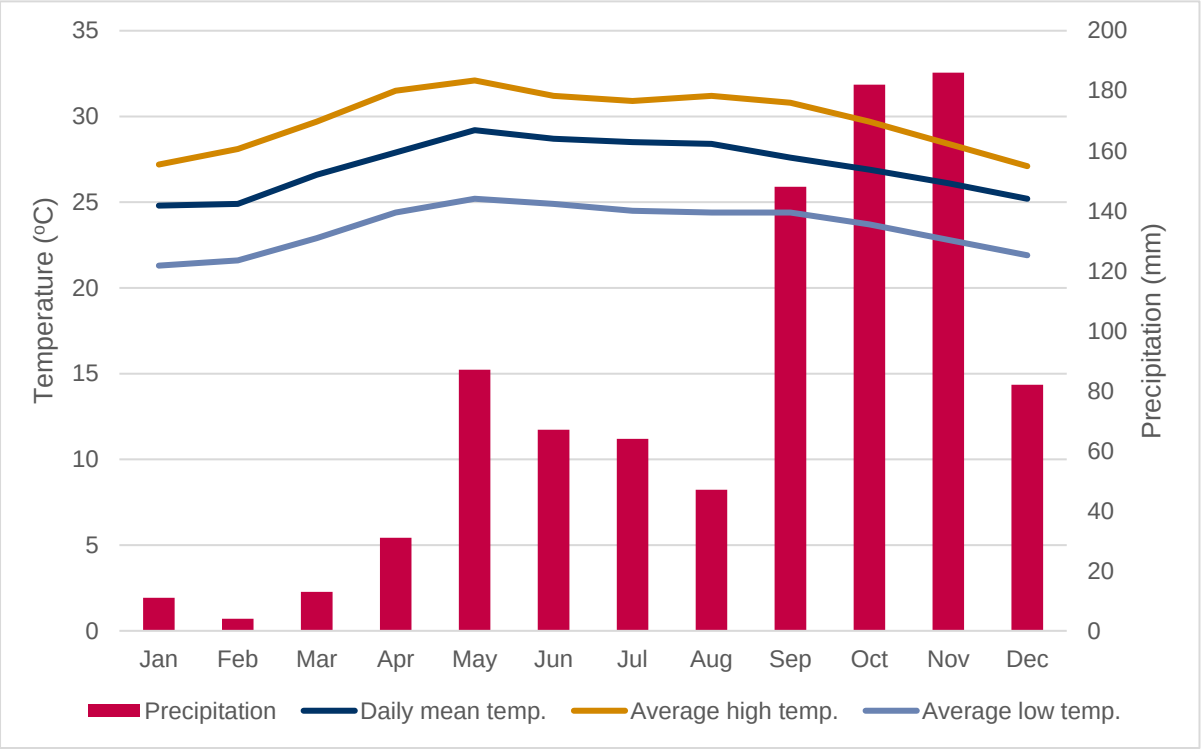
7.1 Climate and Meteorology

7.1.1 Temperature and Precipitation

The Project area is in Tuy Phong district, Binh Thuan province, where the climate is classified to be Aw (tropical savanna) according to the Köppen-Geiger climate classification, characterised by windy and sunny weather, with virtually no winter and little rain. Together with the nearby Bac Binh district, Tuy Phong is considered to be the driest region in Vietnam (Hai Pham, 2014). The climate is divided into two distinct seasons: dry and rainy. Dry season normally starts in May and last until October, while the rainy season is from November to April of the following year. However, heavy rains normally occur in August, September and October, therefore the dry seasons usually last longer.

Data from the meteorological station located in Phan Rang - Thap Cham city ("Phan Rang station"), Ninh Thuan province, around 45 km from the project site, is used to analyse the climate condition. The average temperature recorded at this station is 27.1 ºC. The region is warm to hot all year around. The difference between coolest month (January) and hottest month (May) is only 4.4 ºC. The absolute highest temperature ever recorded at Phan Rang station is 39.4 ºC, while the lowest is 16.1 ºC.

Lying in the driest region of the country, the annual mean precipitation recorded at Phan Rang station is only 920 mm, comparing to the national average of 1,871 mm (IBST, 2009). The region receives very little rain in January, February and March. The temperature and rainfall data recorded at Phan Rang station are presented in Figure 7.1 below.



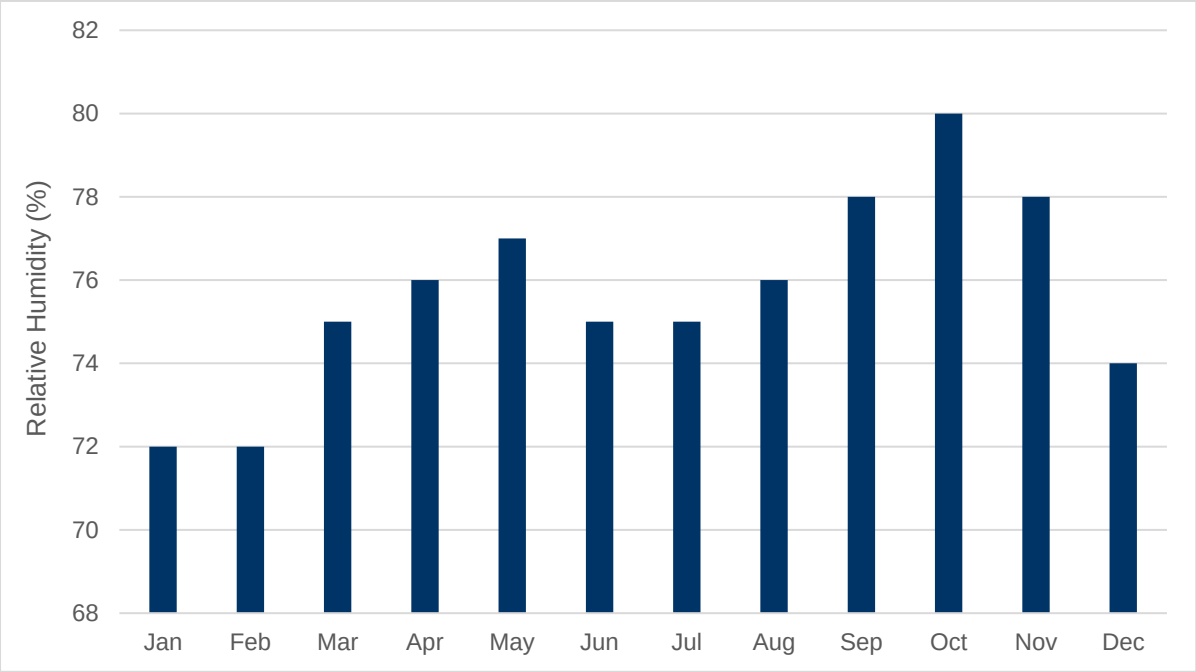
Source: ERM, based on data of Phan Rang meteorological station and climate-data.org

Figure 7.1 Temperature and Precipitation Data of Phan Rang Station

It is noted that the project area is in Tuy Phong district, which is the driest region of the Province. The annual mean precipitation recorded during the period from 1960 to 2010 at Lien Huong station (around 5 km from Project area) is only 640 mm (Vinh Pham, 2012).

7.1.2 Relative Humidity

The annual average humidity in the region is relatively low compared to other regions of the country. Annual average relative humidity is 77.0% at Phan Rang station and 79.6% in Phan Thiet. The monthly average values of relative humidity recorded at Phan Rang station vary between 72% and 80% as shown in Figure 7.2.

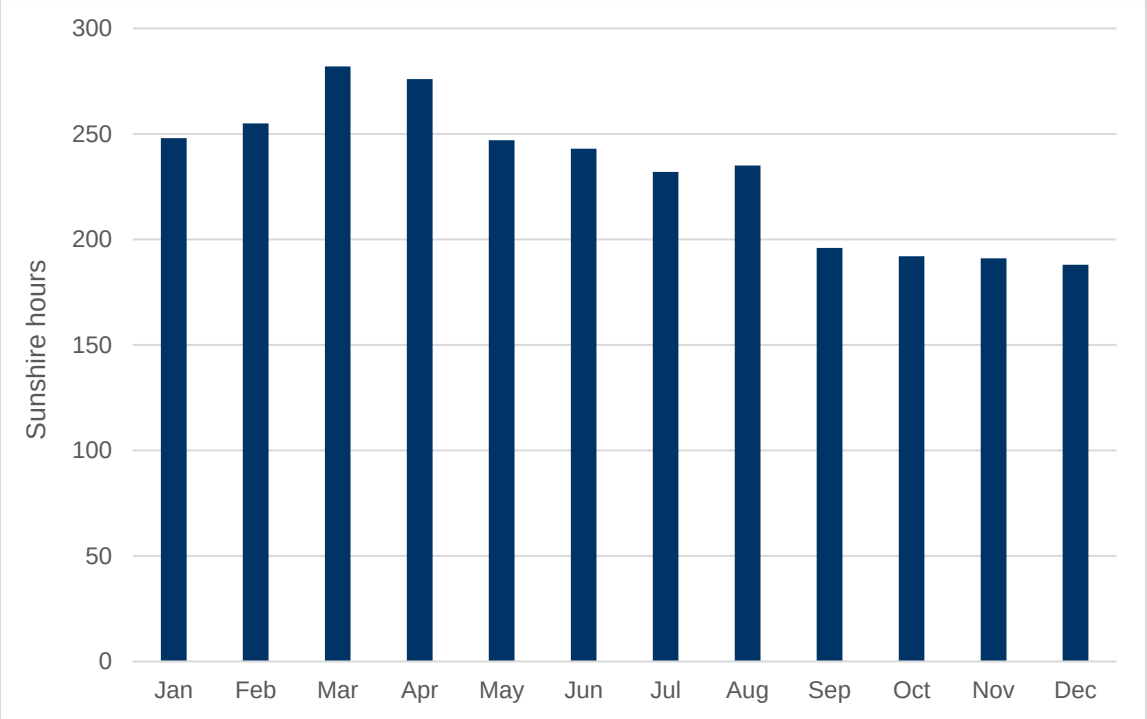


Source: ERM, based on data of Phan Rang meteorological station

Figure 7.2 Average Relative Humidity at Phan Rang Station, Ninh Thuan Province

7.1.3 Sunshine Hours

Binh Thuan province, particularly Tuy Phong district, falls in the sunniest region of the country, having around 2,800 of sunshine hours per year as recorded at Phan Rang station, comparing with 1,700 to 2,500 of sunshine hours per year in other regions of the country. The sunniest months are March and April, while the month with least sunshine hours is November. The monthly average numbers of sunshine hours vary from 188 hours (in December) to 282 hours (in March) as shown in Figure 7.3.



Source: ERM, based on data of Phan Rang meteorological station

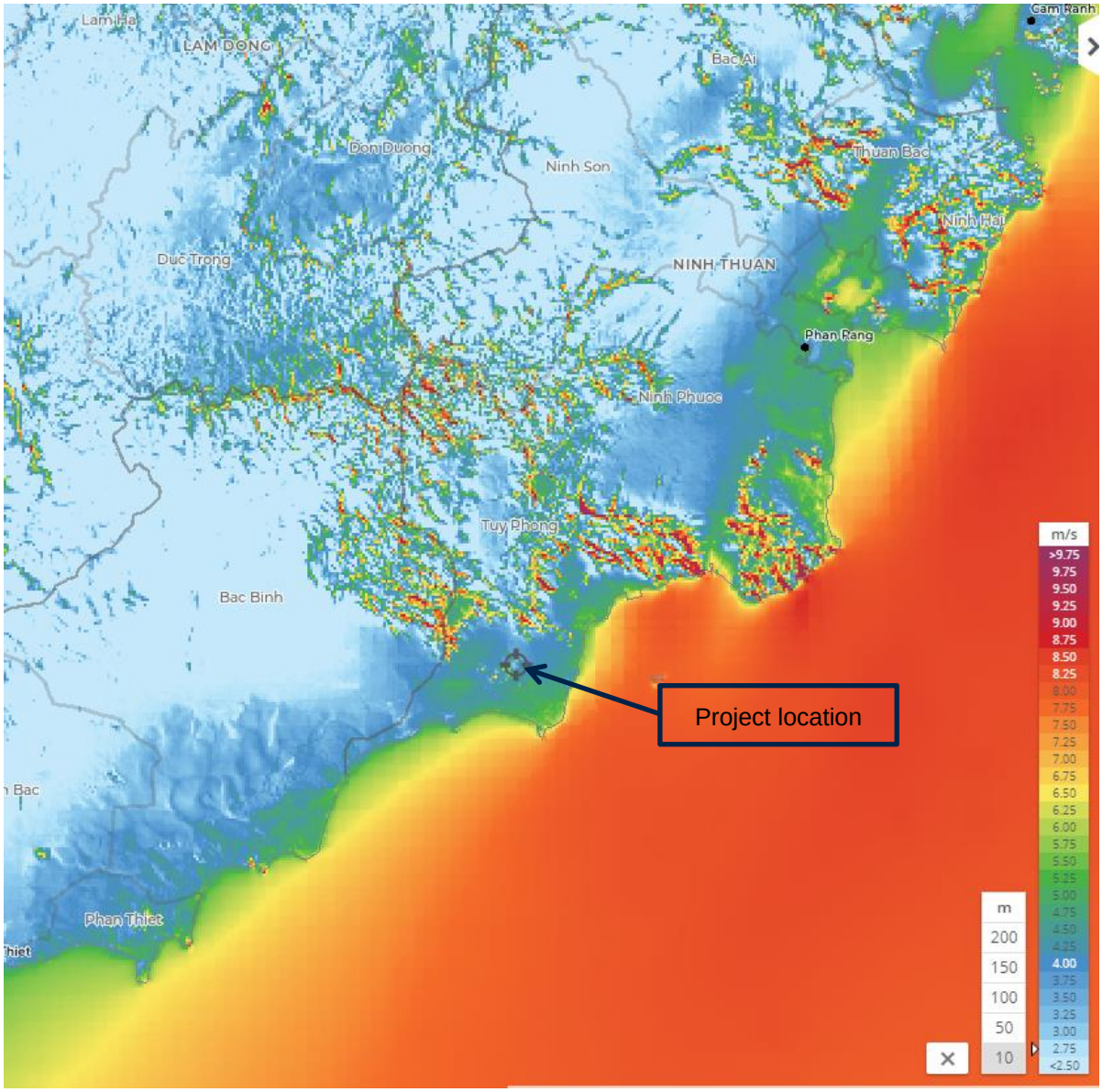
Figure 7.3 Average Number of Sunshine Hours at Phan Rang Station

7.1.4 Winds

The coastal area of Ninh Thuan and Binh Thuan province is one of the windiest regions of the nation. According to the study "Assessment of Wind power potential of Vietnam" (EVN, 2007), the measured wind speed in Tuy Phong district is 6.89 m/s at 65 m above the ground, ranked 3rd among 11 wind measuring stations in this study, just behind Phuong Mai station in Binh Dinh province (7.3 m/s) and Phuoc Minh station in the neighboring Ninh Thuan province (7.22 m/s).

A met mast was installed in Project area in Phu Lac commune in September 2013 and wind speed has continuously measured since then. The monthly average wind speed recorded is 6.1 m/s at the height of 80 m and 5.8 m/s at 60 m.

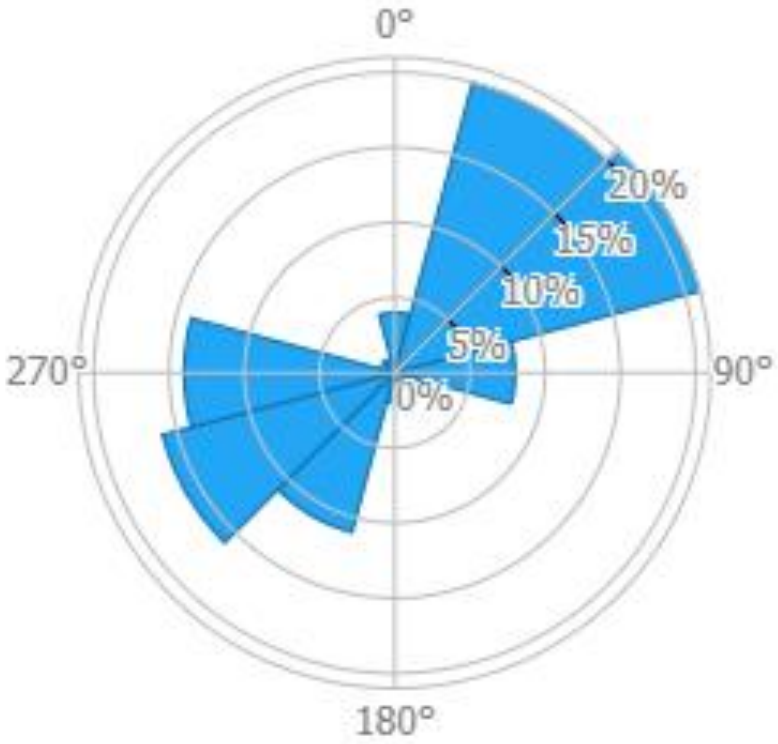
At 10 m above the ground, the wind speed is estimated to be 4.32 m/s using the mathematical model jointly developed by the Department of Wind Energy at the Technical University of Denmark and WBG The mean wind speed map of the Project area and the surroundings is presented in Figure 7.4.



Source: Global Wind Atlas (https://globalwindatlas.info)

Figure 7.4 Mean Wind Speed Map at 10 m

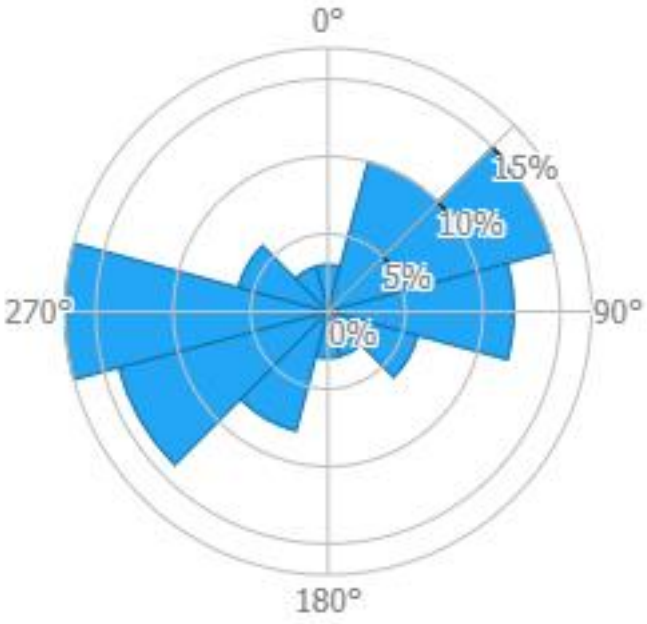
The prevailing wind direction is Northeast as 41% of the time the wind blows from this direction. For 27% of the time, the wind blows from the Southwest, and 14% from the West, as shown in the wind frequency rose below.



Source: Global Wind Atlas (https://globalwindatlas.info)

Figure 7.5 Wind Frequency Rose at 10 m

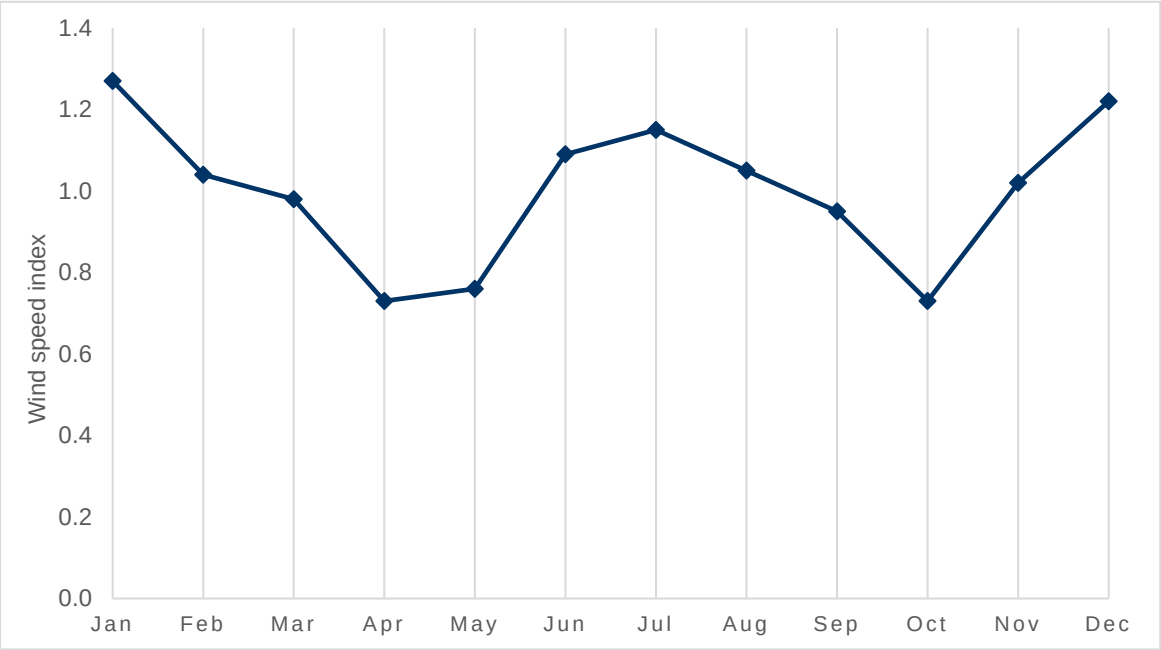
17% of strongest wind blows from the West, 15% from the Northeast and 14% from the Southwest as shown in wind speed rose below.



Source: Global Wind Atlas (https://globalwindatlas.info)

Figure 7.6 Wind Speed Rose at 10 m

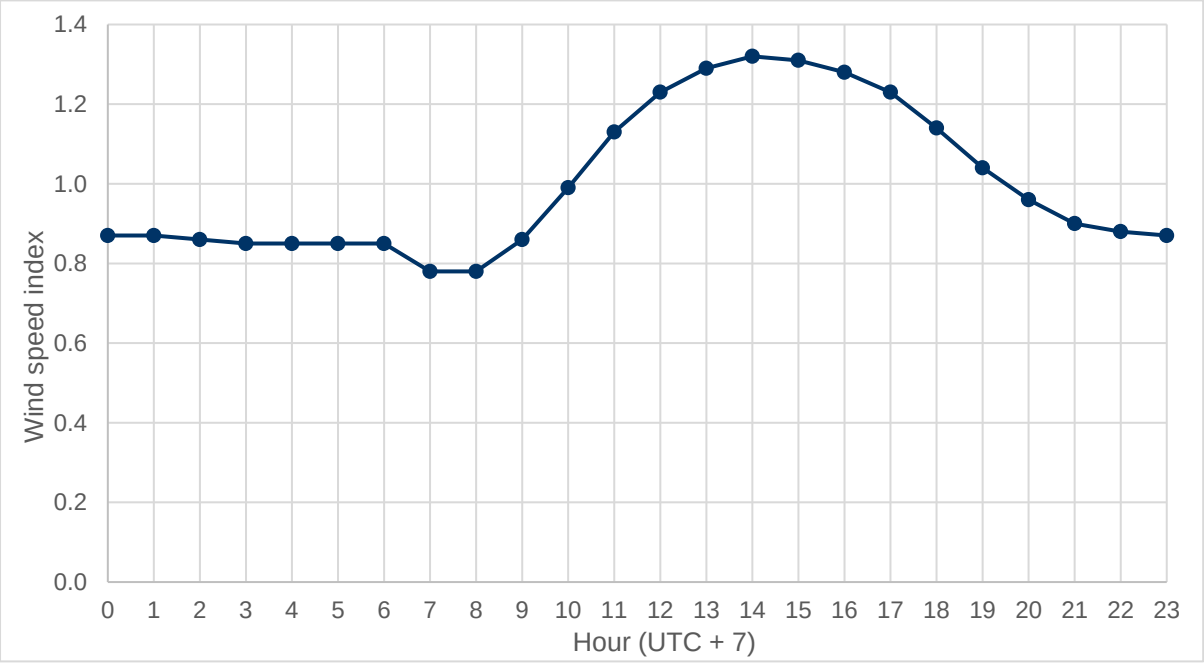
January and December are the windiest months, then the wind speeds gradually decrease in the following months and become lowest in April and May before increasing again in June, July, August and September, and hit another low in October. The monthly wind speed variability is presented in Figure 7.7.



Source: ERM, based on the data from Global Wind Atlas (https://globalwindatlas.info)

Figure 7.7 Monthly Wind Speed Variability of Project Area

During the day, the windiest time are normally in the afternoon, from 13:00 to 17:00, while the wind speeds become lowest in the morning between 7:00 and 8:00. The hourly wind speed variability is presented in Figure 7.8.



Source: ERM, based on the data from Global Wind Atlas (https://globalwindatlas.info)

Figure 7.8 Hourly Wind Speed Variability of Project Area

7.1.5 Natural Hazards

7.1.5.1 Storms and Tropical Depressions

The coastal area of Ninh Thuan and Binh Thuan province has a history of experiencing tropical cyclones. The stormy season normally falls in October and November. The Project area is close to the coastal line but the frequency of direct landfall is not high, and the area is mainly affected by the circulation of the tropical cyclones.

According to the statistics recorded at Cam Ranh and Phan Rang meteorological stations, from 1978 to 2015, there were 45 tropical cyclones affecting the coastal area of Ninh Thuan and Binh Thuan province. 14 of them (31%) are considered “storms”, which the wind speeds are higher than level 7 (50 to 61 km/h) of the Beaufort scale at the time when the storms made landfall, while the majority of them (69%) are considered “tropical depressions”, which the wind speeds are lower than level 7.

7.1.5.2 Tornados

No tornados were recorded in Tuy Phong district during the period from 1971 to 1997, however the neighbouring Bac Binh district experienced 04 tornados during the same period.

7.1.5.3 Flash Flood

A flash flood is a rapid flooding of low-lying areas: washes, rivers, dry lakes and depressions. It may be caused by heavy rain associated with a severe thunderstorm, hurricane, tropical storm.

According to the statistics recorded from 1958 to 1997, Tuy Phong district experienced 02 flash floods on 24 October 1992 and on 15 September 1996.

7.1.5.4 Lightning Strikes

The lightning flash density of Tuy Phong district is 3.4 times/km^2/year, comparing to the national average of 10 times/km^2/year (IBST, 2009). The annual average number of days having thunderstorm is 25 days in Cam Ranh and 19 days in Phan Rang.

7.1.5.5 Earthquake

According to the QCVN 02:2009/BXD, Annex 6: Zoning of peak ground acceleration, Lien Huong town, Tuy Phong district (5 km from the Project footprint), has the peak ground acceleration agR = 0,3658 m/s^2, therefore, the Project area has the macroseismic intensity of level VI in MSK-64 scale.

The most recent earthquake recorded near this region was on 15 July 2020, when an earthquake with the magnitude of 4.0 Richter hit the offshore area of Binh Thuan province[1]. The epicenter of the quake was at 10.398 degrees North latitude, 108.295 degrees East longitude (100 km from the Project site) with a focal depth of approximately 10 km, according to the Centre for Earthquake Information and Tsunami Warning, Vietnam Institute of Geophysics. No damages were reported.

[1] https://vietnamnet.vn/en/society/earthquake-hits-off-binh-thuan-coast-no-tsunami-warning-657968.html

Source: ERM, based on data provided by Centre for Earthquake Information and Tsunami Warning

Figure 7.9 The Location of Epicentre of the Earthquake on 15 July 2020 in Relation to Project Area

7.1.6 Topography

The Project is located in a relative flat agricultural land lying near some low hills with elevation ranging from 100 m to 160 m to the West. There are no rivers or stream within the Project footprint, however, there is a river named Dai Hoa originated from Long Song reservoir located about 8.5 km to the Northwest of the wind farm.

Source: ERM

Figure 7.10 Landscape of Project Area

7.1.7 Geological Condition

The Phu Lac - Giai Doan 2 wind power plant area has geomorphologic features mainly in the form of accumulation, with little change in topographic elevation and less dissection. The regional geology is composed of fine-grained sand layers originating from marine sediments of Phan Thiet Formation. Regarding hydrogeology, the groundwater table is very deep (> 50m). Experimental results in surface water samples near G4 show that the water poses no risk of corrosion or destruction to standard concrete according to TCVN 12041-2017. The stratigraphy limited to the survey depth shows that in the planned area, the cover layer is mainly formed by marine sediments and divided into 5 layers. Engineering geological condition of Phu Lac wind power plant - phase 2 is not very complex. Most of the study area belongs to geological layers of marine sediments with the main distribution of layer 1c right above the topographic surface, followed by layer 2c, which is quite favorable for the construction of Project's components. While in HK G4, medium weathered bedrock is quite shallow, it is also possible to choose to place foundations of electric poles.

7.2 Ambient Air Quality

Air quality are monitored 06 times per year (once every 02 months) by the Department of Natural Resources and Environment (DONRE) of Binh Thuan province at 67 locations in the province. Among them, 02 locations are considered "baseline environment" and the rest are categorised to urban, industrial zones, tourism area, transportation, mining, fish port and dumping sites, and agriculture and forestry. There are 12 monitoring locations located in Tuy Phong district, where the Project is located. Since the geographic coordinates were not given in the report, their approximate locations (based on the description of locations) are shown in Figure 7.11.

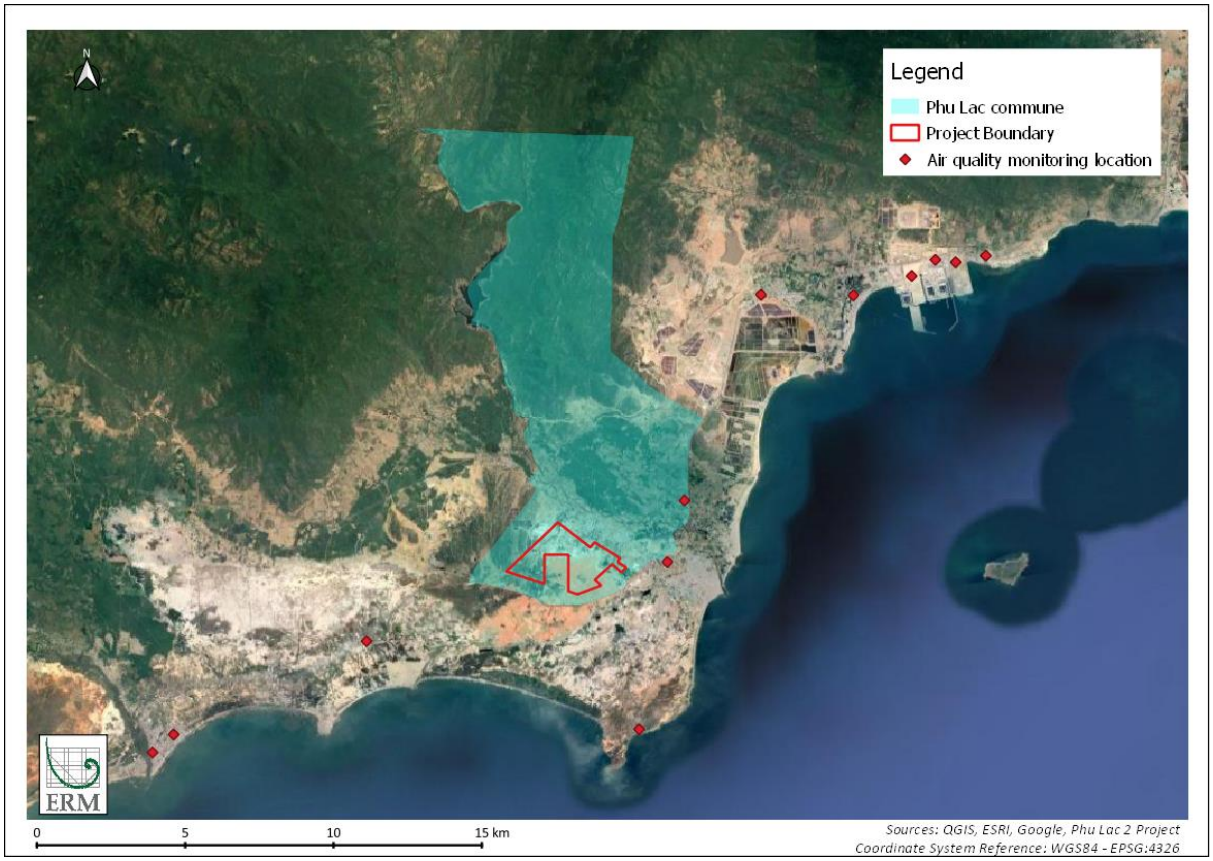


Figure 7.11 Air Quality Monitoring Locations in Tuy Phong District

At the time of preparing this ESIA, the Environmental Monitoring Summary Report of 2019 was available on the website of DONRE of Binh Thuan province[2]. The information from this report were used to evaluate the status of air quality of the Project area and the surroundings.

The monitoring results showed that, in general, the air quality at most of monitoring locations met the QCVN 05:2013/BTNMT National Technical Regulation on Ambient air quality, except the TSP (1-hour average) exceeded the permissible limit at some locations located near the roads with high traffic volume, including one location in fish processing zone in Phu Lac commune, near the Project boundary. Comparing with the year 2018, most of parameters at all locations were quite stable with little variation. In conclusion, the air quality of the Project area as well as other places in Binh Thuan province is not polluted, except the TSP is high in some locations located along major transportation routes.

7.3 Noise

7.3.1 Monitoring Program

The baseline noise monitoring program was designed in accordance with the IFC General EHS Guidelines, Section 1.7 - Noise.

Noise levels were measured at 02 locations (PL1 and PL2) from November 13th to November 17th, 2020 using sound level meters by acoustic technicians of Institute of Environmental Resources, Vietnam National University in Ho Chi Minh city. PL1 represents for the group of dwellings located near the Project boundary, while PL2 is located in a farmland, with only 02 houses nearby, and about 165m from the nearest existing turbine of the Phu Lac 1 wind farm to the North-Northeast.

[2] https://quantracmoitruong.binhthuan.gov.vn/News/solieuquantrac/2020/12/240.aspx

At each location, noise levels were supposed to be measured for 48 hours continuously. However, sometimes, the measurement was stopped to replace the battery. Additional measurement time were added to compensate for these periods. In total, 48 hours of measurement was done at each location.

Every 10 minutes, the values of L_{eq}, L_{max}, L_{min}, L_1, L_{10}, L_{90}, $L_{eqOctave}$ were automatically logged by the sound level meter. Meteorological factors such as wind speed, wind direction, temperature were also recorded using a mini weather station.

The instrument was mounted at 1.5 m above the ground using a tripod placed far from any reflecting surface. In case of light rain, an umbrella with a noise-reducing towel placed on top was also attached to the tripod. Windscreen (WS-10) was also used to reduce effects by windy weather.

Noise monitoring locations are presented in Table 7.1 and shown in below

Table 7.1 Noise Level Measurement Location and Time

Code	Address	Coordinates	Description	Distance to nearest WTG
PL1	Phu Dien village, Phu Lac commune, Tuy Phong district	11°14'15.6"N, 108°41'47.3"E	Group of dwellings located near the Project boundary	460 m to WTG05
PL2	Phu Dien village, Phu Lac commune, Tuy Phong district	11°13'46.9"N 108°42'08.6"E	Farmland far from existing man-made sources of noise	470 m to WTG06

Both locations are categorised as “Normal area” as defined in QCVN 26:2010/BTNMT National Technical Regulations for Noise, and “Residential, institutional, educational area” as defined in IFC General EHS Guideline.

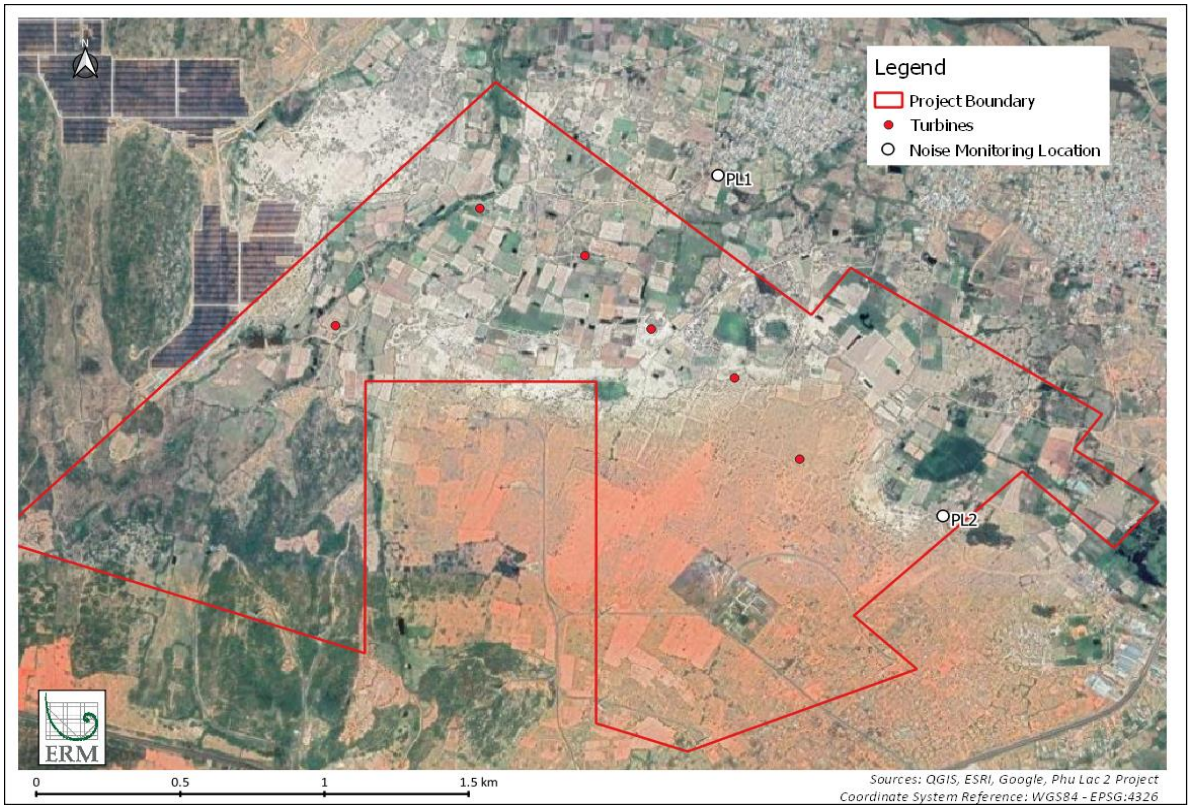


Figure 7.12 Baseline Noise Monitoring Locations

Figure 7.13 Site Setting for Noise Monitoring Location N1

Figure 7.14 Site Setting for Noise Monitoring Location N2

7.3.2 Noise Monitoring Results

Summary of noise levels are presented in table below:

Table 7.2 Baseline Noise Monitoring Results

Noise levels	PL1		PL2		Allowable limits	
	Day 1	Day 2	Day 1	Day 2	QCVN 26:2010/BTNMT[3]	IFC General EHS Guidelines 1.7[4]
$L_{Aeq, day}$ (dBA)	49.5	51.4	48.3	50.4	70	55
$L_{Aeq,night}$ (dBA)	48.8	47.7	49.6	48.8	55	45
$L_{Aeq,24h}$ (dBA)	49.3	49.6	48.8	49.9	-	-

The daytime noise levels at two locations were considerably lower than IFC standards. However, the night-time noise levels at both locations exceeded IFC standards by 3.3 to 4.6 dBA. This can be explained as below:

- The location PL1 is close two unpaved paths (about 60m and 30 m away respectively). There are three groups of dwellings (01 - 06 households in each group) located from 40 to 85 m away from the noise meter. The major sources of noise here were motorcycles passing by frequently during the daytime, sound from loud speakers of people singing karaoke (04 to 05 hours on each day of monitoring). Sometimes, there were also sounds from dog barking, rooster crowing and birds singing. The noise levels were influenced by sounds of insects, especially from 17:30 to 00:30.
- The location PL2 was chosen to be far from man-made sources of noise, and was expected to represent the baseline noise levels without influences from human activities. However, during the night time, the sound from bird caller decoy (a device to support bird trapping), heavily influenced the recorded noise levels (from 19:00 to 04:00). Other sources of noise were sound of insects (although small), sometimes rooster crowing, dog barking and bird singing. It is also noted that while the monitoring location PL2 is located 165 m from the nearest existing turbine of Phu Lac 1 wind farm, the noise from the WTG was not perceived by the surveyors.

In conclusion, the existing noise levels at residential areas near the future Phu Lac 2 wind farm met the IFC standards for the daytime (55dBA) but exceeded the night-time limit (45 dBA) because of man-made and natural sources of noise. However, it is noted that the noise levels here are still considerably lower than the allowable limits set by QCVN 26:2010/BTNMT National Technical Regulation on Noise, for the daytime as well as the night time.

[3] for Normal area, as defined in QCVN 26:2010/BTNMT National Technical Regulation on Noise

[4] for Residential, institutional and educational area, as defined in IFC General EHS Guideline 1.7: Noise

8. BIODIVERSITY BASELINE

8.1 Background

This chapter presents the collected information (from desktop review and field survey) about the biodiversity values occurring at the Project's area, and then, assesses if this triggers critical habitat when reviewed against the criteria in IFC Guidance Note 6: Biodiversity conservation and sustainable management of living natural resources (2019). Guidance Note 6 (GN6) corresponds to Performance Standard 6 (PS6) issued in 2012 and provides updated guidance on the interpretation of the standard. The field surveys for this Project has been conducted and described in ESIA 2012, Bird and Bat Baseline Description 2017 that are related to Phu Lac wind farm phase 1 (hereinafter, called as Phu Lac 1). According to consultantcy with IFC, no additional biodiversity surveys are required for the Project (Phu Lac phase 2).

The definition of areas in this chapter area as follows:

- The Project Area is defined as the development boundaries. It is the Projects footprint of disturbance;
- Important conservation areas , such as World Heritage Areas (WHAs) and Key Biodiversity Areas (KBAs), were identified within a 50 km radius. The extent of this analysis is generated by the IBAT search engine and is used in the baseline chapter to determine the proximity of conservation areas;
- The Project AoI is the entire area being affected by Project and the client's activities. The AoI has been assessed to define habitat values in the immediate Project vicinity where species may regularly occur; and
- Where a species is identified to have or is likely to have a regular occurrence in the Project AoI, the Ecologically Appropriate Area of Analysis (EAAA) has been defined as required under IFC PS6 for that species. The EAAA is used to identify the presence of critical habitat for that species (through application of the IFC PS6 critical habitat thresholds outlined in the IFC PS6 Guidance Note).

Critical Habitat may not be limited to pristine or highly biodiverse areas, but rather may include both modified habitat and natural habitats across the broader landscape that supports the biodiversity values that trigger the Critical Habitat criterion. Critical Habitats can therefore be a subset of both modified habitat and natural habitat.

Assessment for Critical Habitat is undertaken as a screening process against the criteria defined within IFC PS 6 Guidance Note. This involves analysis of desk-based data collection, habitat mapping and incorporation of field survey results. Critical Habitat criteria are defined in PS6 Guidance Note 6 (IFC 2012, revised 2019), Paragraphs GN69 to 97. Table 8.1. provides details of the qualifying requirements for Criteria 1 to 3 (i.e. thresholds), while details of the likely qualifying interests for Criterion 4 and 5 will be defined based on research and expert opinion. The criteria listed have been used to complete this assessment.

The five criteria are 'triggers' in that if an area of habitat meets any one of the criteria, it will be considered Critical Habitat irrespective of failing to meet any other criterion. This approach is generally more cautious but is used more widely in conservation. Critical Habitat criteria therefore have two distinctive characteristics. First, components of biodiversity are essentially assigned to only two levels of conservation significance, those that trigger Critical Habitat and those that do not (Tier considerations being secondary to this primary Critical Habitat determination). Second, each criterion is applied separately and not in combination, meaning that the scores are not cumulative.

Table 8.1 Critical Habitat Criteria (IFC PS6 Guidance Note 2012)

Criteria	Thresholds
Criterion 1: Critically Endangered (CR) / Endangered (EN) species:	(a) Areas that support globally-important concentrations of an IUCN Red-listed EN or CR species (0.5% of the global population AND 5 reproductive units of a CR or EN species); (b) Areas that support globally-important concentrations of an IUCN Red-listed VU species, the loss of which would result in the change of the IUCN Red List status to EN or CR and meet the thresholds in (a). (c) As appropriate, areas containing nationally/regionally-important concentrations of an IUCN Red-listed EN or CR species.
Criterion 2: Habitat of significant importance to endemic and/or restricted-range species;	(a) Areas that regularly hold ≥10% of the global population size AND ≥10 reproductive units of a species.
Criterion 3: Habitat supporting globally significant concentrations of migratory species and/or congregatory species;	(a) Areas known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population of a migratory or congregatory species at any point of the species' lifecycle. (b) Areas that predictably support ≥10 percent of the global population of a species during periods of environmental stress.
Criterion 4: Highly threatened and/or unique ecosystems; and/or	(a) Areas representing ≥ 5% of the global extent of an ecosystem type meeting the criteria for IUCN status of CR or EN. (b) Other areas, not yet assessed by IUCN, but determined to be of high priority for conservation by regional or national systematic conservation planning.
Criterion 5: Areas associated with key evolutionary processes	No set criteria

Notes: *Restricted-range/ Endemic Species = Species with world distributions of less than 50,000km^2; Migratory species = Any species or lower taxon of wild animals, in which a significant proportion of the members of the entire population or any geographically separate part of the population cyclically and predictably crosses one or more national jurisdictional boundaries (CMS, 1979) ; Congregatory Species = Species that gather in globally significant numbers at a particular site and at a particular time in their life cycle for feeding, breeding or resting (during migration) (Langhammer, Bakarr and Bennun, 2007).*

The complete critical habitat screening table is provided in Appendix D. Those considered suitable for assessment for critical habitat are discussed further in this section.

8.2 Ecologically Appropriate Area of Analysis (EAAA)

In accordance with IFC PS6, in Critical Habitat, clients should consider project-related impacts across the potential affected landscape or seascape. This is the area of analysis to assess the applicability of the critical habitat criteria and thresholds. PS6 notes when defining the boundaries, the following aspects should be a consideration: distribution of the species or ecosystems, ecological patterns, processes, features, and functions that are necessary for maintaining them.

Critical Habitat Screening will consider candidate species within two EAAAs including EAAA1 and EAAA2 (Figure 8.1). The EAAA1 will be assessed for avian and bat fauna whereas EAAA2 will be assessed for herpetofauna, mammals and flora. Aquatic species like fishe are unlikely to be adversly affected by the Project activities, thus they are not considered as receptor in the EAAAs. The factors that were taken into consideration for the identification of the EAAAs include surrounding environmental condition, surrounding land uses, main habitat types for critical habitat candidate species and existing anthropogenic barriers such as highway roads. The identification of EAAA1 also took into account the concept of home ranges (the extent to which species normal foraging or daily movement range will overlap with the Project, or habitats where staging migrant birds may rest and feed before passing through the Project area), which are often very broad for avian species.

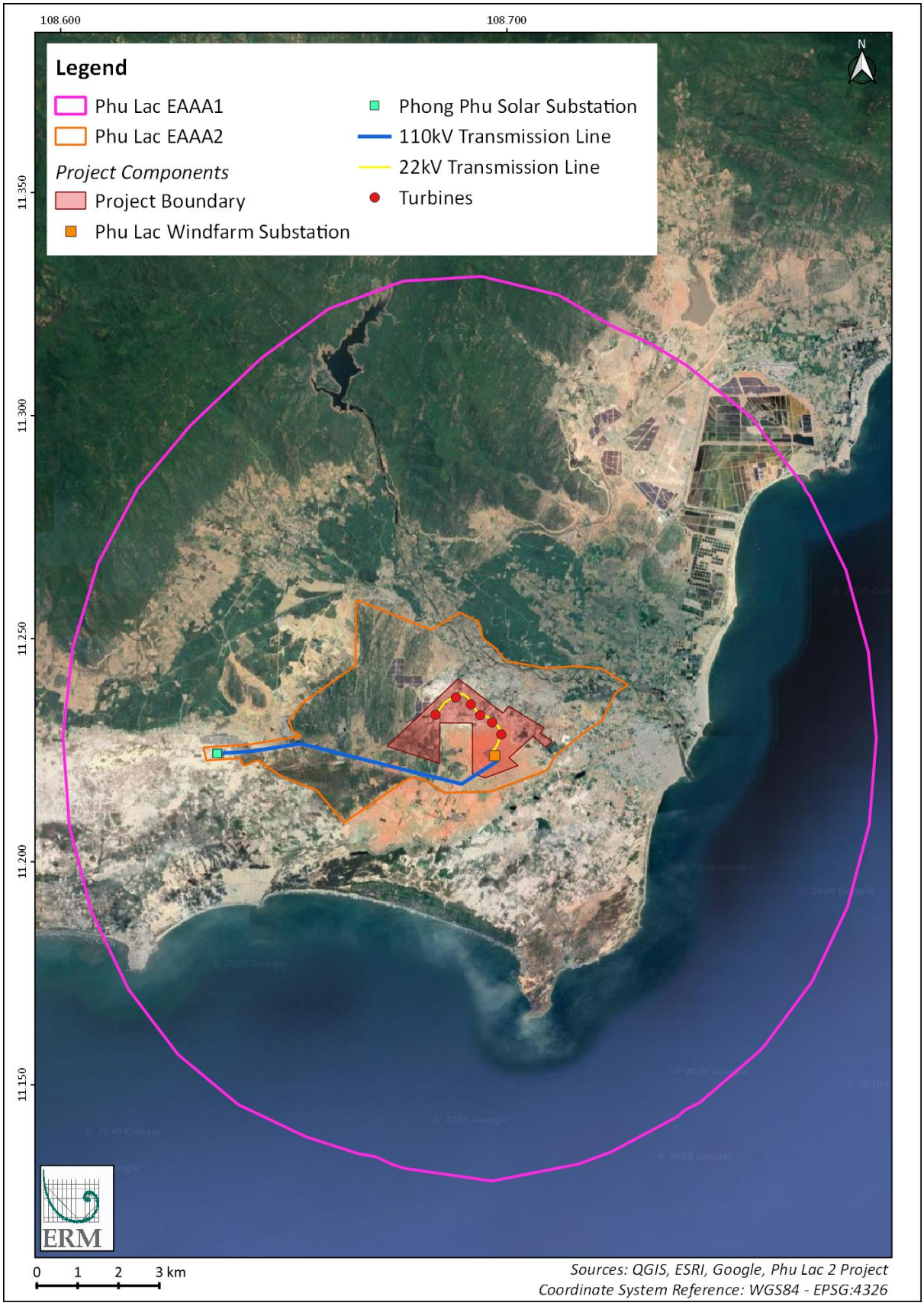


Figure 8.1 EAAAs of Phu Lac Project

8.2.1 Land Cover Classification within the EAAAs

The Land Cover Classifications for each EAAA was presented in Figure 8.2 and Figure 8.3. Quantitave analysis of each land cover in each EAAA was given in Table 8.2 and Table 8.3. In total, the EAAA1 covers an area of about 34,356 ha, transevering a diverse range of land covers that can be important for avian species such as forest, surface water, aquactulral land (i.e. fish ponds), agricultural land (i.e. orchads) and build-up land. The EAAA2 is about 2,750 ha in size and via remote sensing, the forest within the EAAA2 looks very sparse due to human disturbances. Therefore, the EAAA2 provides a very limited suitable habitats for terrestrial fauna like mammals and reptiles.

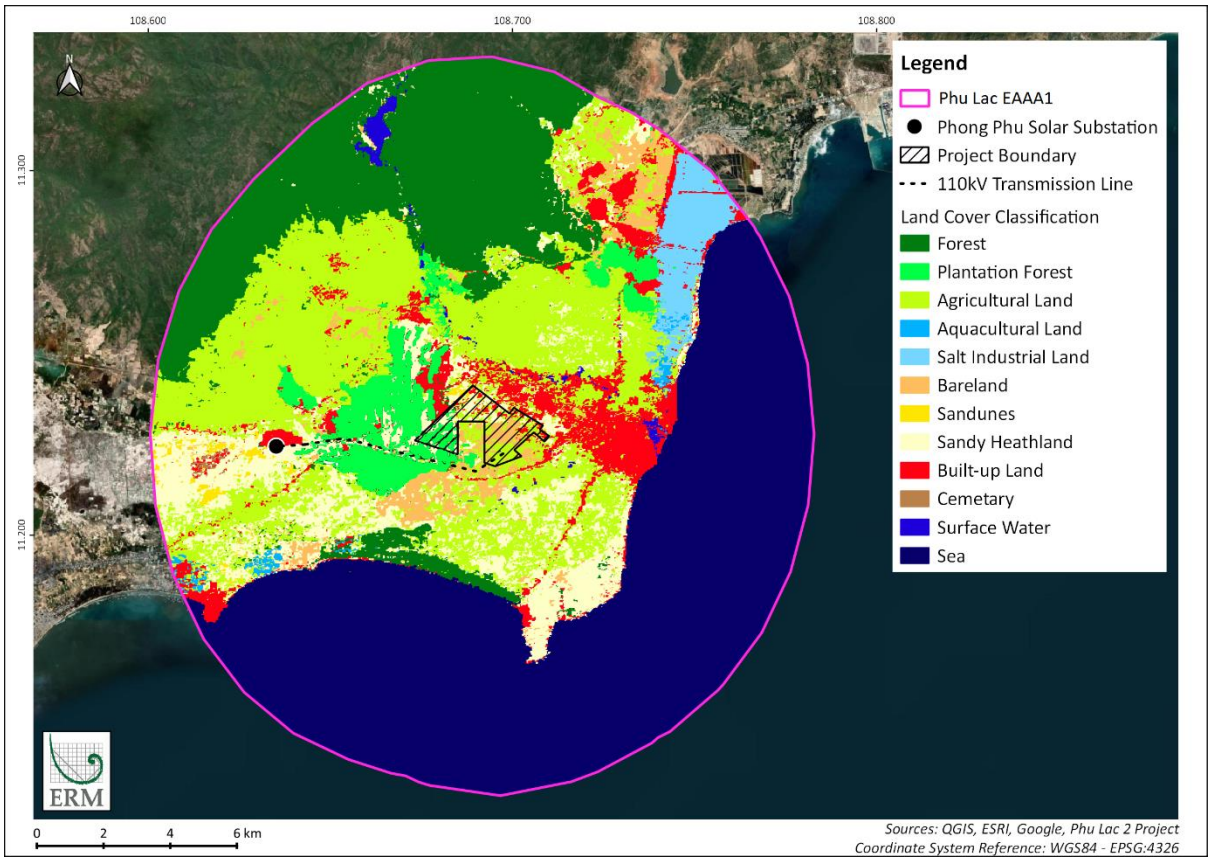


Figure 8.2 Land Cover Classifications within EAAA1

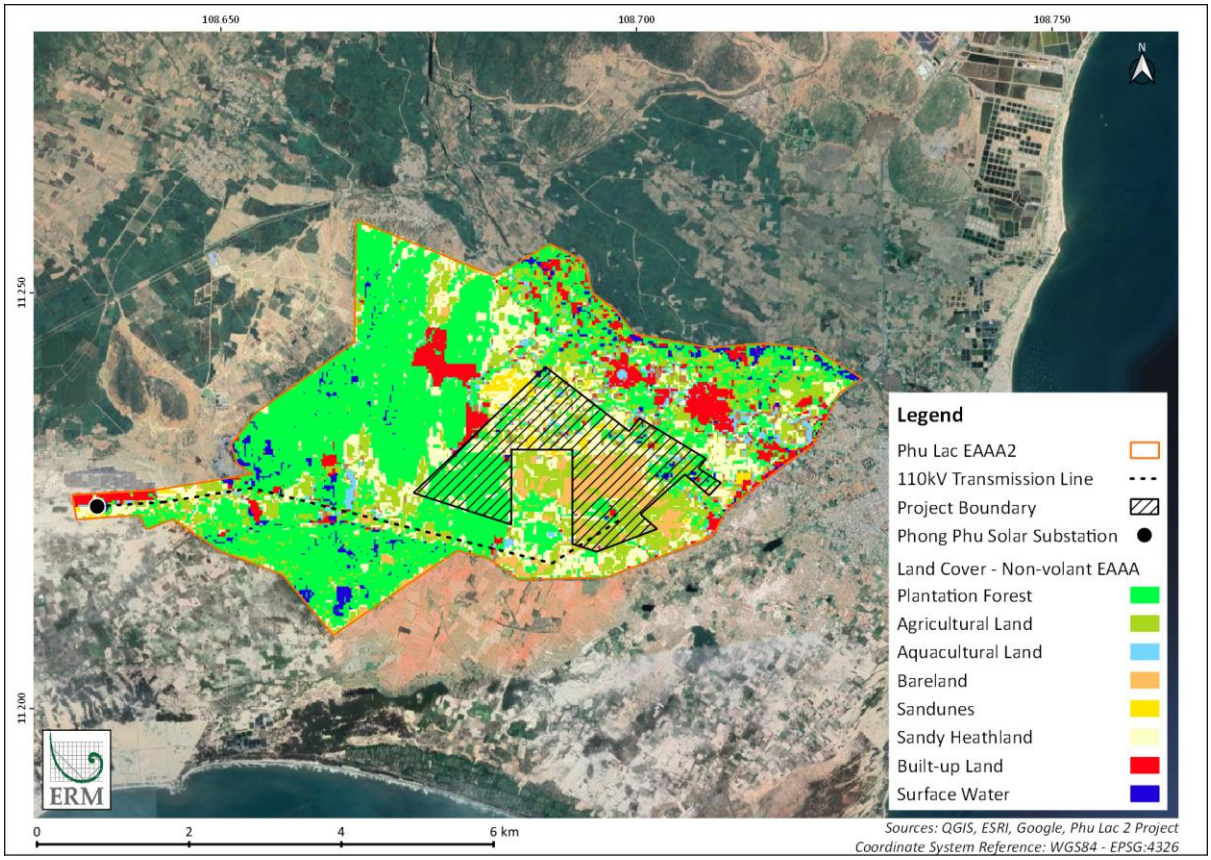


Figure 8.3 Land Cover Classifications within EAAA2

Table 8.2 Area of Each Land Cover and Habitat Type within the EAAA1

Type of habitat	Land Covers	Area (ha)	%
Natural	**Terrestrial**	**9,896.35**	**28.81**
	Forest	5,402.58	15.725
	Bareland	966.824	2.814
	Sandy Heathland	3,363.12	9.789
	Sandunes	163.831	0.477
	Freshwater	**207.184**	**0.603**
	Surface Water	207.184	0.603
	Marine	**12,210.76**	**35.542**
	Sea	12,210.76	35.542
	Total	**22,314.30**	**64.951**
Modified	**Terrestrial**	**11,125.90**	**29.809**
	Agricultural Land	7,828.51	22.787

Type of habitat	Land Covers	Area (ha)	%
	Built-up Land	1,968.27	5.729
	Cemetary	46.164	0.134
	Plantation Forest	1,282.96	3.734
	Marine	**915.35**	**2.664**
	Salt Industrial Land	780.194	2.271
	Aquacultural Land	135.156	0.393
	Total	**12,041.25**	**32.473**

Table 8.3 Area of Each Land Cover and Habitat Type within the EAAA2

Type of habitat	Land Covers	Area (ha)	%
Natural	**Terrestrial**	**715.303**	**26.003**
	Bareland	286.934	10.431
	Sandy Heathland	428.369	15.572
	Freshwater	**25.464**	**0.926**
	Surface Water	25.464	0.926
	Total	**740.77**	**26.929**
Modified	**Terrestrial**	**2,010.01**	**73.071**
	Plantation forest	884.994	32.173
	Agricultural Land	594.233	21.602
	Built-up Land	429.204	15.603
	Plantation Forest	101.578	3.693
	Total	**2,010.01**	**73.071**

8.3 Desktop Review

The desktop review considered online sources, literature and environmental studies undertaken within 50 km radius of the Project area. IBAT was used as the main source for identifying threatened species and important conservation areas. Additional sources that verifies the IBAT screening include:

- Alliance for Zero Extinction (AZE);
- BirdLife International;
- Global Biodiversity Information Facility (GBIF);
- International Union for the Conservation of Nature (IUCN) Red List of Threatened Species (the 'IUCN Red List') and their profiles;

- IUCN Red List of Ecosystems; and

The information is combined with mortality survey information from the 2017 studies undertaken by AF-Consulting JSC (see section 8.6) and used to evaluate potential critical habitat triggers that may be associated with the EAAAs.

8.3.1 Ecoregion Description

According to Queiroz et al. (2013), Vietnam has a total of 14 World Wide Fund for nature (WWF)-identified terrestrial ecoregions[5]. The Project lies within the Southern Vietnam Lowland Dry Forest ecoregion, which is 13,500 square miles in size. In terms of climatic conditions, the region has an average temperature of about 26.5° and average rainfall of 1200-2400mm per year (Nguyen *et al.*, 2011).

The majority of the ecoregion is occupied by dipterocarp, thin forests and semi-deciduous closed mixed forests (Nguyen *et al.*, 2011). The first woody community encountered away from the beach in southern Vietnam is generally a thicket community that gives way to a low scrubby forest further inland. According to Wikramanayake & Rundel (n.d.), two of only six Indochinese endemic species belonging to the *Dipterocarpacea* families, including Sao la hinh tim (*Hopea cordata)* [IUCN CR] which is known as “Sao lá hình tim” in Vietnamese and *Shorea falcata* [IUCN CR; VNRB CR], were found in this region, and there are possibilities that many other endemic kinds may be discovered given more careful studies. There are several large mammals of conservation significance in this ecoregion, including the Red-shanked Douc Langur (*Pygathrix nemaeus*) [IUCN CR; VNRB EN], Red-cheeked gibbon (*Nomascus gabriellae*) [IUCN EN; VNRB EN], and Pileated gibbon (*Hylobates pileatus*) [IUCN EN] and potentially the Tiger (*Panthera tigris*) [IUCN EN; VNRB CR]. However, Tiger is considered to be possibly extinct in Vietnam.

The main threats to this habitat are agriculture, exploitation of valuable hardwood trees and other plant resources, and the rampant hunting primarily to supply the huge commercial market in both Vietnam and China.

8.3.2 World Heritage Areas

World Heritage Areas are areas of outstanding universal value designated by the United Nations Educational, Scientific and Cultural Organization (UNESCO), as detailed in Sections 8.3.2.1 and 8.3.2.2.

8.3.2.1 World Heritage Sites

World Heritage Sites are sites selected by UNESCO as having cultural, historic, scientific or other form of significance. These areas are legally protected by international treaties and demarcated by UNESCO as protected zones. This allows for practical conservation of areas which would otherwise be subjected to threats such as uncontrolled and unrestricted access, and associated activities such as poaching and illegal logging.

Vietnam has eight registered World Heritage Sites (UNESCO, 2015a). As none of the World Heritage Sites overlap with the Study Area and the Project area, World Heritage Sites are not considered relevant for this assessment.

8.3.2.2 Biosphere Reserves

Biosphere Reserves are areas made up of terrestrial, coastal and marine ecosystems, internationally recognized under UNESCO’s Man and Biosphere Programme. They are intended to be learning sites

[5] The WWF defines ecoregions as being large units of land or water that share similar biogeographical characteristics, such as endemic species, environmental conditions, and ecological dynamics, and ecoregions are intended to represent the original distribution of distinct natural assemblages. The WWF has identified 867 terrestrial ecoregions, and 450 aquatic ecoregions worldwide (Global Forest Atlas, n.d.)

for sustainable development where each reserve encourages sustainable management of interactions between social and ecological systems (UNESCO, 2015b).

None of the Biosphere Reserves in Vietnam are within the Study Area, therefore they are excluded from the scope of assessment.

8.3.3 Ramsar Sites

The Convention of Wetlands, also known as the Ramsar Convention, is an international treaty that provides the framework for the conservation and use of wetlands and their resources. The Ramsar Convention for Vietnam has been effective from 20 January 1989, and currently has nine sites designated as Wetlands of International Importance, which cover an approximate surface area of 120,549 ha (Ramsar Convention on Wetlands, n.d.). None of these sites are within the Study Area, and hence Ramsar sites are not considered relevant for this assessment.

8.3.4 Key Biodiversity Areas (KBAs)

Key Biodiversity Areas (KBAs) are defined by the Key Biodiversity Areas Partnership as sites that contribute significantly to the global persistence of biodiversity, applicable to terrestrial, freshwater, and marine ecosystems. Sites qualify as global KBAs if they meet one or more of 11 criteria as defined by the Partnership, grouped into the following five categories: threatened biodiversity, geographically restricted biodiversity, ecological integrity, biological processes and irreplaceability (IUCN, 2016). KBAs include Important Bird and Biodiversity Areas (IBA), Alliance for Zero Extinction (AZE), Important Plant Areas (IPA) and Important Sites for Freshwater Biodiversity. Based on the IBAT database, one KBA, named Deo Nui San, has been identified within 50km radius from the Project area (see Figure 8.4 and Table 8.4).

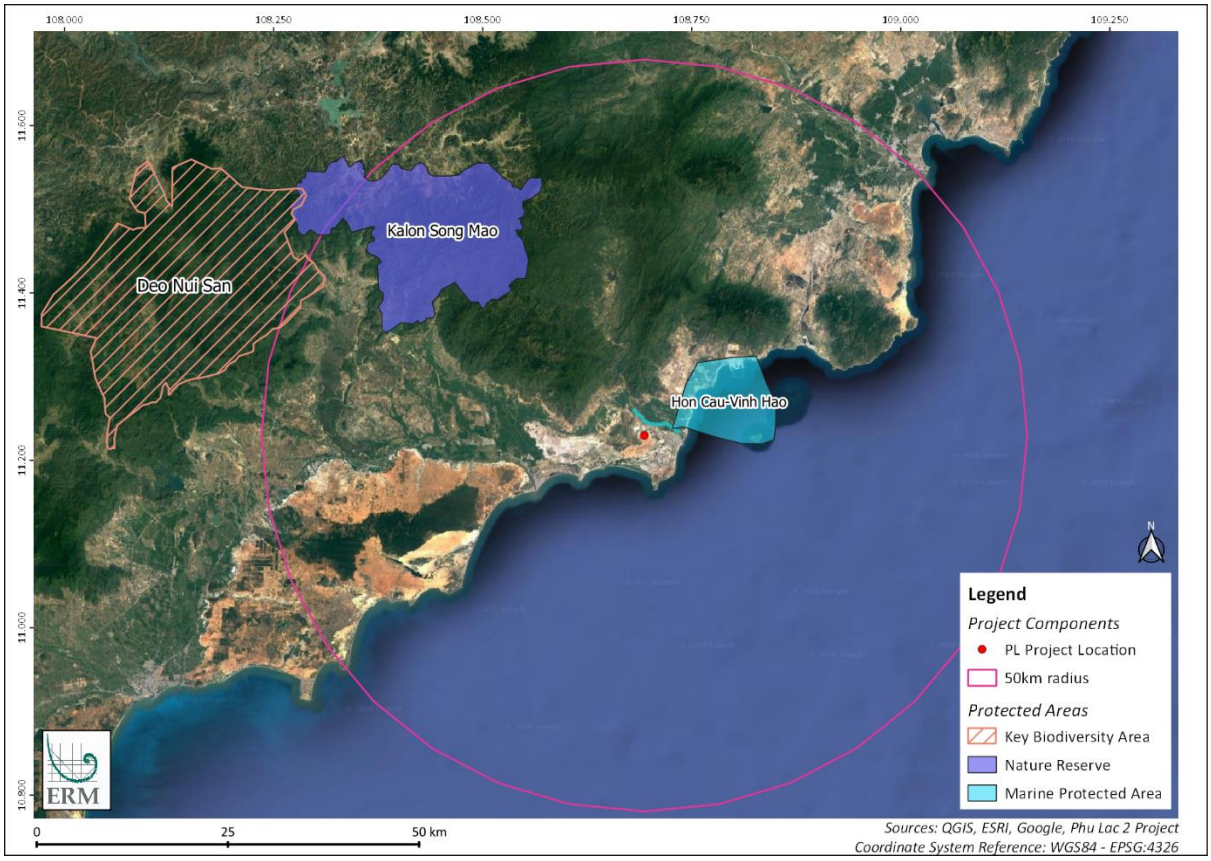


Figure 8.4 Key Biodiversity Area and Protected Areas Surrounding Project Area

8.4 Protected Areas (PAs)

According to the Dudley & Stolton (2007), a Protected Area is “a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve long-term conservation of nature with associated ecosystem services and cultural values.” Under the provisions of IFC PS6, a Protected Area and Internationally Recognized area requires specific management actions if development proceeds within its boundary. Consultation with protected area managers and the community will also be required.

8.4.1 ASEAN Heritage Parks

ASEAN Heritage Parks (AHPs) are selected protected areas in the ASEAN region recognized for their unique flora and fauna and ecosystems, wilderness and excellent values. There are no AHPs located within the Study Area and thus, ASEAN Heritage Parks are not considered relevant for this assessment.

8.4.2 National Protected Areas

Two Nationally Protected Area exists within the 50km radius from Project’s location, which are the Kalon Song Mao Nature Reserve and the Hon Cau - Vinh Hao Marine Protected Area. Information of the Protected Areas are presented in the Figure 8.4 and Table 8.4.

.

Table 8.4 Information of Protected Areas and Key Biodiversity Areas within the 50 km Radius from the Project's Location

No.	Name	Approximate Distance from Project's location (km)	Geographic and Status information	Biodiversity
	Protected Areas (PAs)			
1	Kalon Song Mao Nature Reserve	35	■ Area size: 200 km^2 ■ Status year : 1986 ■ IUCN category: IV ■ Management Authority: Not Reported The principal vegetation types at the nature reserve are evergreen forest, semi-evergreen forest and deciduous forest. Evergreen forest is distributed on ridges and mountainsides, from middle elevations up to the highest peaks within the nature reserve. Semi-evergreen forest occurs at lower elevations, mainly from 200 to 500 m, along stream and river valleys (thiennhienviet, 2004b)	It is stated that before 1986, large mammals, such as Asian elephant *Elephas maximus* [IUCN EN] and gaur *Bos gaurus* [IUCN VU], were still abundant in the area. Gaur were reportedly still present in 1988-1989 but the species was said to have almost disappeared by 1992. Animal species reported to be still present in the area include Large-antlered Muntjac *Muntiacus vuquangensis* [IUCN CR], Red Muntjac *M. muntjak* [IUCN LC], Sambar *Cervus unicolor* [IUCN VU], Yellow-cheeked Crested Gibbon *Hylobates gabriellae* [IUCN EN], a species of douc langur (probably Black-shanked Douc Langur *Pygathrix nigripes* [IUCN EN]), Silvered Leaf Monkey *Trachypithecus cristatus* [IUCN NT], Bear Macaque *Macaca arctoides* [IUCN NT], Clouded Leopard *Neofelis nebulosa* [IUCN VU], Asian Black Bear *Ursus thibetanus* [IUCN VU], Sun Bear *Helarctos malayanus* [IUCN VU] and Dhole *Cuon alpinus* (Le & Tran, 2000).
2	Hon Cau - Vinh Hao Marine Protected Area	11	■ Area size: 125 km^2 ■ Status year : 2002 ■ IUCN category: II ■ Management Authority: Not Reported Hon Cau (also known as Cu Lao Cau) is a small and young island situated 9km away from the seashore in Tuy Phong district- Binh Thuan Province. According to the Marine Conservation Institute (n.d.), 78% of the area is marine and 22% is terrestrial and coastal	In terms of biodiversity values, 175 phytoplankton species, 163 seaweed species, 147 coral species, 80 mollusc species, 46 crustacean species, 26 echinoderm species and 211 fish species have been recorded at Hon Cau - Vinh Hao marine protected area (thiennhienviet, 2004a).

No.	Name	Approximate Distance from Project's location (km)	Geographic and Status information	Biodiversity
			area. The major threat to marine biodiversity at Hon Cau-Vinh Hao is unsustainable exploitation of marine resources. In particular, destructive fishing practices, such as dynamite fishing and trawling, are having serious negative impacts on the coral reef ecosystem (thiennhienviet, 2004a)	
	Key Biodiversity Areas (KBAs)			
3	Deo Nui San	55	■ Area size: 711.92 km^2 ■ Status year : 2012 The Deo Nui San or Nui San Pass is a forested area along the road from a small town called Di Linh to the seaside town of Phan Thiet. It is known as an important site for birding of many endemic species (xeno-canto, n.d.)	This KBA was triggered by the presnece of Pygmy Slow Loris *Nycticebus pygmaeus* (IUCN EN; VRDB EN) and the Black-shanked Douc Langur (Key Biodiversity Areas Partnership, 2020). In addition, many endemic species are sighted within this area, including the Orange-breasted Laughingthrush *Garrulax annamensis* (IUCN LC), Dalat Shrike-Babbler *Pteruthius annamensis*, Vietnamese Cutia *Cutia legalleni* (IUCN NT), Black-crowned Parrotbill *Psittiparus margaritae*, Black-hooded Laughingthrush *Garrulax milleti* (IUCN LC) (xeno-canto, n.d.)

8.4.3 Protection Forest

Part of the 110kV transmission line goes through the protection forest area which is under the management and protection of the Tuy Phong Protection Forest Management Board (Figure 8.5). The board has made contracts with local people to grow casuarina and acacia in the area since 2006 and pay them annually to look after the trees. The forest was grown with the purpose of shielding sand and prevent desertification. As confirmed with the Forest Protection County of Tuy Phong district who is the local based office of the Tuy Phong Protection Forest Management Board that, there are no salamanders or any wild animals in the forest. About 6 – 7 years ago, there were muntjacs but they are no longer exist now because people travel a lot in this area. Due to the lack of biodiversity values within this protection forest, it is considered as a modified habitat.

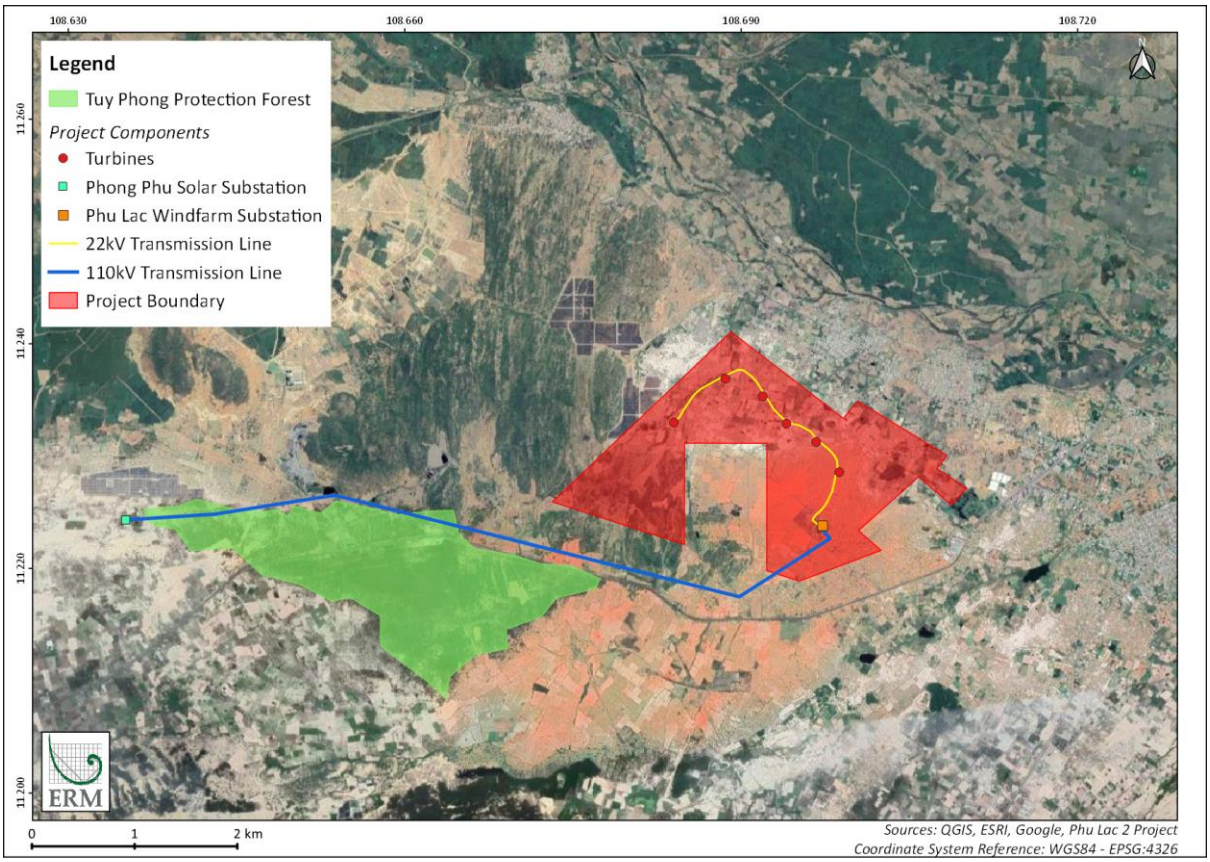


Figure 8.5 The Project's Transmission Line Intersecting with the Tuy Phong Protection Forest

8.5 Invasive Species

Invasive species are non-native species to a particular ecosystem and whose introduction and spread causes, or are likely to cause, socio-cultural, economic or environmental harm or harm to human health. These species become naturalized in their introduced range, and often reproduce in large numbers and spread over a large area. This can result in competition and damage to native species. Invasive species have the capacity to exacerbate their role in ecosystem degradation.

According to the Global Invasive Species Database (GISD, n.d.), Vietnam is home to 131 invasive species, of which 102 are terrestrial species and 29 are aquatic species (freshwater and marine). The list of potential invasive species in the Project's area are shown in Appendix A.

8.6 Biodiversity Field Surveys (ESIA 2012, Bird and Bat Mortality Studies 2017)

This sections uses the results from ESIA 2012, Bird and Bat Baseline Description 2017 that are related to Phu Lac wind farm phase 1 (Phu Lac 1), which has 12 turbines in operation since September 2016. Figure 8.6 illustrates the position of Phu Lac 1 and 2's turbines.

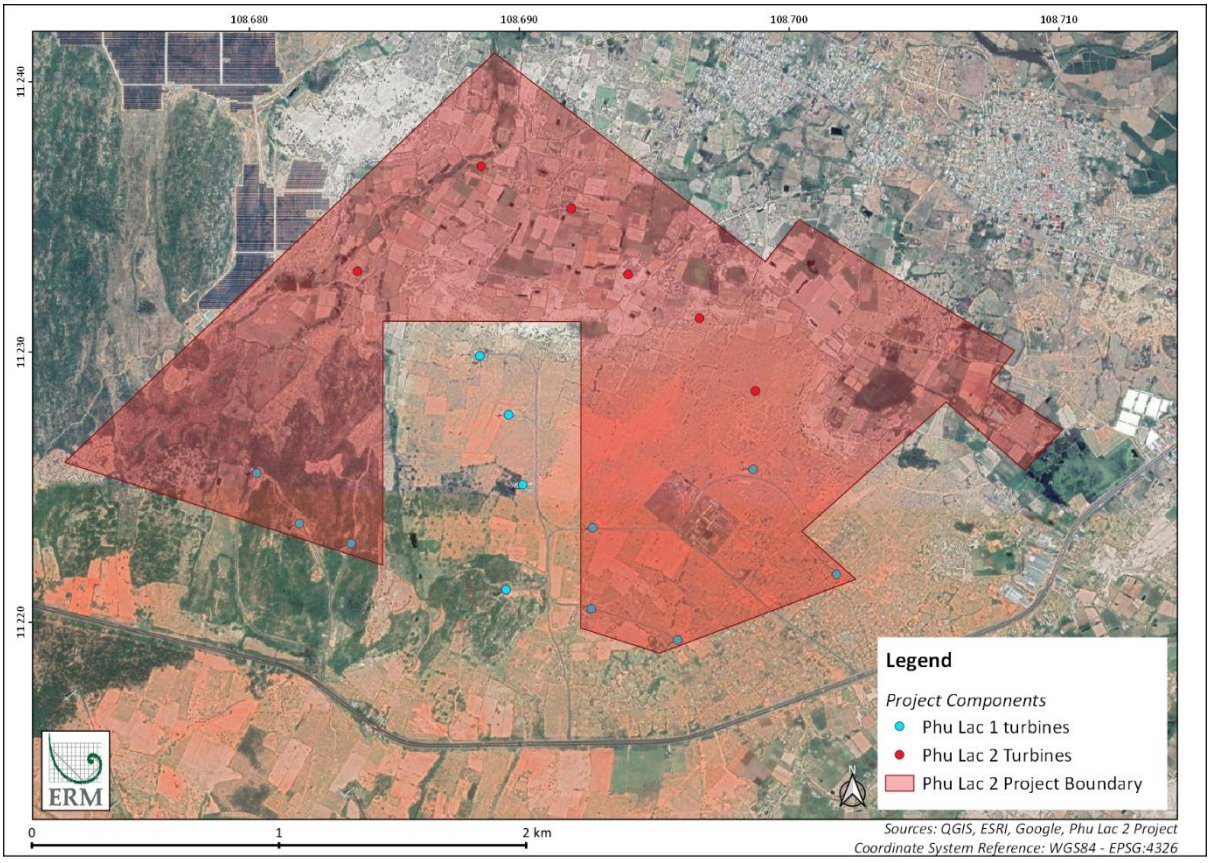


Figure 8.6 Phu Lac 1 and 2's Turbine Layouts.

8.6.1 Birds

8.6.1.1 Methodology

The methodology conducted in the EISA 2012 was not described. Regarding the survey in 2017, mortality study (carcass search) was conducted for one day each month in May, July, August and September 2017, as well as Feburary, March and April 2018 (a total of 7 searches from 2017 to 2018) at Phu Lac 1. The surveyors checked the areas within 200m diameters around all Phu Lac 1's turbines for bird carcasses. During the searching, incidental records of live birds present in and around the site were also made.

8.6.1.2 Result

Overall, there were 40 species found at Phu Lac 1 by combining the results of 2012 and 2017 surveys. All of them are IUCN Least Concern species and not registered in Vietnam Red Data Book, none are endemic species. 11 are migratory/ congregatory species. The carcass searches found three dead bodies of Red-collared Dove *Streptopelia tranquebarica* [IUCN LC], Eastern Spotted Dove *Spilopelia chinensis* [IUCN LC] and the Cook's Swift *Apus cooki*. The list of bird species at Phu Lac 1 can be found in Appendix B.

8.6.2 Bats

8.6.2.1 Methodology

The methodology conducted in 2012 was not described in the ESIA. It was acknowledged that interviews were made with a local farmer who has nets over his fruit trees. The 2017 survey was conducted by doing mortality study (carcass search) around the operating Phu Lac 1's turbines for two days a month (except February 2018) for 12 months from May 2017 to April 2018. Areas of 70 meter radius was searched around eight turbines in 20 minutes (four turbines were excluded because, according to the 2017 Bat Baseline Description, "the terrain and vegetation cover surrounding these rendered the likelihood of carcass detection extremely low").

8.6.2.2 Results

Overall, the 2012 field survey found no bat species, while the 2017 mortality survey recorded 71 bat carcasses of six bat species (Appendix C). According to Furey and Racey (2016), bats' foraging strategies are categorized into five options as described in Table 8.5. Except for the unindentified fruit bat *Rousettus sp.* whose foraging strategy is V, the bats found in the carcass search all use category III strategy. The bat species are all IUCN Least Concern species and not registered in Vietnam Red Data Book, and none is either endemic/restricted range or migratory species.

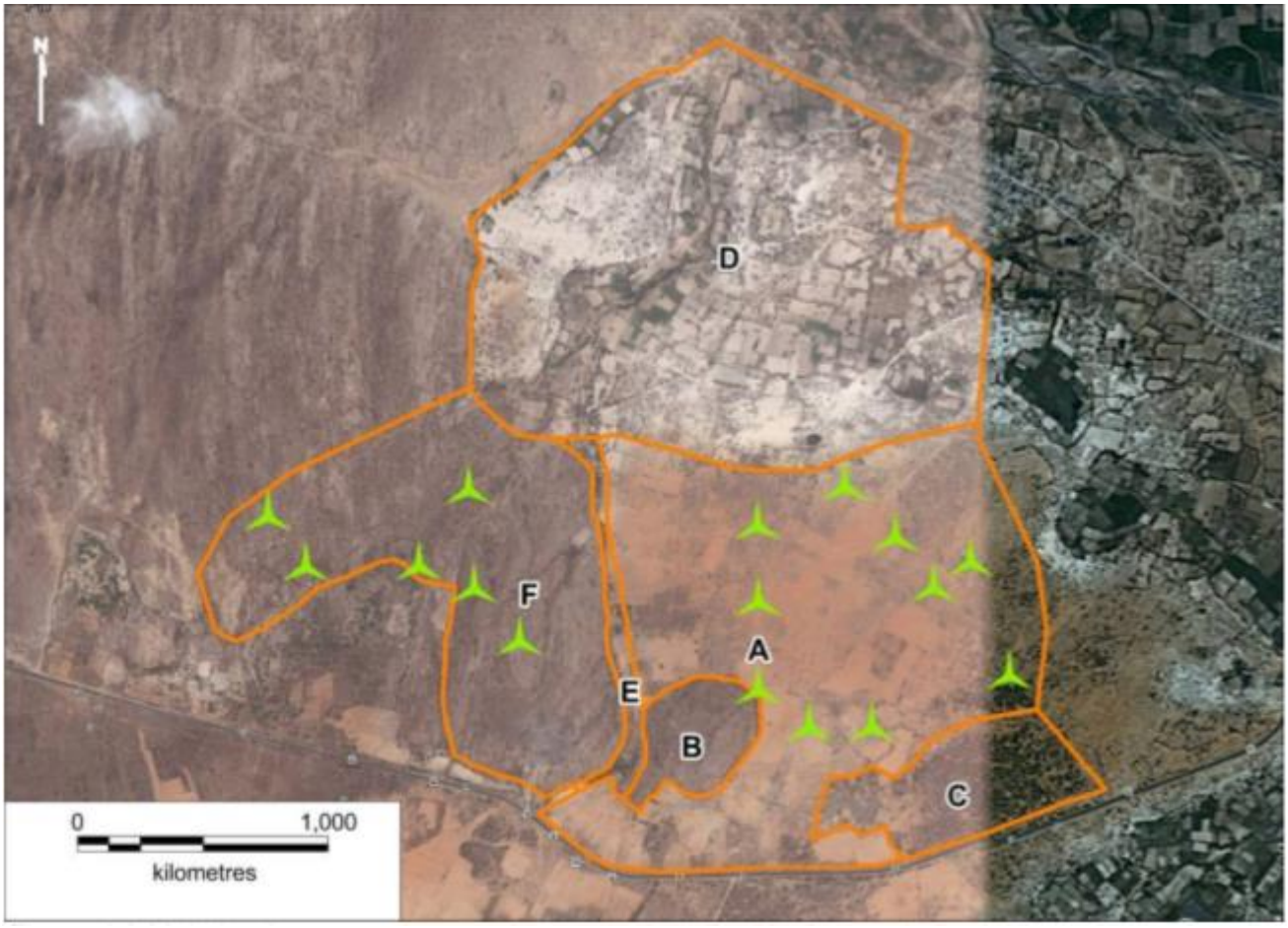
Table 8.5 Bat Foraging Strategies

Categories	Description
I	Insectivorous species that forage in the highly cluttered airspace within the forest interior (or forest interior specialists).
II	Insectivorous species that forage in partially cluttered spaces such as clearings, streams or other tunnels within the forest or just above the canopy (edge and gap foragers).
III	Insectivorous bats that forage in unobstructed airspaces found in large clearings or high above the forest canopy (open-space foragers).
IV	Fruit and nectar-eating bats that fly into the partially cluttered air-spaces between tree canopies, roost in small numbers and forage locally.
V	Fruit and nectar-eating bats that fly in unobstructed airspaces, roost in large colonies and forage over large areas.

8.6.3 Flora

The 2012 flora survey for Phu Lac 1 investigated six areas as illustrated in Figure 8.7 and Table 8.6 describes the flora composition in each surveyed area. None of the flora species found in 2012 are of high conservation value (CR/EN or endemic/restricted-range). It should also be noted that the location of Phu Lac 1's turbines (depicted by the three-winged green shape) in Figure 8.7 are outdated and the correct locations are illustrated in Figure 8.6 and Figure 8.8. The correct Phu Lac 1's turbines are located in areas F, B and A.

Through remote sening, the 2012 landscape (Figure 8.7) appears slightly different from the 2020 landscape, especially in area C (Figure 8.8), which pose a risk of misinterpretation if flora data from 2012 is transferred to 2020. However, given most of the Phu Lac 2's Project components are located in areas D and A, the areas that were heavily modified in 2012 and have not changed significantly in terms of vegetation cover until now, the flora baseline collected for Phu Lac 1 can still be applicable for Phu Lac 2.



Source: ESIA 2012.

Figure 8.7 Six Surveyed Areas in 2012 for Phu Lac 1

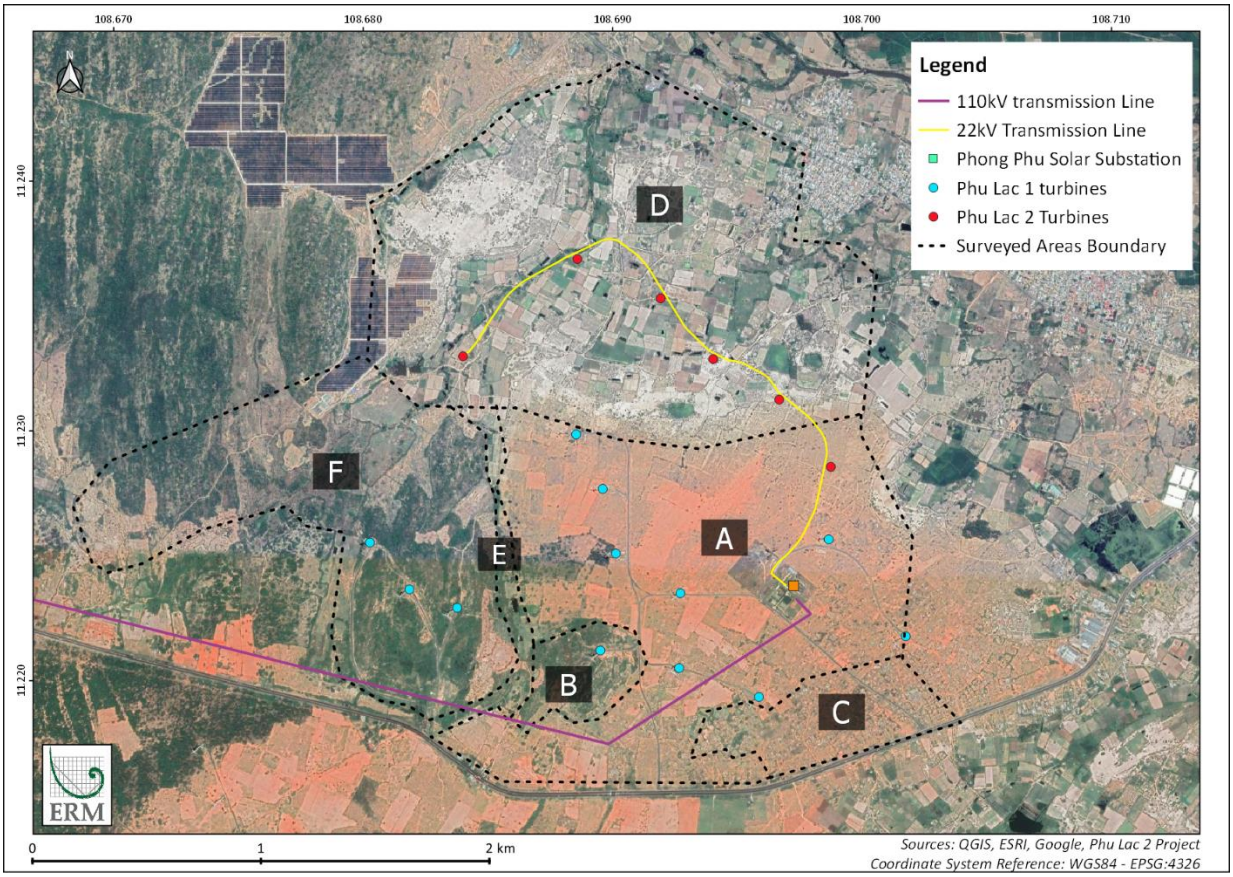


Figure 8.8 Boundaries of Six Surveyed Areas in 2012 Transfrerred to the 2020 Landscape.

Table 8.6 Summary of 2012 Landscape Characteristics

Areas	Characteristics	Species
A	■ Dry and open grassland originated from the dry coastal lowlands. ■ Scattered vegetation, mainly small bushes.	■ *Waltheria indica* ■ *Evolvulus alsinoides*
B	■ Steep slopes and widespread cover of stones/rocks. ■ Tropical xeric shrubland dominated by bushes, herbs and perennials.	■ Medicinal plants: - *Morinda tomentosa* - *Strychnos lucida* (IUCN LC) - *Leucoena leucocephala* ■ Wood: - *Terminalia corticosa* ■ Ornamental: - *Portulaca pilosa*

Areas	Characteristics	Species
		- Common Purslane *Portulaca olerace* (IUCN LC)
C	Similar vegetation to area A	
D	■ Mixed farmland and scrub-landscape. ■ Vegetation is shaped by long-time interaction between livestock and flora	Plantations species (e.g. banana, coconut, cashew-nuts)
E	■ Narrow valley between Area B and F ■ Similar vegetation to area D	
F	Mixture of vegetation found in areas A and B	

8.6.4 Other Fauna Species

According to the ESIA 2012, no efforts were made to sample other mammal species other than bats as the Project had been considered to only pose direct impacts on bats only. During the site visit, an unidneitified deer was sighted in area F that resembled a Southern Red Muntjac *Muntiacus muntjak* (IUCN LC). Another reptilian was recorded, which is the Oriental Garden Lizard *Calotes versicolor* (IUCN LC). no rare aquatic and terrestrial animal species was found. The type of agro-ecosystem with the features of terrestrial ecosystem as well as the aquatic ecosystem of the project area is relatively poor, with no endemic wildlife species, so the negative impacts of the implementation of the project are reported as negligible.

8.6.5 Summary of Baseline

Although the biodiversity assessment in the original EIA may be correct in it's conclusions concerning the wind farms impacts, it is the case that there are significant gaps in the information available. These include the low level of survey efforts for bird and bats, as well as a lack of cumulative assessment in relation to exising wind farm capacity. The 2017 carcass surveys at Phu Lac 1 do provide some support for the conclusions regarding low-medium levels of impacts, although these did identify concerns around possible cumulative effects on bats. Additionally, it is also important to note the magnitude of impacts found at Phu Lac 1 may not be transferable to Phu Lac 2, which may be attributed by various factors (e.g. difference in landscape where turbines are located). The impacts of Phu Lac 2 taking into account the baseline results from Phu Lac 1 and the transferability of data will be evaluated later in another section of this EISA.

8.7 Natural/Modified Habitat Loss

According to IFC PS6, a habitat can be described as geographical units that include terrestrial, marine, freshwater areas as well as airway passages. Given the Project's components are all built in areas D and A, where vegetation coverages are relatively very sparse and consist of mostly small bushes and plantation trees, the terrestrial habitats that are cleared due to the development of this Project are considered to be all Modified. Table 8.7 describes how the development of each Project's components are asociated with terrestrial habitat loss in terms of size.

The airspace associated with the turbine layout is considered to be natural habitat for the volant species, and thus, loss of natural airspace will require a No Net Loss (NNL) to be applied. Acccording to IFC PS6, mitigation measures to achieve NNL include:

- Avoiding impacts on on biodiversity through the identification and protection of set-asides;
- Implementing measures to minimize habitat fragmentation, such as biological corridors;
- Restoring habitats during operations and/or after operations; and
- Implementing biodiversity offsets.

Further details about mitigation measures will be described later in the Biodiversity Impact Assessment section of this ESIA.

Table 8.7 Project's Land Uses

Project's land uses	Size (ha)	Percentage
Termed uses	**8.29**	**64.8%**
Turbine foundations (including construction site for turbines)	4.2	32.8%
Substation 22/110kV	0.06	0.5%
Factory's internal road	4.03	31.5%
Temporary uses	**4.5**	**35.2%**
Laydown areas	3.5	27.4%
Construction site for other components (e.g. transmission line, transportation road)	1	7.8%

8.8 Critical Habitat Assessment

This section aims to identify candidate species that are potential to occur within the EAAAs and assess them against the criteria described on Table 8.1. The candidate species include threatened species (e.g. endangered, critically endangered species), endemic or range-restricted species, migratory species threatened or unique ecosystems and areas associated with key evolutionary processes.

The potentiality of occurences of species are judged based on the availability of suitable habitas within the EAAAs and the field survey results. The Project's land covers suggested limited suitable habitats for aquatic species, thus they are all considered to unlikely to occur within the EAAAs.

8.8.1 Endangered Species

Within the Project's 50 km radius, 63 endangered species are predicted according to IBAT (Table 8.8), which includes:

- Ten species categorised as CR, 15 as EN, 35 as VU in the IUCN Red List.
- Six species are categorised as CR, 18 as EN in the Vietnam Red Data Book.

However, of these species, only the King Cobra *Ophiophagus hannah* [UCN VU; VRDB CR] and the Black and White Spitting Cobra *Naja siamensis* [IUCN VU] are likely to occur within the EAAAs (EAAA2) since there have been a few records of them occurring in cultivated areas and/or Binh Thuan province, and caught

by locals on newspaper. However, the numbers that potentially occur in the area are not enough to to trigger critical habitats under critierion 1. More details about the justification of the potential occurrence as well as the likelihood of trigger critical habitats for each endandgered species are given in Appendix D.

Table 8.8 Endangered Species within 50 km Radius of the Project

Class name	Scientific name	Common name	IUCN	VRDB
REPTILIA	*Crocodylus siamensis*	Siamese Crocodile	CR	CR
REPTILIA	*Eretmochelys imbricata*	Hawksbill Turtle	CR	EN
REPTILIA	*Indotestudo elongata*	Elongated Tortoise	CR	EN
MAMMALIA	*Pygathrix nigripes*	Black-shanked Douc Langur	CR	N/A
MAMMALIA	*Muntiacus vuquangensis*	Large-antlered Muntjac	CR	VU
AVES	*Calidris pygmaea*	Spoon-billed Sandpiper	CR	N/A
AVES	*Gyps bengalensis*	White-rumped Vulture	CR	CR
AVES	*Sarcogyps calvus*	Red-headed Vulture	CR	N/A
AVES	*Emberiza aureola*	Yellow-breasted Bunting	CR	N/A
MAMMALIA	*Panthera pardus ssp. delacouri*	Indochinese Leopard	CR	N/A
MAMMALIA	*Bos javanicus*	Banteng	EN	EN
REPTILIA	*Chelonia mydas*	Green Turtle	EN	EN
MAMMALIA	*Chrotogale owstoni*	Owston's Civet	EN	N/A
MAMMALIA	*Nycticebus pygmaeus*	Pygmy Slow Loris	EN	EN
MAGNOLIOPSIDA	*Hopea ferrea*	N/A	EN	EN
MAGNOLIOPSIDA	*Dipterocarpus intricatus*	N/A	EN	N/A
MAMMALIA	*Trachypithecus germaini*	Indochinese Silvered Langur	EN	N/A
MAMMALIA	*Viverra megaspila*	Large-spotted Civet	EN	VU
AVES	*Pavo muticus*	Green Peafowl	EN	N/A
AVES	*Sterna acuticauda*	Black-bellied Tern	EN	N/A
AVES	*Lonchura oryzivora*	Java Sparrow	EN	N/A
MAGNOLIOPSIDA	*Camellia dilinhensis*	N/A	EN	N/A
MAGNOLIOPSIDA	*Magnolia bidoupensis*	N/A	EN	N/A
MAMMALIA	*Nomascus gabriellae*	Red-cheeked Gibbon	EN	EN
ACTINOPTERYGII	*Scleropages formosus*	N/A	EN	EN
MAMMALIA	*Bos gaurus*	Gaur	VU	EN
REPTILIA	*Caretta caretta*	Loggerhead Turtle	VU	CR
REPTILIA	*Dermochelys coriacea*	Leatherback	VU	CR

Class name	Scientific name	Common name	IUCN	VRDB
MAMMALIA	*Helarctos malayanus*	Sun Bear	VU	N/A
REPTILIA	*Lepidochelys olivacea*	Olive Ridley	VU	EN
MAMMALIA	*Lutrogale perspicillata*	Smooth-coated Otter	VU	EN
MAMMALIA	*Macaca arctoides*	Stump-tailed Macaque	VU	VU
MAMMALIA	*Macaca fascicularis*	Nicobar Crab-eating Macaque	VU	LR
MAMMALIA	*Neofelis nebulosa*	Clouded Leopard	VU	N/A
MAMMALIA	*Panthera pardus*	Leopard	VU	CR
MAMMALIA	*Ursus thibetanus*	Asiatic Black Bear	VU	EN
MAGNOLIOPSIDA	*Hopea odorata*	N/A	VU	N/A
MAGNOLIOPSIDA	*Dipterocarpus alatus*	N/A	VU	N/A
MAMMALIA	*Macaca leonina*	Northern Pig-tailed Macaque	VU	VU
MAMMALIA	*Arctictis binturong*	Binturong	VU	EN
MAMMALIA	*Rusa unicolor*	Sambar	VU	N/A
MAMMALIA	*Aonyx cinereus*	Asian Small-clawed Otter	VU	N/A
AMPHIBIA	*Microhyla annamensis*	Vietnam Rice Frog	VU	N/A
ACTINOPTERYGII	*Bagarius yarrelli*	N/A	VU	N/A
REPTILIA	*Naja siamensis*	Black And White Spitting Cobra	VU	N/A
REPTILIA	*Ophiophagus hannah*	King Cobra	VU	CR
REPTILIA	*Python bivittatus*	Burmese Python	VU	N/A
AVES	*Mulleripicus pulverulentus*	Great Slaty Woodpecker	VU	N/A
AVES	*Buceros bicornis*	Great Hornbill	VU	VU
AVES	*Rhyticeros undulatus*	Wreathed Hornbill	VU	N/A
AVES	*Carpococcyx renauldi*	Coral-billed Ground-cuckoo	VU	N/A
AVES	*Columba punicea*	Pale-capped Pigeon	VU	EN
AVES	*Clanga clanga*	Greater Spotted Eagle	VU	N/A
AVES	*Egretta eulophotes*	Chinese Egret	VU	VU
AVES	*Ciconia episcopus*	Asian Woollyneck	VU	VU
AMPHIBIA	*Leptobrachium leucops*	N/A	VU	N/A
MAMMALIA	*Arctonyx collaris*	Greater Hog Badger	VU	N/A
AMPHIBIA	*Microhyla pineticola*	Pine Narrow-Mouth Frog	VU	N/A

Class name	Scientific name	Common name	IUCN	VRDB
REPTILIA	*Physignathus cocincinus*	Chinese Water Dragon	VU	VU
MAMMALIA	*Capricornis sumatraensis*	Mainland Serow	VU	EN

8.8.2 Endemic Species

Within the Project's 50 km radius, 20 endemic species are predicted by IBAT(Table 8.9). None of this species are registered in Vietnam Red Data Book.

Of these species, the Bauer Leaf-tied Gecko *Dixonius aaronbaueri* [IUCN LC] might occur in the EAAA1 due to its tolerance of degraded habitat (there was a record of it in a plantation in an area of elevated sand dunes, surrounded with low, shrub vegeaton) and a historic record in Binh Thuan province[6]. However, no evidence of this species found in the field survey and it is unlikely that any subpopulations that might occur in the EAAA1 will be equivalent to 10% of the potentially dense population in the Nui Chua National Park locating about 100 km away to the Project.

The Cà Nà Marbled Gecko was once recorded in Cà Nà cape, Binh Thuan province locating about 30 km off the Project. Althought the species' habitat remains cryptic, the place where it was found a very rocky outcrop and its ecology suggests the dependene of rocks for breeding[7], which the EAAA1 provides limited amount of suitable habitats for it. The species is unlikely to occur within the EAAA1.

Table 8.9 Endemic Species within 50 km Radius of the Project.

Class name	Scientific name	Common name	IUCN
MAGNOLIOPSIDA	*Magnolia bidoupensis*	N/A	EN
AMPHIBIA	*Microhyla annamensis*	Vietnam Rice Frog	VU
AMPHIBIA	*Leptobrachium leucops*	N/A	VU
AMPHIBIA	*Microhyla pineticola*	Pine Narrow-Mouth Frog	VU
AMPHIBIA	*Feihyla palpebralis*	N/A	NT OR LR/NT
MAMMALIA	*Rattus osgoodi*	Osgood's Vietnamese Rat	LC OR LR/LC
MAGNOLIOPSIDA	*Oenanthe javanica*	Water Dropwort	LC OR LR/LC
LILIOPSIDA	*Monochoria vaginalis*	Pickerel Weed	LC OR LR/LC
AVES	*Chloris monguilloti*	Vietnamese Greenfinch	LC OR LR/LC
AVES	*Garrulax annamensis*	Orange-breasted Laughingthrush	LC OR LR/LC
AMPHIBIA	*Microhyla picta*	Painted Rice Frog	DD
ACTINOPTERYGII	*Schistura dalatensis*	N/A	DD
MAMMALIA	*Crocidura zaitsevi*	Mikhail Zaitsev's Shrew	DD
REPTILIA	*Dixonius aaronbaueri*	Bauer Leaf-toed Gecko	LC OR LR/LC

[6] https://www.iucnredlist.org/species/169689/110757863#population

[7] https://www.iucnredlist.org/species/104717112/104718911#text-fields

Class name	Scientific name	Common name	IUCN
REPTILIA	*Gekko canaensis*	Cà Nà Marbled Gecko	LC OR LR/LC
AMPHIBIA	*Theloderma laeve*	N/A	DD
REPTILIA	*Gekko grossmanni*	N/A	DD
LILIOPSIDA	*Ranalisma rostrata*	Mui Vang	DD
MAGNOLIOPSIDA	*Pistacia weinmanniifolia*	N/A	DD
MAMMALIA	*Hypsugo dolichodon*	Long-toothed Pipistrelle	DD

8.8.3 Migratory/ Congregatory Species

Within the Project's 50 km radius, 268 migratory/congregatory species are predicted to occur by IBAT, 204 of which belong to the Aves class[8] and nearly all of them is classified as NT or LC in the IUCN Red List. The rest is aquatic species that are not relevant for assessment of this Project.

Of these species, there were 11 species that were recorded during the field surveys at Phu Lac 1, which could potentially occur at the Project's site.

Table 8.10 Migrator Speces that Potentially Occur within the EAAAs of the Project.

No.	Common Name	Scientific Name	IUCN	VNRB
1	Black Drongo	*Dicrurus macroercus*	LC	N/A
2	Burmese shrike	*Lanius collurioides*	LC	N/A
3	Common Hoopoe	*Upupa epops*	LC	N/A
4	Pied bushchat	*Saxicola caprata*	LC	N/A
5	Red-collared dove	*Streptopelia tranquebaria*	LC	N/A
6	Red-wattled lapwing	*Vanellus indicus*	LC	N/A
7	Oriental Pratincole	*Glareola maldivarum*	LC	N/A
8	Plaintive Cuckoo	*Cacomantis merulinus*	LC	N/A
9	Oriental Skylark	*Alauda gulgula*	LC	N/A
10	Barn Swallow	*Hirundo rustica*	LC	N/A
11	White-shouldered Starling	*Sturnia sinensis*	LC	N/A

None of these are predicted to occur in sufficient numbers to meet the numerical triggers for criterion 3.

8.8.4 Overall Results

Table 8.11 shows the overall results of CHA against the five biodiversity criterions of IFC PS6. The justifications for each candidate species against criteria 1, 2 and 3 are given in Appendix D.

[8] Vietnam is located within the East Asia/Australasia Flyway (EAAF). It encompasses large parts of East Asia, all of Southeast Asia and includes eastern India and the Andaman and Nicobar Islands. During the non-breeding period 37 shorebird species are regularly present in Vietnam, but no species are present in numbers that exceed 5% of their Flyway population estimate (Bamford et al., 2008).

Table 8.11 Critical Habitat Assessment Results

Criterion	Assessment result
Criterion 1	Based on the screening assessment, no species triggered critical habitat within the EAAAs under Criterion 1.
Criterion 2	Based on the screening assessment, no species triggered critical habitat within the EAAAs under Criterion 2.
Criterion 3	Based on the screening assessment, no species triggered critical habitat within the EAAAs under Criterion 3.
Criterion 4	No ecoststems in Vietnam have yet been assessed under IUCN Red List of Ecosystems and the site is highly modified. Therefore, the EAAAs does not contain highly threatened or unique ecosystem that trigger critircal habitats under criterion 4.
Criterion 5	The EAAA2 is heavily modified and does not contain areas with high endemism or importance in maintain genetic diversity supporting key evolutionary processes. The EAAAs does not contain critical habitat under criterion 5.

8.9 Ecosystem Service

8.9.1 Defining Ecosystem Services

Ecosystem Services (ES) are defined as the benefits that people, including businesses, derive from ecosystems (IFC, 2019)[9]. These services are substantial and varied, underpinning basic human health and survival needs as well as supporting economics activities, the fulfilment of people's potential, and enjoyment of life.

Guidance Notes (GN106 defines ecosystem services as the benefits that people, including businesses, obtain from ecosystem services and this definition is aligned with the Millennium Ecosystem Service Assessment (MES, 2006)[10], a UN initiated global assessment on such services. Ecosystem services are organized into four major categories (IFC, PS 6, para 2.):

Provisioning Services

These are goods or products obtained from ecosystems, such as food, water, timber and other products from NTFP (non-timber forest product).

Regulating Services

These include benefits obtained from an ecosystem's control of natural processes, such as climate regulation, disease control, erosion prevention, water flow regulation, and protection from natural hazards.

Cultural Services

These are the non-material benefits obtained from ecosystems, such as recreation, spiritual values, and aesthetic enjoyment.

[9] IFC, June 2019, retrieved on: January 2021, retrieved at : https://www.ifc.org/wps/wcm/connect/5e0f3c0c-0aa4-4290-a0f8-4490b61de245/GN6_English_June-27-2019.pdf?MOD=AJPERES&CVID=mRQjZva

[10] The Millennium Assessment, November 2006, retrieved on: January 2021, retrieved at : https://www.researchgate.net/publication/232660941_The_Millennium_Assessment/link/561541d808aed47facefbd62/download

Supporting Services

These are the natural processes such as soil formation, nutrient cycling and primary productivity, which maintain other ecosystem services.

In line with the IFC PS (2019), this chapter identifies and prioritizes ecosystem services at the Project Site and Area of Influence (AOI) as defined by GN117, establishing how these services are of relevance to affected local communities and are likely to be impacted by the Project. The following sections provide an assessment of potential impacts arising from construction and operational related activities of the Project on identified ecosystem services within the Project site and AOI.

8.9.2 Applicable Standards and Guidelines

The International Finance Corporation's (IFC) performance standards require projects to assess and preserve the benefits from ES. The IFC also requires that the environmental and social risks and impacts identification process consider a project and communities' dependence on ES. A fundamental component is to apply the mitigation hierarchy to determine measures to limit impacts on ES.

ERM has utilized the World Resource Institute (WRI) Guidelines: *Weaving Ecosystem Service into Impact Assessment* to guide the approach used to assess ES in relation to the project. The ES review was undertaken following a five-stage approach (WRI 2014):

- Screening assessment to Identify ES that may occur within the study area;
- Data Collection and prioritization for 'screened in' ES;
- Scoping to refine the list of ES based on those identified in the study area and potentially impacted by the project;
- Prioritization to identify ES importance to beneficiaries; and;
- Impact Assessment to identify the impacts to ES and their human beneficiaries as a result of the project.

8.9.3 Screening and Scoping

8.9.3.1 Area of Influence

The Area of Influence (AoI) as defined in the WRI Guidelines:

"*…area relevant to the assessment of project impacts and dependencies on priority ecosystem services. It includes (1) the ecosystems that supply the priority ecosystem services and (2) the locations where the project and affected stakeholders access priority ecosystem services.*"

For the purposes of this ES screening, the AoI will consist of community areas and sites utilized by the community for their livelihoods. The AoI was based on the Ecologically Appropriate Area of Analysis (EAAA) identified for the project (Figure 8.9). There are two EAAAs defined for the Project, namely the EAAA1 for the assessment of avifauna's critical habitats and the EAAA2 for reptiles and mammals. The assessments of critical habitats are analzyed in section 8 in the biodiversity baseline. The EAAA1 covers an area of about 34,355.6 ha, consisting of 22,314.3 ha of Natural habitats and 12,041.3 ha of Modified habitats; while the EAAA2 covers 2,750.8 ha consisting of 740.8 ha and 2010.0 ha of Natural and Modified habitats respectively (see section 8 in Biodiversity Baseline)

The EAA1 traverses a diverse range of land covers that can be important for avian species such as forest, surface water, aqua-cultural land (i.e. fish ponds), agricultural land (i.e. orchads) and build-up land. The EAAA2 covers various types of habitat including built-up, agricultural land, surface water and sparse

plantation forest. The majority of dense vegetation in EAAA2 is the representation of forest within Song Trau Protection Forest and Nui Chua KBA.

8.9.3.2 Screening

An ES screening assessment was undertaken to determine the likely ES values that could be potentially important to affected communities. The types of ES that have been defined in the WRI Guideline is used as a basis to crosscheck ES that may or may not be found in the AoI; potential ES in the AoI that correspond with the definition are then screened in for prioritization. ES that are not found in the AoI and has very minimum used are then screened out. The results of the screening assessment are contained in Table 8.12

This assessment was done using available sources of primary data, including information collected during the scoping visit, social and environment surveys. The survey also gathered information from local interviews with fishers and farmers.

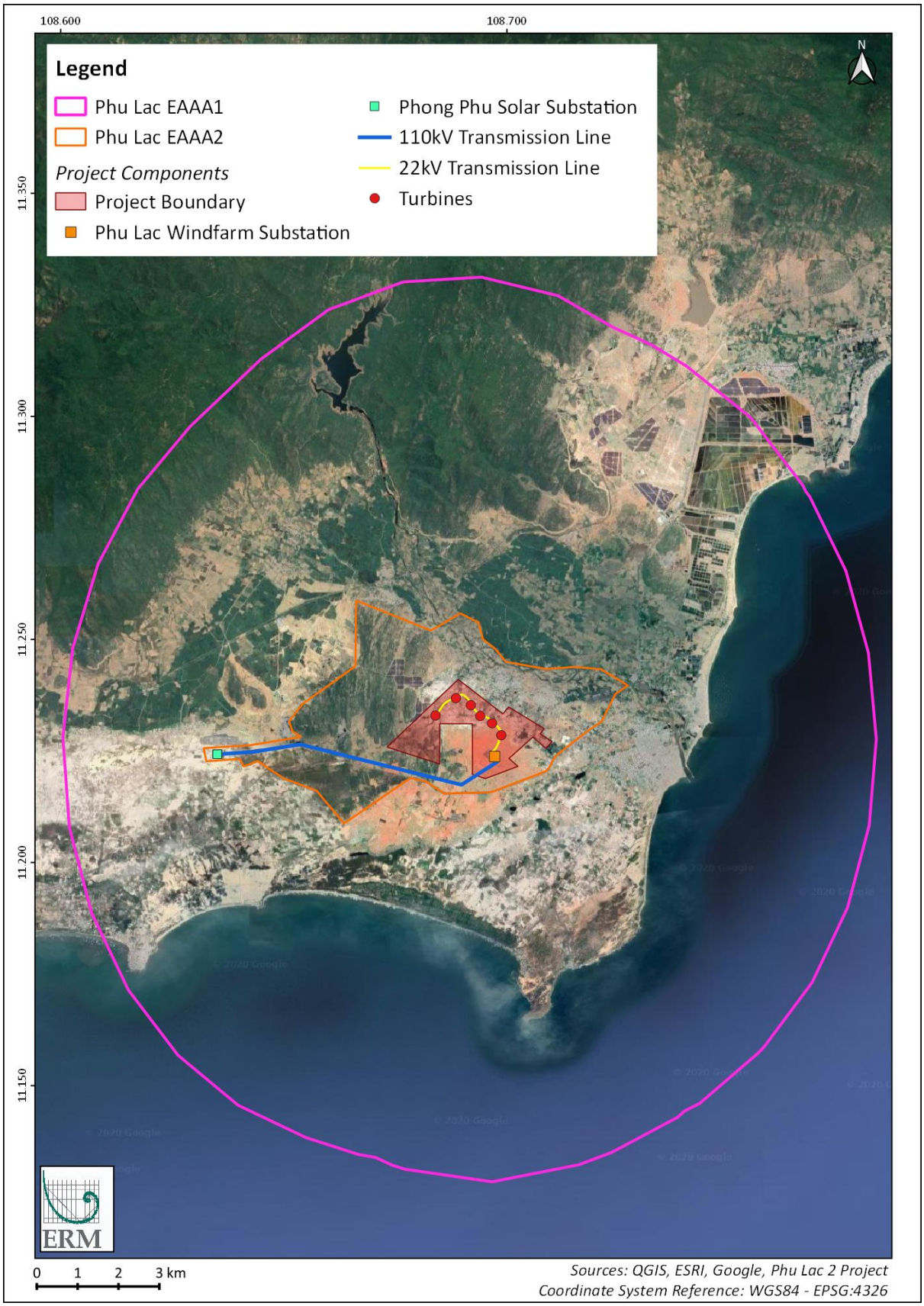


Figure 8.9 ES Screening Area of the Project

Table 8.12 ES Screening Assessment

Ecosystem Service Type	Description	Current Known Ecosystem Services condition	Scope in?
Provisioning Services			
Food: wild-caught fish and shellfish & aquaculture	Fish caught for subsistence or commercial sale; Fish, shellfish, and/or plants that are bred and reared in ponds, enclosures, and other forms of fresh- or salt-water confinement for harvesting	Fishing is as one of the local people's livelihoods recorded in the survey. People go fishing within a day and in the nearshore area. No aquaculture activity was reported in the survey. The development of the Project does not cause loss of aquaculture land or affect fishing activities of local people.	No
Food: wild meat	Animals hunted for primarily food (recreational hunting covered under cultural services)	No hunting activities reported in the surveyed area.	No
Food: cultivated crops	Annual and permanent crops grown for subsistence use and commercial sale	Annual crops: Purple onion is the main crop of high economic value. In addition, there are other plants such as rice, peanut, chili, hibiscus, vegetables, and beans. Perennial trees include dragon fruit, jujube, grape and cashew. The development of the Project mainly acquires agricultural land that may affect the cultivated crops provisional services of the ecosystem.	Yes
Food: herbs and plants	Herbs and plants collected for food by local people	Local people use agricultural products as mentioned the row above for daily nutrient and use of herbs was not reported during the survey. The development of the Project mainly acquires agricultural land that may affect the herbs and plants provisional services of the ecosystem.	Yes
Livestock farming	Sedentary and nomadic livestock farming	Livestock farming is reportedly in captivity, not grazing. Water used for animals is from wells and ponds in the area. Livestock farming in small scale with 2 to 4 heads of animals per household. The scale of livestock farming is small and since the main form is captivity, the development of the Project does not likely to affect any grazing land of local livestock farms.	No

Ecosystem Service Type	Description	Current Known Ecosystem Services condition	Scope in?
Biomass fuel	Wood, dung and plant matter collected for charcoal, fuel	Firewood was reported using as a cooking biomass fuel but not popular. People are now using gas and electricity as the main energy source for cooking. The forest area loss occurring in the Tuy Phong protection forest due to the Project's development of the transmission line is small and unlikely to affect the use of firewood of local people.	No
Timber and wood products	Wood collected for local use or for sale as timber, wood pulp and paper	No timber collection recorded in the area at the time of the survey. Forest exploitation (hunting, logging and forest products), used to be the main livelihood, but now plays a negligible role in livelihood activities. Local people do not rely on the forest for timber products. The forest area loss occurring in the Tuy Phong protection forest due to the Project's development of the transmission line is small and unlikely to affect the exploitation of timber and wood products of local people	No
Non- Timber Forest Products (NTFP)	Non-timber products collected from the forest. For example, cane, palm, straw, cotton, hemp, twine and rope, natural rubber	No non-timber products collection in the proximity area of the Project.	No
Freshwater	Freshwater for bathing, drinking, irrigation, laundry, household and industrial use	The water sources of drinking and other domestic purpose of the local community are piped water and bottled water. The industrial cluster in the Bac Tuy Phong district, especially the Binh Thuan – Nha Be garment industry, uses piped water. Water for production irrigation is from ponds or wells. During the construction of the Project, freshwater may be consumed.	Yes
Regulating services			
Biochemical, natural medicines, pharmaceuticals	Natural medicines, biocides, food additives, pharmaceuticals and other biological material for commercial or domestic use. For example, pelts, carved or decorative animal products, live animal trade	Hibiscus is reported for medicinal use. Hibiscus is planted by local people recent years due to its high adaptability to local drought conditions. However, these plants are planted in small numbers and are not the primary livelihood of local people. The Project does not affect the planting of hibiscus in the area.	No

Ecosystem Service Type	Description	Current Known Ecosystem Services condition	Scope in?
	Genes and genetic information used for animal breeding, plant improvement, and biotechnology	Evidence suggests that there is no current use of genes and genetic information used for animal breeding, plant improvement, and biotechnology.	No
Ecosystem functions	The influence ecosystems have on air quality by extracting chemicals from the atmosphere (i.e., serving as a “sink”) or emitting chemicals to the atmosphere (i.e., serving as a “source”)	Evidence suggests that the Project area has no influence on air quality in the vicinity.	No
	Carbon sequestration (impacts on global climate change) regulation of temperature, shade air quality by vegetated areas	Evidence suggests that the Project area has no influence on Carbon sequestration in the vicinity.	No
	Influence ecosystems have on the timing and magnitude of water runoff, flooding, and aquifer recharge	Evidence suggests that the Project area has no influence on water runoff, flooding, and aquifer recharge in the vicinity.	No
	Role played by vegetation and bacteria in the filtration and decomposition of organic wastes and pollutants and the assimilation and detoxification of compounds.	Evidence suggests that the Project area has no influence on filtration and decomposition of organic wastes and pollutants in the vicinity.	No
	Role of natural habitats (e.g. wetlands, beaches, reefs) in protecting crops, buildings, recreation areas from waves, wind and flooding from coastal storms.	The Project area is a farmland for growing rice, purple onion, chili, bean…. No natural habitats were observed within the area for Project development. The Project is located next to the Tuy Phong protection forest that shelter the farmland from sandstorm, however the forest holds little biodiversity values and is only considered as a modified habitat (not natural). Additionally, the Project only leads to a very small area loss of Tuy Phong and the impact is negligible.	No
	Regulation of fire frequency and intensity (e.g. dense forest can provide firebreaks)	No information	No

Ecosystem Service Type	Description	Current Known Ecosystem Services condition	Scope in?
	Predators from forests, grassland areas, etc. may control pests attacking crops or livestock	Pests can be controlled by a lot of taxon including birds, bats, small mammals and reptiles. Avifauna and chirpoteran are subjected to fatalities due to turbine and transmission line collisions, which may lead to decreased number of predators.	Yes
	Influence ecosystems have on the incidence and abundance of human pathogens	There are no ecosystems that will influence the abundance of human pathogens in the area.	No
	Role of vegetation in regulating erosion on slopes and riparian areas	The Project area is a plain area and mainly serving for agriculture activity. Erosion of soil on slopes or riparian areas are unlikely to occur due to Project's vegetation clearance.	
	Birds, insects and some small mammals pollinate certain flora species, including some agricultural crops	Birds, bats and other fauna can be impacted by the Project in various ways that might result in the reduction in populations of these taxon within the Project's area.	Yes
Cultural Services			
Spiritual, religious or cultural value	Natural spaces or species with spiritual, cultural or religious importance	There are no natural spaces or species of cultural significant in the area. Even though Cham ethnic minority people living in the area but no natural spaces or species with spiritual, cultural or religious importance of them reported in the survey.	No
	Cultural value placed on traditional practices such as hunting, fishing, crafts and use of natural resources.	Many households have ancestral graves on their agricultural land and the Project's acquisition of agricultural land might have emotional issues.	Yes
	Use of natural spaces and resources for tourism and recreation (e.g. swimming, boating, hunting, bird-watching, fishing)	No use of natural spaces and resources for tourism and recreation	No
	Cultural value placed on the aesthetic value provided by landscapes, natural landmarks	There is no specific culturally aesthetic landmarks in the Project area.	No
	Information derived from ecosystems used for intellectual development, culture, art, design, and innovation.	Evidence suggests that the Project area is not considered as areas for intellectual development, culture, art, design, and innovation.	No

Ecosystem Service Type	Description	Current Known Ecosystem Services condition	Scope in?
Supporting Services			
Non-use value of biodiversity (e.g. existence, bequest value)	Species and areas valued globally as of high conservation value	No species of high conservation status are found within the Project's area according to the biodiversity baseline.	No
	Formation of biological material by plants through photosynthesis and nutrient assimilation.	Evidence suggests that the Project area of AoI is not considered as a formation of biological material by plants through photosynthesis and nutrient assimilation.	No
	Flow of nutrients (e.g., nitrogen, sulfur, phosphorus, carbon) through ecosystems.	Evidence suggests that the Project area is not considered to give the service for flow of nutrients.	No
	Flow of water through ecosystems in its solid, liquid, or gaseous forms.	Long Song/Dai Hoa river runs through Phu Lac commune and Lien Huong town to reach the sea in the east. The river is approximately 2km from the Project site. However, the Project does not disturb such flow of water.	No
	Natural soil forming processes throughout vegetated areas.	Evidence suggests that the Project area of AoI is not considered as a formation of biological material by plants through photosynthesis and nutrient assimilation.	No
	Natural spaces that maintain species populations and protect the capacity of ecological communities to recover from disturbances.	The airspace that the Project acquires traversing the important habitat of avifauna and chiropteran.	Yes

Notes: [a] *Numbers in this column refer to sections within the Socio-Economic Baseline Report which forms part of this ESHIA*
[b] *WRI Guidelines: Weaving Ecosystem Service into Impact Assessment*

Source: Social, Environment, Biodiversity Baseline ERM, 2020

8.9.4 Ecosystem Services Scoping

The scoping exercise was undertaken in order to refine the list of ES that have:

- **Potential Beneficiaries:** Known and potential beneficiaries for a service at the local, national, and / or global level;
- **Sources of Impact:** Potential sources of impact were considered based on the social data obtained for the site;
- **Project Dependence:** IFC PS-6 requires that the ES assessment take into consideration any services that the Project may rely upon during construction, operation and/or decommissioning. Therefore, all services for which there is a potential project dependency were scoped into the prioritization stage.

The goal of the scoping exercise was to identify a list of ES to be assessed during the surveys.

8.9.4.1 Approach

The WRI guidelines and IFC PS6 requires that priority ES are identified and impacts to those services are assessed (IFC, 2012). The prioritization process is aimed at identifying those services for which Project impacts would be most likely to result in adverse impacts on project affected communities and other beneficiaries. Using the information collected through the baseline data collection and stakeholder engagement processes, ES were prioritized according to a priority matrix ranking two criteria:

- Importance of the ES to the beneficiary which considers the intensity of use, degree of dependence and the importance expressed by the project affected communities; and
- Irreplaceability of the ES, which refers to the availability of alternatives, the accessibility, cost and appetite for those alternatives as discussed with the beneficiary.

8.9.4.2 Results

After compiling baseline information on the importance and irreplaceability of each service, these ratings were combined to assign a priority rating to the service grading from Low to Major as shown in the ES prioritization matrix in Table 8.13.

ES identified as High priority or Major priority were considered Priority ES. The weight given to each of these components varied slightly depending upon the service, but stakeholder values were given precedence over other criteria where the rating was not clear.

In addition to the above, according to the IFC definition of priority ES, all services for which project dependencies are identified are considered priority services. The importance and irreplaceability of services relied upon by the Project was assessed through the same prioritization process outlined above, with the Project filling the role of the beneficiary.

In addition to the prioritization exercise, the baseline data collection process provided the opportunity to collect information on the status, trends, and sustainability of resource use as they pertain to the habitats and species that support ES. This information was gathered through secondary sources and field studies by the environment team and where appropriate through engagement with local stakeholders. This information is important for the assessment of impacts on ES and therefore on local people as the final receptors of these changes.

Table 8.14 outlines the results of Prioritization assessment for each type of ecosystem service.

Table 8.13 ES Prioritization Matrix

Importance to Beneficiaries		Irreplaceability		
		High (2)	**Moderate (3)**	**Low (5)**
Low (1)	The service is used and valued by parts of the community, but it is not important in maintaining quality of life or livelihoods of Project Affected Communities.	**Low Priority (2)**	**Low Priority (3)**	**Moderate Priority (5)**
Medium (2)	The service is readily used by some members of the Project Affected Communities for income or subsistence, but they are not dependent upon the service for their livelihoods, and not everyone utilizes the service.	**Low Priority (4)**	**Moderate Priority (6)**	**High Priority (10)**
High (3)	The service is highly important in maintaining the livelihoods of the Project Affected Communities, and is used by most of the community regularly.	**Moderate Priority (6)**	**High Priority (9)**	**Major Priority (15)**
Essential (4)	The service is essential to maintain the health of the Project Affected Communities, and the service is used by all members of the community.	**High Priority (8)**	**Major Priority (12)**	**Major Priority (20)**

Irreplaceability definition	
High	Many spatial alternatives exist that are readily available to the Project Affected Communities, and there are no major impediments to their usage.
Moderate	Spatial alternatives exist but are either less accessible than the affected service, or there are other barriers to their use such as distance, cost and skills required to access the service.
Low	There are few to no spatial alternatives available to the Project Affected Communities.

Priority Ranking	
Low Priority	2 to 4
Moderate Priority	5 to 6
High Priority	8 to 10
Major Priority	12 to 20

Table 8.14 Result of Prioritization

Ecosystem service	Trends and sustainability	Beneficiaries	Importance to beneficiaries	Irreplaceability	Potential Alternatives	Priority
Provisioning Service						
Food: cultivated crops	Use of the services is predicted to increase in the absence of the Project.	All villages that cultivate crops within AoIs of project location.	High	High	Besides crops from the community agricultural land, the local people can purchase the cultivated crops in the market. (see Agriculture section in section Livelihoods)	Moderate Priority (6)
Food: herbs and plants	Use of the services is predicted to be stable in the absence of the Project.	All villages that cultive herbs and plants within AoIs of project location.	High	High	Besides vegetables from the community agricultural land, the local people can purchase the vegetables in the market. (see Agriculture section in section Livelihoods)	Moderate Priority (6)
Freshwater for bathing, drinking, irrigation, laundry, household and industrial use	Use of the services is predicted to increase in the absence of the Project.	All villages within AoIs of project location.	High	High	Many alternatives for accessing freshwater such as well water, rainwater, clean water station, and river. (see Water Supply section in Baseline Chapter 9.9.1.7; 9.9.1.8; and 9.9.2.4.1)	Moderate Priority (6)
Regulating services						
Predators from forests, grassland areas, etc. may	Use of the services is predicted to increase	All villages within AoIs of project location.	Medium	High	Many species can control pests and another	Low Priority (4)

Ecosystem service	Trends and sustainability	Beneficiaries	Importance to beneficiaries	Irreplaceability	Potential Alternatives	Priority
control pests attacking crops or livestock	in the absence of the Project.				alternative for predator is use of pesticides.	
Birds, insects and some small mammals pollinate certain flora species, including some agricultural crops	Use of the services is predicted to increase in the absence of the Project.	All villages within AoIs of project location.	Moderate	High	Birds and bats can be impacted by the Project; however other alternatives for pollinaotrs are availabe which include insects, small mammals and human as well.	Low Priority (4)
Cultural services						
Cultural value placed on traditional practices such as hunting, fishing, crafts and use of natural resources.	Use of the services is predicted to increase in the absence of the Project.	All villages within AoIs of project location.	Low	Moderate	Alternatives to household burial include burial in the commune's graveyard or cremation.	Low Priority (3)
Supporting Services						
Natural spaces that maintain species populations and protect the capacity of ecological communities to recover from disturbances.	Use of the services is predicted to be stable in the absence of the Project.	No communities within AoIs of project location may gained direct benefit from this service.	Low	Moderate	Flying fauna species have large home range and can easily use other similar airspace that are available in the Projects' AoI. The clearance of a small area in Tuy Phong forest does not significantly impact the foraging and nesting grounds of fauna.	Low Priority (3)

8.9.4.3 Priority Ecosystem Services

Ecosystem services identified as High Priority or Major Priority were considered Priority Ecosystem Services. However, after understanding the combination between the importance to beneficiaries and the irreplaceability, the highest rank in the prioritization is the moderate priority (6). This result is mainly due to high numbers of alternative and no significant barrier to access the ecosystem service in the project location. These services (see Table 8.15) will then be assessed further in impact assessment.

Table 8.15 The Priority Ecosystem Service

Priority Ecosystem Service	Description
Food: cultivated crops	There will be potential disturbances and loss of agricultural land to local economic activities relating crops cultivation.
Food: herbs and plants	There will be potential disturbances and loss of agricultural land to local economic activities relating herbs and plants.
Freshwater	The community and industries will use freshwater resources including groundwater from wells, piped water and rivers. The Project will consume piped water mainly during project construction.

9. SOCIO-ECONOMIC BASELINE

9.1 Objectives

The socio-economic assessment for the proposed Phu Lac wind power project (the Project) to understand the social sensitive and possible economic impact associated with the Project. The development of the Project may have certain social and economic impacts that may be negative or positive. The negative socio-economic impacts need to be avoided as much as possible. The impacts which cannot be avoided need to then be mitigated and managed. Hence, the key objectives of the assessment are as follows:

- Gather data about socio-economic conditions in the Project area to help identify potential impacts:
  - Identification and analysis of the issues needs and concerns of both directly and indirectly affected households (AHs), vulnerable communities and ethnic minority (EM) groups.
  - Assessment of the perceived impacts of the Project development from pre-operation (land acquisition process) to operational phases.
  - Based on the baseline socio-economic report, criteria are established to assist the strategies formulation, to maximize the project benefits and minimize the project impacts on the affected communities.
  - Having insight of the living patterns of the possibly affected population, especially vulnerable people and EM groups.
- Identify and understand stakeholders' perceptions and concerns, including local authorities and communities, who might be affected by the Project's construction and operation activities.

The baseline report analyses the socio-economic and cultural contexts at national and local (provincial, district, and commune) levels. It also includes socio-economic characteristics at the household-level for the affected communities. The findings reported are based on a review of socio-economic conditions collected during site visits held between 12th and 15th November 2020. Efforts have been made to highlight the differences between surveyed areas and the differences between genders on socio-economic parameters present at the area of interest. The study employed other results generated from secondary data that involves synthesizing this existing data from the internet, journals, government archives and methodological triangulation to validate this.

9.2 Methodology

9.2.1 Research Area

The research is included Tuy Phong district of Binh Thuan province where the Project is located. More specifically, the baseline study focused on the surveyed communes as specified in Table 9.1.

Distinctive by the socio-economic structure, all the surveyed communes are predominantly based on agriculture production. Lien Huong town is relatively urbanised with its developing business and services given its geographical location: border to the sea in the east, having the National Road 1A crossing in the west and Dai Hoa river running through from the west to the east.

Table 9.1 Research Areas of Project Affected Communes

Province	District	Commune	Project Component and Impacts			Socio-economic Structure	
			Turbine Component	T-line Component	No Project Component but Displaced Households	Agricultural Economy	Urbanised Economy
Binh Thuan	Tuy Phong	Phu Lac	X	X	-	X	-
		Chi Cong	-	X	-	X	
		Lien Huong	-	-	X	Lien Huong people reclaimed and engaged in farming activities in agriculture land within Phu Lac territory	

9.2.2 Data Collection

The socio-economic data collection was designed so that information was gathered at the national, local, and household levels to detect changes in the socio-economic baseline condition of affected communities towards the Project. The task includes secondary socio-economic baseline data collection and primary socio-economic data collection. Data for the national level is from secondary data sources and desk-based research while data for the local and household levels is based on both secondary and primary data sources. Primary socio-economic data collection was conducted through engagement with relevant state agencies, local authorities, and local communities. For local community engagement, household surveys, focus group discussions (FGDs), key informant interviews (KIIs), and field observations were carried out. Appendices A, B and C provide the Household Questionnaire, FGD Guideline and List of Participants in the Survey, respectively.

9.2.2.1 Primary Data Collection

The study undertook the primary data collection with a multi-layer approach to socio-economic analysis using mixed methods which combine qualitative and quantitative methods, including:

- Semi-structured interviews with local authorities;
- Household interviews;
- FGDs; and
- Field observations.

In order to organise the interview and household survey, invitation letters were prepared and sent to the local authorities prior to the meetings. The household survey was organised in collaboration with the commune level authorities, and in particular the village heads. The surveyed households were selected based on the list of affected households by land acquisition process and randomly recruited based on diverse and inclusive requirements such as age, education backgrounds, livelihoods, gender, and social group shows the surveyed sample by geographical location and the research method in the study.

Table 9.2 Research Sample by Geographical Location and Research Method

Level of Administration				Number of Engagements		
Province	District	Commune/	Village/Quarter	Interviews with local authorities	Household Interviews	FGDs

Level of Administration				Number of Engagements		
Binh Thuan	Tuy Phong			1	-	-
		Phu Lac		1	-	-
			Phu Dien	-	16	4
			Lac Tri	-	97	
		Chi Cong		1	-	-
		Lien Huong		1	-	-
			Quarter 1 Quarter 3 Quarter 4 Quarter 5 Quarter 6 Quarter 8	-	34	1
		Phong Phu		-	-	-
			Village 1	-	2	0
Total				4	149	5

9.2.2.1.1 Meetings with Authorities

Semi-structured interviews were applied to collect updated information about the socio-economic conditions of the study area as well as the key concerns and perceptions of local authorities about the Project. Local authorities' suggestions were also collected for the Project to consider the environmental and social performance management and impact mitigations. This consultation with the authorities helped the team confirm the development trends and current status of socio-economic conditions, infrastructure, and public services.

The consultation process also aimed to inform stakeholders about Project progress while assessing awareness at different levels and identifying some of the community's key issues, concerns, and expectations (Table 9.3).

Table 9.3 Engagement with Local Authorities for the ESIA Report Development

Level of Governance	Organizations	Date of Engagement	Topics Covered in the Interviews and Meetings
Tuy Phong District Authorities	People's Committee of Tuy Phong district	12th November 2020	■ Update about Project progress and current status of the ESIA; ■ Obtain up to date socio-economic data about infrastructure and public services, health, livelihoods, and employment of people in the district; and ■ Obtain feedback or perceptions linked to Project development.
	Forest Ranger Sub-devision (FRD) of Tuy Phong district	12th November 2020	■ Update about Project progress and current status of the ESIA; ■ Discuss any potential livelihood activities of local villager within the Project's boundary.

Level of Governance	Organizations	Date of Engagement	Topics Covered in the Interviews and Meetings
Communal Authorities	People's Committee of Phu Lac commune People's Committee of Chi Cong commune People's Committee of Lien Huong commune-level town	13th November 2020	■ Update about Project progress and current status of the ESIA; ■ Obtain up to date socio-economic data about infrastructure and public services, health, livelihoods, and employment of people in the commune; ■ Obtain information on the supporting programs available in the area, especially for ethnic minority community; ■ Gain feedback or perceptions about Project development; and ■ Obtain acceptance and support from the People's Committee to conduct the household survey and FGDs in the area.

The four semi-structured interviews were conducted with key stakeholders, comprised of representatives of the Phu Lac, Chi Cong, and Lien Huong commune(-level town) People's Committees, representatives of Forest Ranger Sub-devision (FRD) of Tuy Phong district, and Tuy Phong district People's Committee. These interviews collected general information about the health status and public services in the community, socio-economic condition, welfare policies, safety and security, and other supported programs for local people. Each interview lasted approximately 45 minutes. Researchers made some additional observations in surveying by exploring local infrastructure as roads, schools, and commune health centers to overview the local context.

9.2.2.1.2 Households Interview

The household surveys were conducted to a total of 149 affected households (with a total of 693 household members). The survey targeted at affected households residing in three communes/town of Tuy Phong, including Phu Dien, Lac Tri villages, and Lien Huong town, where the main site and nearby components of the project are located, and along the transmission line route. The surveyed households were identified based on the list of households provided by the Project Owner, then refined after consultation with the village head of Phu Dien, Tuy Phong Land Fund Development Center and village representatives. The following is the criteria for refining the list:

- Repetition (one person with two names, people from the same family/household); and
- Unavailable households (those no longer living in the commune and have moved to other places or passed away; and those were who were not reachable after three contact attempts).

The final list with such eliminations was the one used for the survey. Any households who were not reachable or refused to take the survey were registered within the list.

A summary of the demographic information of the surveyed population is provided in Figure 9.1 and Table 9.4.

Table 9.4 Household Interviews by Geographical Location

Level of Administration				Number of Surveyed Households			Total
Province	**District**	**Commune/Commune-level Town**	**Village/Cluster**	**Households with Land Acquisition for the Project**	**T-line Affected Households**	**Random Households**	
Binh Thuan	Tuy Phong	Phu Lac	Lac Tri	0	0	44	44
			Phu Dien	16	0	53	69
		Lien Huong	Cluster 1	0	0	1	9
			Cluster 3	1	1	9	11
			Cluster 4	2	0	3	5
			Cluster 5	3	5	1	9
			Cluster 6	2	0	2	4
			Cluster 8	1	1	3	5
		Phong Phu	Village 1	0	2	0	2
Total				**24**	**9**	**116**	**149**

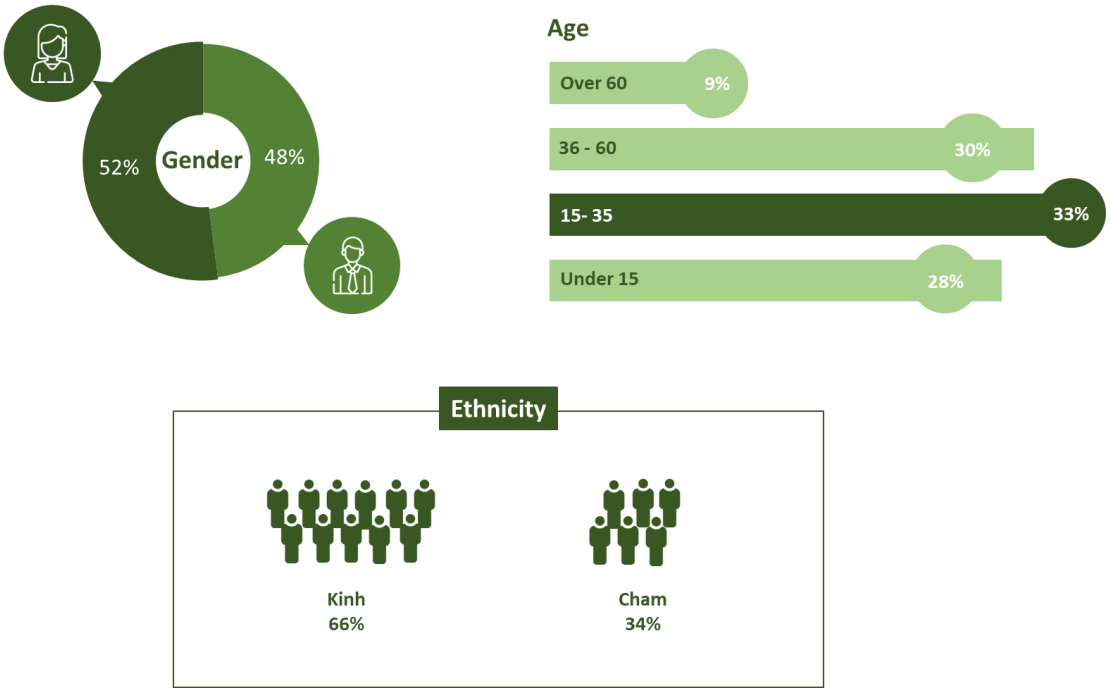


Figure 9.1 Summary of Demographic Information of the Surveyed Population

The survey was carried out based on a structured questionnaire which was tested to ensure the proper language use, local dialect and proper modification. The questionnaire was designed to collect the following data:

1. Population
2. Ethnicity

3. Religion
4. Vulnerability
5. Education
6. Livelihoods and employment
7. Income and expenditure
8. Land, housing and household assets
9. Health
10. Access to public services
11. Community relationship; and
12. Awareness and perception about the Project.

9.2.2.1.3 Focus Group Discussion

FGD was conducted with 05 groups including:

- Agriculture farmers (02 groups)
- Ethnic Minority Group (the Cham people)
- Women Group
- Vulnerable People Group

Vulnerable households include ones that comply at least with one of the following criteria:

- Poor/near poor with government certification
- Households having physical disability or mental disability
- Household with main labour being children (under 15 years old)
- Household with main labour being the elderly (55 for female and 60 for male)
- Headed households are illiteracy
- Elder people who are above age 60 living alone
- Single moms, women leading/heading households.
- Ethnic minority households.

The FGDs aim to obtain qualitative information about the socio-economic conditions, supported policies, livelihood activities and collect local demands related to their livelihood restoration. The FGDs will be gender-inclusive and ensure vulnerable households are included. Such discussions will be recorded, and these records will indicate the responsibility and timeline for implementing the decisions.

The 05 FGDs were conducted with 45 representatives dominated by female participants (36 women, accounting for 80.0% of FGD participants). The FGDs followed the standard guidelines, which were modified to reflect the local context. Some key demographic indicators of FGD attendants are presented in Table 9.5.

Table 9.5 Key Demographic Indicators of FGD Participants

Characteristics	Participants				
Total of participants	46				
Number of FGD	Farmers	Union	Vulnerable	Women	Ethnic minority (Cham)

Characteristics	Participants				
	2	0	1	1	1
Gender	Male			Female	
	9			36	
Age of participants	15-35 years old		36-60 years old	>60 years old	
	5		25	16	
Occupation	Farmers	Retired	Part-time job	Small Business	
	40	1	2	4	

9.2.2.2 Secondary Data

The socio-economic data collection is designed to cover the information from the national level to the regional and local levels. Data for the national, provincial, and district levels are mostly from secondary data sources and desk-based research, including Statistical Yearbook 2019 and Binh Thuan Province's socio-economic reports, districts, and communes. Secondary data are also obtained from the portal of Binh Thuan province and other social media channels.

9.2.3 Data Analysis

The data were analysed by mixed methods research, involving mixing and combining quantitative and qualitative analytical research techniques.

The quantitative analysis components were based on household surveys. All answered questionnaires were managed in an excel file after the data were refined. Then, the next stage mainly involved the use of descriptive statistics to compute reading comprehension. Besides, other quantitative data from secondary sources also employed to describe a fuller picture of the population's socio-economic status. On the other hand, the qualitative analysis components were based on FGDs and KIIs. Basically, the interview data were analysed based on systematic coding and further developed in a stage-wise collaborative process to test for the applicability, common understanding and adequacy of the code system. The coded segments are then grouped and synthesised up into the following main categories:

- Human capital
- Natural capital
- Financial capital
- Physical capital
- Social capital
- Vulnerability
- Gender profile
- Local perception about the Project
- Needs assessment for livelihood restoration

9.2.4 Data Limitations

The data used in this study came from 33 households, out of 39 affected households, who were identified and contactable during the survey. It is noted that at the time of the survey, the list of affected households was not confirmed as final version and thus eight households in the area of the 110kV transmission line were not found at the addresses provided in the list. The household profile will be

more comprehensive and auditable during the later stage if socio-economic information of all affected households can be captured.

Many households are not informed about the Project and land acquisition, which considerably influences the sample selection and leads to information insufficiency. The reason is that the interviews have to rely on the memory of interviewees, hence the collected information may not as accurate as expected. Furthermore, most of the interviewed people were not comfortable sharing personal information, especially sharing their income and daily expenses. As a result, it was difficult to estimate precisely for households having both cash and subsistence income.

The individuals in a household are different in their income and consumption habits. Some interviewees are the breadwinner; others are spouses and/or dependents. An unexpected problem called proxy reporting[11] arises, exemplified that working men do not always know their household's expenditure as accurately as their wives, who are not available at the house visit time to join the interview.

The undertaken study is structured around the project information as provided by the stakeholders such as local authorities, community representatives, any significant changes in the proposed activities may result in the variation of the outcome. Based on the available documents and community consultations, the environmental and social study is undertaken by ERM and the site survey observations.

Regarding data analysis, one of the problems we encountered in using excel as statistical analysis is that data organization differs according to analysis, forcing the data to be arranged in various ways to do different analyses.

9.3 National Overview

9.4 Demographic Information

The Socialist Republic of Vietnam is located on the Indochina peninsula in Southeast Asia. China borders it to the North, Laos and Cambodia to the west, the Gulf of Thailand to the southwest, and the East Sea to the East and South, and is composed of a mainland area of 331,230 km^2 and more than 4000 islands. It has a population of 96.2 million (2019), equivalent to an increase of 1.56% in comparison with 2018, of which the urban population was 33.12 million people (34.4%), and the rural population was 63.08 million people (65.6%). The male and female population was 47.88 million people and 48.32 million people, respectively, with the corresponding share of 49.77% and 50.23% (Vietnam Population and Housing Census, 2019; also see Table 9.6 and Figure 9.2).

[11] Proxy reporting, also called "indirect interview", one person (the proxy_ answers questions on behalf of another person (the sampled subject))

Table 9.6 Vietnam at a Glance

Viet Nam		
Full name	Socialist Republic of Viet Nam	
Capital	Ha Noi	
Largest city	Ho Chi Minh	
Area	331,230 km^2	
Official language	Vietnamese	
Population	96,208,984 people	
Ethnic groups	85.3% Kinh 14.7% Ethnic minorities	
Main religion	13.2 million people are religious (13.7%) Catholic: 5.9 million people, 44.6% of the total number of religious followers and 6.1% of the total population Buddhism: 4.6 million people, 35% of the total religious followers and 4.8% of the total population	
GDP	5,542.3 trillion VND (2018)	
GDP per capita	58.5 million VND (2018)	

Source: Vietnam General Statistic Office, 2018 and Vietnam Population and Housing Census, 2019[12]

[12]Tong dieu tra dan so va nha o nam 2019, retrieved on: 23 December 2019, at http://tongdieutradanso.vn/project-of-the-census.html

Source: Vietnam Population and Housing Census, 2019

Figure 9.2 Major Indicators of Vietnam Demography

Vietnam has a total of 54 ethnic groups. The Kinh ethnic group makes up the largest proportion with approximately 85.3% of the population, and mainly lives in the deltas and major cities while the other 53 ethnic minority groups, especially those with small populations, are scattered across mountainous

and remotely rural areas. Vietnamese is the official language and is spoken by around 90% of the population. Minority groups are distinguished by distinct languages including Tay, Hmong, Thai, and Khmer in the more remote rural areas. Some ethnic minority groups such as Tay, Thai, Nung, Hmong, Muong, Cham, Khmer, Kohor, Ede, Bahnar, and Jarai have their own writing systems (DFAT, 2017). Despite rapid economic growth in recent decades, ethnic minority communities living in mountainous and highland areas have been trapped in poverty. According to the World Bank (2013), ethnic minorities account for 14% of the total population but they also account for up to 50% of the total poor population.

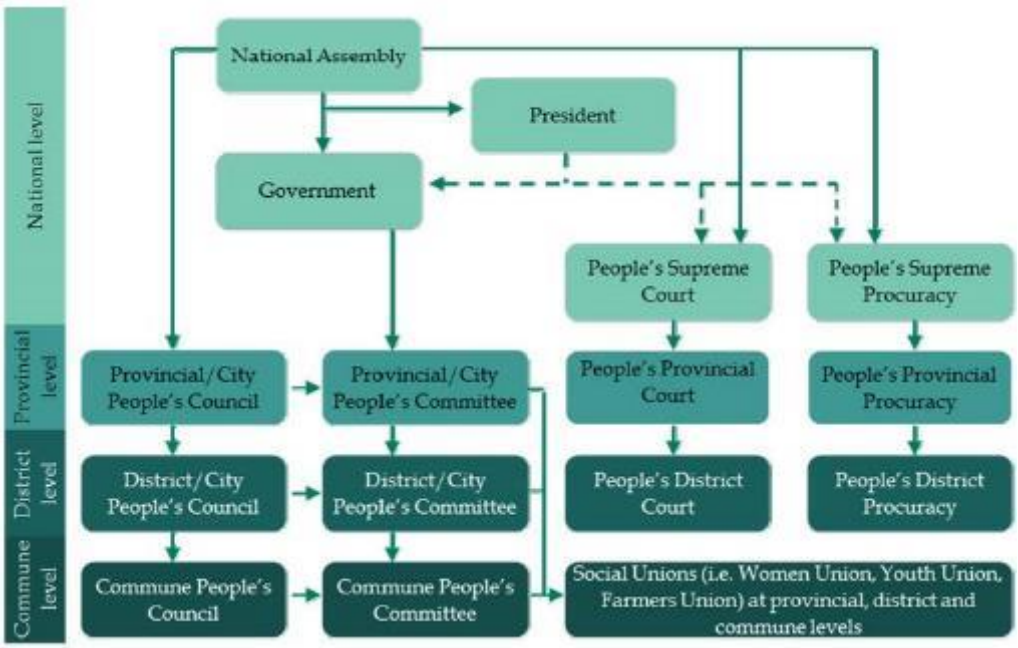
Labour force aged 15 years and above in 2019 was 55.8 million persons with an increase of 417.1 thousand persons year-on-year. The employed labour force aged 15 years and above in 2019 was 54.7 million persons, including 19 million people working in the sector of agriculture, forestry and fishery, accounting for 34.7% of the total; 16.1 million people working in the industry and construction sector, making up 29.4%; and 19.6 million ones working in the service sector, representing 35.9%. In 2019, the unemployment rate was 1.98%, of which the unemployment rate in urban was 2.93%; and in the rural area was 1.51% (Vietnam General Statistic Office, 2019).

The average monthly income per capita in 2019 at current prices was about 4.2 million VND, higher than the income of 3.9 million VND in 2018. In 2019, the whole country recorded 68.5 thousand households suffering from food shortage, a decrease of 34.7% from the previous year, corresponding to 278 thousand persons suffering from this problem, a decline of 33.8%.

The human development index (HDI) of Vietnam is 0.693 and ranked 118 out of 189 countries in the latest United Nations Human Development Report 2019 (UNDP, 2019).

9.5 Institutional Context

The state system of governance of Vietnam has four levels: national, provincial, district and commune as illustrated in Figure 9.3.



Source: Own presentation by ERM

Figure 9.3 The State System of Vietnam

At the national level, the State of Vietnam consists of the National Assembly, the President, the Government, the People's Supreme Court and the People's Supreme Procuracy.

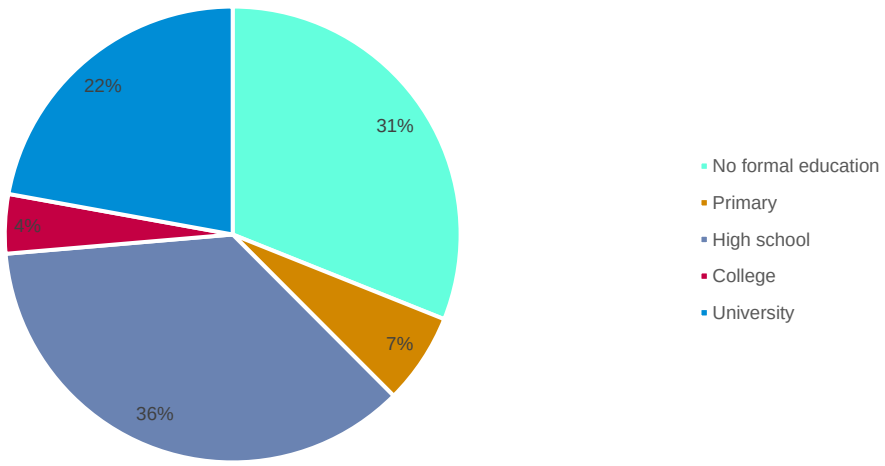
- The National Assembly is the supreme organ of state and the only body with constitutional and legislative power to draw up, adopt, and amend the constitution and to make and amend laws, to

legislate and implement state plans and budgets, and to initiate or conclude wars, and to assume other duties and powers it deems necessary.

- The President represents Vietnam both domestically and internationally and maintains the regular and coordinated operation and stability of the national Government and safeguards the independence and territorial integrity of the country.
- The Government is the executive organ of the National Assembly, the highest body of state administration of the Socialist Republic of Vietnam. It carries out overall management of work for the fulfilment of the political, economic, cultural, social, national defence, security and external duties of the State.
- The Supreme People's Court supervises the judicial work of both the local People's Courts, which are responsible to their corresponding People's Councils, and the Military Tribunals. The People's Courts function at all levels of Government except the commune, where the commune administrative committee functions as a primary court.
- The Supreme People's Procuracy, with its local and military subdivisions, acts as a watchdog for the state. It monitors the performance of government agencies, maintains vast powers of surveillance, and acts as a prosecutor before the People's Courts.

The organization of institutional governance from provincial/city level to commune-level consists of:

- The People's Council at provincial, district and commune levels: a body of state power at the local level, representing the rights of the people and is elected by local people; and
- The People's Committee at provincial, district and commune levels: the executive body of the People's Councils and State administrative agencies at the local level. The People's Committee at the provincial/city and district level includes departments for different fields such as agriculture and rural development, natural resources and environment, transport, etc. The number of staff may vary from commune to commune depending on the size and area of the commune. Vietnam currently has 11,162 commune-level administration units, including 1,567 wards, 597 towns and 9,064 communes[13]. The capacity of Vietnamese rural commune's human resources is required to be strengthened to meet the higher demand for the national development cause. Among 145,112 permanent staff of the commune level, 31% are reported to have no formal education (see Figure 9.4).



Source: Data from Mai Duc Ngoc, 2015

Figure 9.4 Formal Education Attainment of Commune-level Permanent Staff in Vietnam

[13] Mai, Duc Ngoc. 2015. Can bo lanh dao chu chot cap xa o nong thon Viet Nam hien nay (Key Communal Human Resources in Contemporary Rural Vietnam). *Khoa hoc Xa hoi Viet Nam* 12(2015): 19-27.

While it is not recognised within the State's local administration system, village-level institutions as the basic unit of Vietnamese society and their interactions with the State are crucial to understanding Vietnamese socio-political characteristics and citizens' behaviours[14]. During the current New Rural Development Program, village leadership and participation are becoming more critical to participatory village development planning and implementation of grassroots democracy, and community development.

The village structure basically includes the Village Party Branch, led by the village party branch secretary (Bí thư Chi bộ thôn), Village People's Board (Ban Nhân dân thôn), led by the village head (Trưởng thôn) and Committee of Actions of the Fatherland Front's at the village (Ban Công tác Mặt trận thôn). Each village has its mass organisations including Women's Union, Farmer's Association, Veteran's Association, Youth Union and Elderly Association, and other social organisations such as the Red Cross Union and the Study Promotion Association. Each village has 5-12 solidarity groups in residential areas that are headed by local villagers. In line with the Government's Decree No. 34/2019/CP dated 24 April 2019, no more than three persons in a non-specialized activity in a village or street population group are entitled to a monthly allowance from the state budget, and only for the following titles: Village Party Branch Secretary; Village head; and Head of the Committee of Actions of the Front's work. In common practice, some village heads take on multiple titles, for example the Village Party Branch Secretary, Deputy Party Branch Secretary, Village Militia Chief (thôn đội trưởng), or public officer.

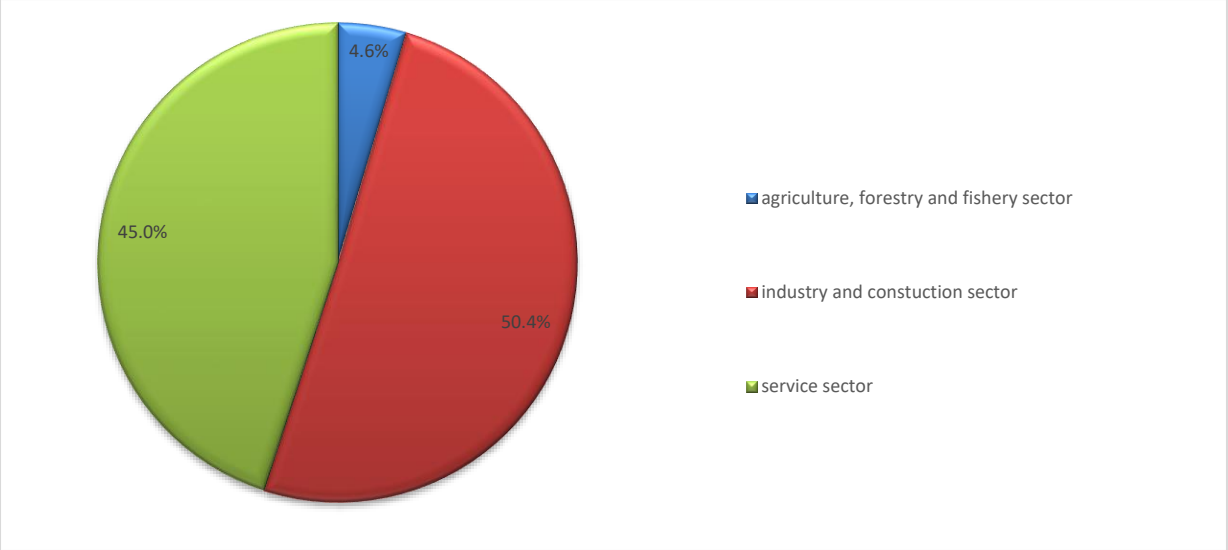
9.6 Economy and Industry

Vietnam is described as 'a development success story' with a dramatic transformation from one of the poorest countries in the world at the time of economic reforms in the 80s (known as Doi Moi or Renovation reforms), to 'low middle-income status' over a period of 25 years (DFAT, 2017).

Gross domestic product (GDP) in 2019 increased by 7.02% over 2019. Of which, the agriculture, forestry and fishery sector increased by 2.01%, contributing 4.6% to the general increase; industry and construction increased by 8.90%, contributed 50.4%; service sector increased by 7.3%, contributing 45%. Regarding the economic structure in 2019, the agriculture, forestry and fishery accounted for 13.96% of GDP; the industry and construction accounted for 34.49%; the service sector accounted for 41.64% and product tax minus product subsidies accounted for 9.91%. The corresponding structure of 2018 is 14.68%; 34.23%; 41.12%; and 9.97%.

According to the General Statistics Office of Vietnam (2018), GDP per capita was estimated to be 58.5 million VND, equivalent to 2,590 USD – 201 USD higher than in 2017. It is noted that GDP and GDP per capita of Vietnam in 2019 has not been officially released at the time of reporting.

[14] Nguyen, The Anh. 2003. Village versus State: The Evolution of State-Local Relations in Vietnam until 1945. *Southeast Asian Studies* 41(1): 101-123.

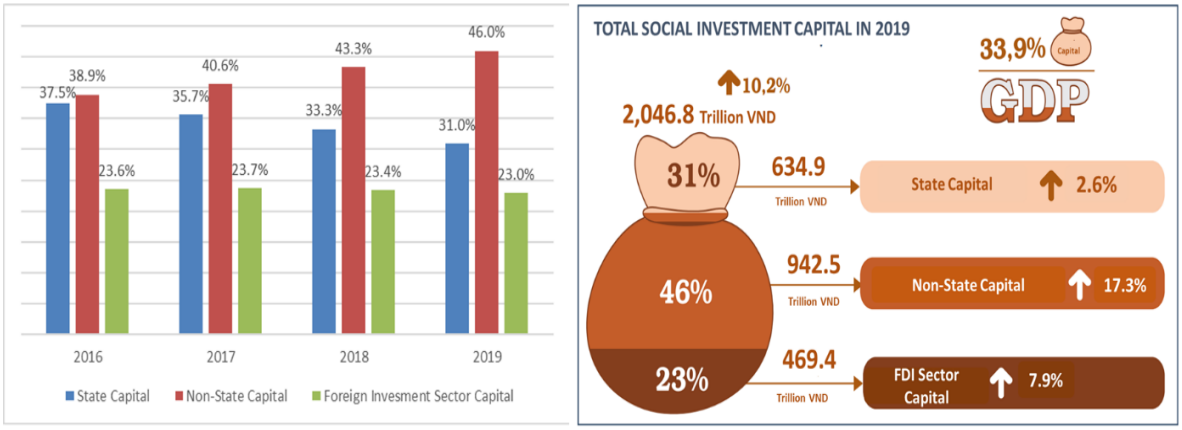


Source: Vietnam General Statistics Office 2019

Figure 9.5 GDP Contribution by Sector

By types of ownership, throughout 2016-2019, the non-state economy's GDP always accounted for the highest proportion, and the foreign investment sector was the lowest one. In 2019, social investment capital at current prices reached 2,046.8 trillion VND, rising 10.2% over the previous year and equal to 33.9% of GDP (see Figure 9.6). These include:

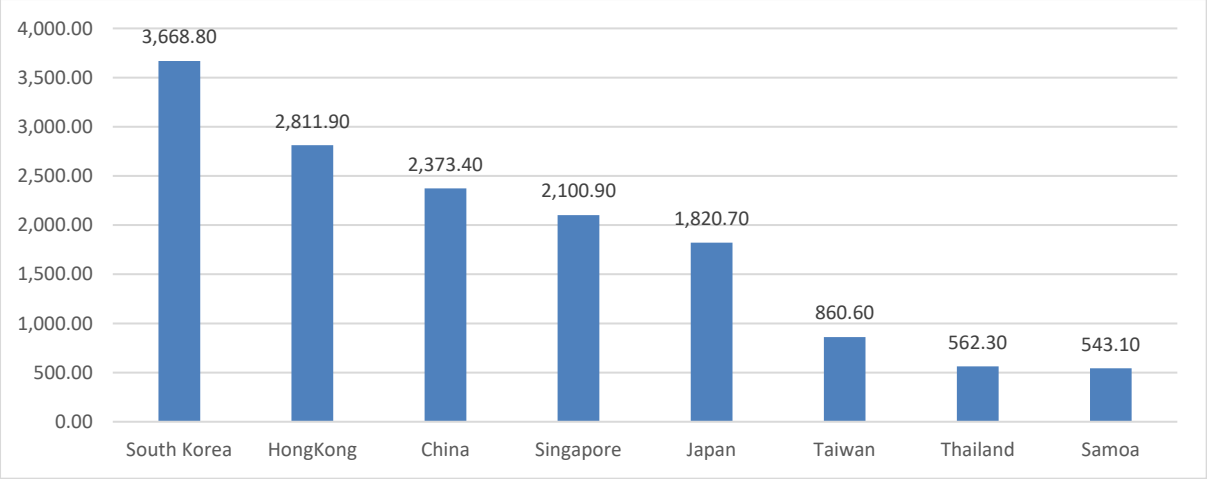
- state-owned capital reached 634.9 trillion VND, accounting for 31% of the total capital and increasing 2.3% compared to the previous year;
- non-state sector reached 942.5 trillion VND, accounting for 46% and rising by 2.7%;
- FDI sector reached VND 469.4 trillion, accounting for 23% and decreasing by 0.4%



Source: Vietnam General Statistics Office, 2019

Figure 9.6 The Structure of Social Investment Capital during 2016-2019 and Details in 2019 (at Current Prices) (%)

In 2019, 81 countries and territories had new licensed direct investment projects in Vietnam. Of which, South Korea is the largest investor with 3,668.8 million USD, accounting for 21.9% of the total registered capital. Followed by Hong Kong Special Administrative Region (China), China, Singapore, Japan, Taiwan, Thailand and Samoa in the top eight investors. Details of investment capital are shown in Figure 9.7.



Source: Vietnam General Statistics Office 2019

Figure 9.7 Top Eight Investor into Vietnam Market in 2019 (USD)

Export turnover was 263.45 billion USD, increased 8.1% compared to 2018, of which the domestic economic sector reached 82.10 billion USD, accounting for 31.2%. % of the total exports; the FDI sector (including crude oil) reached 181.35 billion USD (68.8%) added 4.2% to the total exports year on year.

Import turnover was at 253.51 billion USD, surged 7% compared to 2018. Of which, the domestic economic sector reached 108.01 billion USD and the foreign-invested sector made 145.50 billion USD. These sectors both increased by 13.8% and 2.5% respectively.

9.7 Overview of Binh thuan Province

Binh Thuan Province is a coastal province of South Central Vietnam. However, it is sometimes seen as part of the Southeast region. To the north, it borders on Lam Dong Province, to the Northeast, it borders on Ninh Thuan province, to the west, on Dong Nai provinces, and to the Southwest, on Ba Ria- Vung Tau Province. Much of the borders with Lam Dong and Ninh Thuan are mountainous, while much of the rest of the province is relatively flat. However, there are several hills with a height of at least 200m along the province's coast. The Binh Thuan coast is 192km long, with several small islands off the coast of it.

Binh Thuan covers an area of 7,992 km^2, including the mainland and islands. It is located along Vietnam's main north-south transport corridors. National Route 1A runs through the province, connecting 6 out of the province's ten districts to the rest of the country. Binh Thuan's central railway station along the North-South Railway is Muong Man Railway Station, located around 10 km northwest of Phan Thiet. Four smaller railway stations are in Phan Thiet and the eastern part of the province. The province is connected to the Central Highlands by two national roads. It does not have an airport; the nearest commercial airport is located near Da Lat.

Regarding administrative divisions, Binh Thuan is subdivided into ten district-level sub-divisions with eight districts, including Bac Binh, Duc Linh, Ham Thuan Bac, Ham Thuan Nam, Ham Tan, Phu Quy, Tanh Linh, Tuy Phong, a district-level town (La Gi) and one provincial city (Phan Thiet). There are further subdivided into 12 commune-level towns (or townlets), 96 communes, and 19 wards. In this report, the survey was conducted at Phu Lac, Phong Phu commune and Lien Huong town of Tuy Phong district.

Binh Thuan is located in the subequatorial monsoon tropical climate, with an abundance of sun and wind. It is the province with no winter and one of the driest places in the country. The climate here is divided into two distinct seasons, rainy season and dry season. The rainy season usually starts from May to October, dry season from November to April next year. However, in reality, the rainy season only focuses on August, September and October, so the actual dry season usually lasts longer. The average annual rainfall is 1,024 mm, with the relative humidity is 79%. The total sunny hours are 2,459 per year. Also, Binh Thuan province is rarely affected by big storms or prolonged storms compared to

other central coastal provinces. It has reserves of arsenic in the Northwestern mountains and titanium along its western coast.

Much of what is known about Binh Thuan Province is that it was part of the Cham principality of Panduranga, which had its political centre in neighbouring Ninh Thuan Province. It was the last independent principality after the fall of Vijaya in 1471. Binh Thuan was later incorporated into Vietnam, while Ninh Thuan remained independent longer, until 1832. Before 1976, Binh Thuan Province was much smaller because much of the west was in the separate Binh Tuy Province. Binh Tuy, Binh Thuan and Ninh Thuan were merged in 1976 to form Thuan Hai Province. It was divided again into Ninh Thuan and Binh Thuan in 1991, while Binh Tuy remained part of Binh Thuan Province.

Table 9.7 Binh Thuan Province Overview

Binh Thuan Province	
Number of cities:	1
Number of districts	10
Area	7,992 km^2
Population	1,232,267
Poverty proportion	1.92%
Ethnic groups	Kinh, Cham, Tay, Coho, Hoa, Raglai, Choro
Main religions	Catholicism, Buddhism, Islam, Caodaism, Protestantism
GRDP 2019	75,954.9 billion VND
GRDP per capita 2019	61,600,000VND
Average income per capita 2019	43 million VND/person

Source: Vietnam General Statistic Office, 2018 and Vietnam Population and Housing Census, 2019 , Satellite image from Google Map, 2020

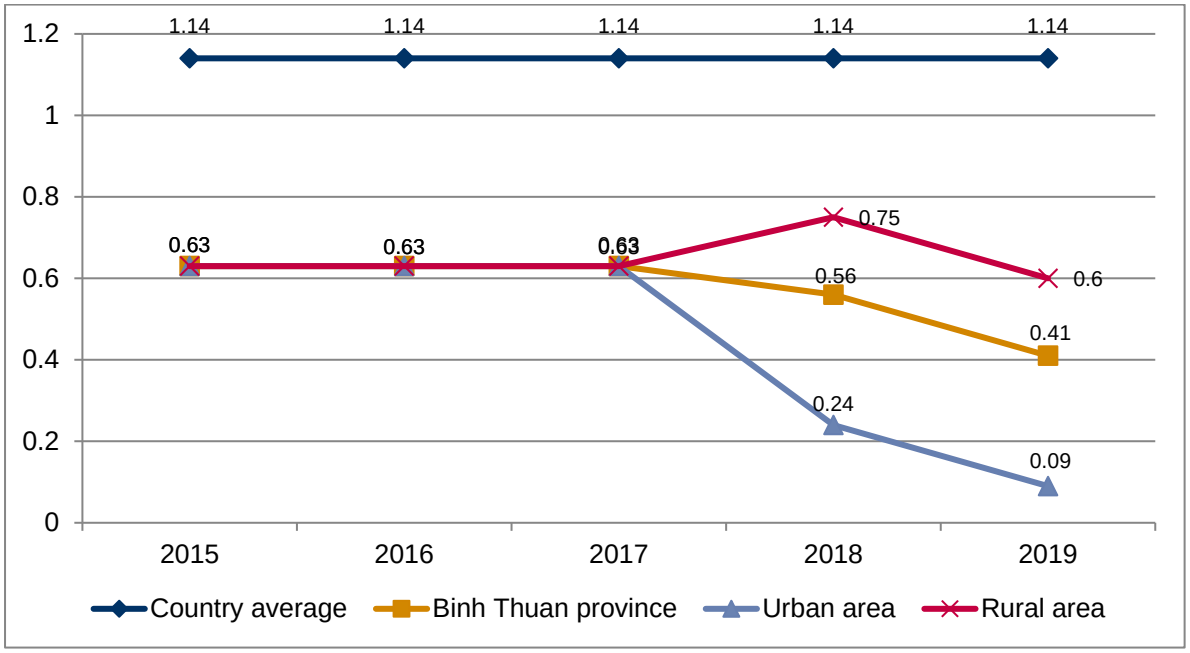
9.7.1 Demographic Information

9.7.2 Population

The estimated figure of the national average population of Binh Thuan was 1,232,267 persons in 2019, an increase of 4,998 persons, and equivalent to an increase of 0.41% compared to that in 2018. The population in urban areas continuously showed an upward trend, while the population in rural areas experienced the opposite direction. The population structure by gender remained almost unchanged, with the lower female population than male. In 2019, the urban population was 469,276 persons, accounting for 38.0%; the rural population was 762,991 persons, making up 62.0%; the male and female population was 619,167 persons and 613,100 persons, respectively, with the corresponding shares of 50.2% and 49.8%.

Source: Binh Thuan Statistical Yearbook 2019.

Figure 9.8 Population in Binh Thuan Province by Gender and Living Area



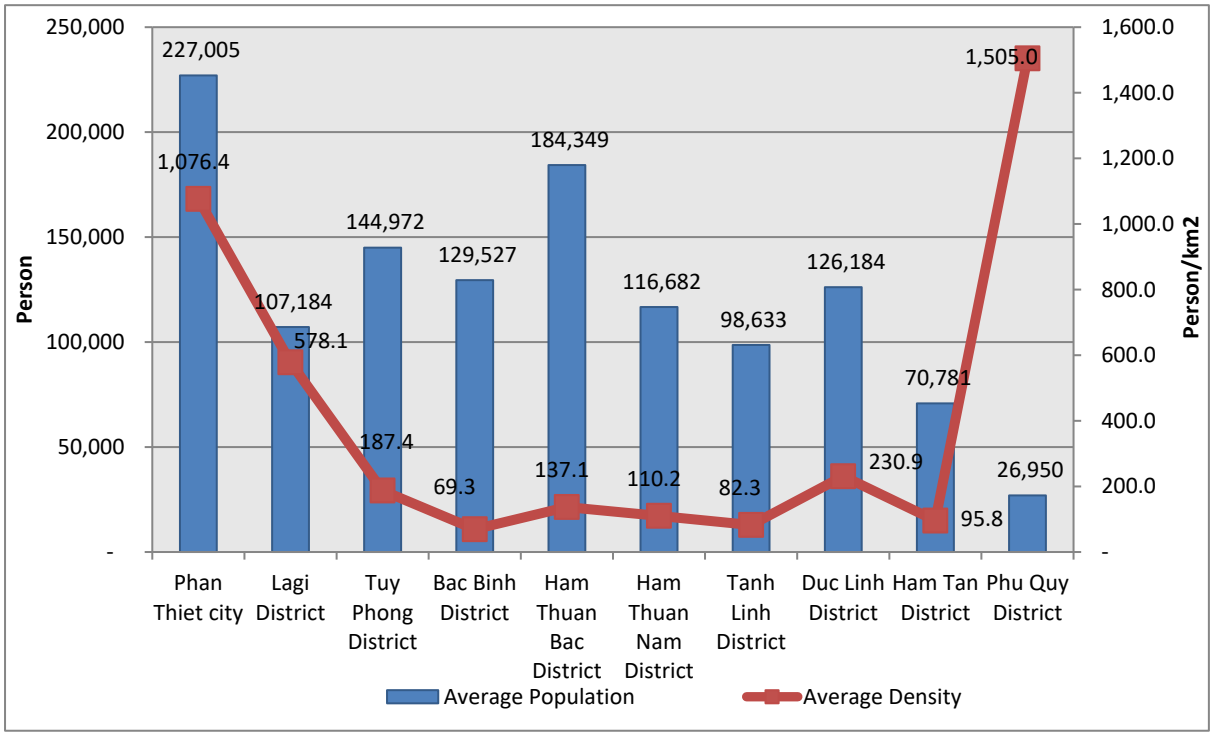
Source: Binh Thuan Statistical Yearbook 2019

Figure 9.9 Population Growth Rate of Binh Thuan Province and Country Average over 2015 – 2019.

The trend lines in Figure 9.9 describes the population growth rate of Binh Thuan province and the country on average. In general, Binh Thuan maintained a stable population trend from 2015 to 2017, but a mixture of the trend was observed in three categories in the following years. More specifically, the province's growth rate of the two areas from 2015 to 2017 was stable at 0.63%, just as half as the country average with 1.14%. However, the year 2017 marked a significant time when the three categories' trends in population growth differed. There was a slight decline in the province rate from 2017 to 2018, from 0.63% to 0.56%, continuing with a more noticeable decrease to 0.41% in 2019. However, there was an opposite trend in the urban and rural areas. While the rate in urban areas

reduced dramatically from 2017 to 2019, at 0.24% and 0.09%, respectively, rural areas experienced a moderate increase in 2018 with 0.75%, and then dropped to 0.6% in 2019.

The population of Binh Thuan is unevenly distributed among the cities and districts. The population is most concentrated in Phan Thiet city, accounting for 18.4% of the whole population. Phu Quy has a small population size (26,950) but owns the highest population density (1,505 people/ km²) due to its small area. Ham Thuan Bac, Tuy Phong and Duc Linh districts also have high population densities (approximately 200 people/km²), while other districts have no considerable difference in population density and are close to the average level of the whole province (about 155 people/km²). Details are visualized in Figure 9.10.

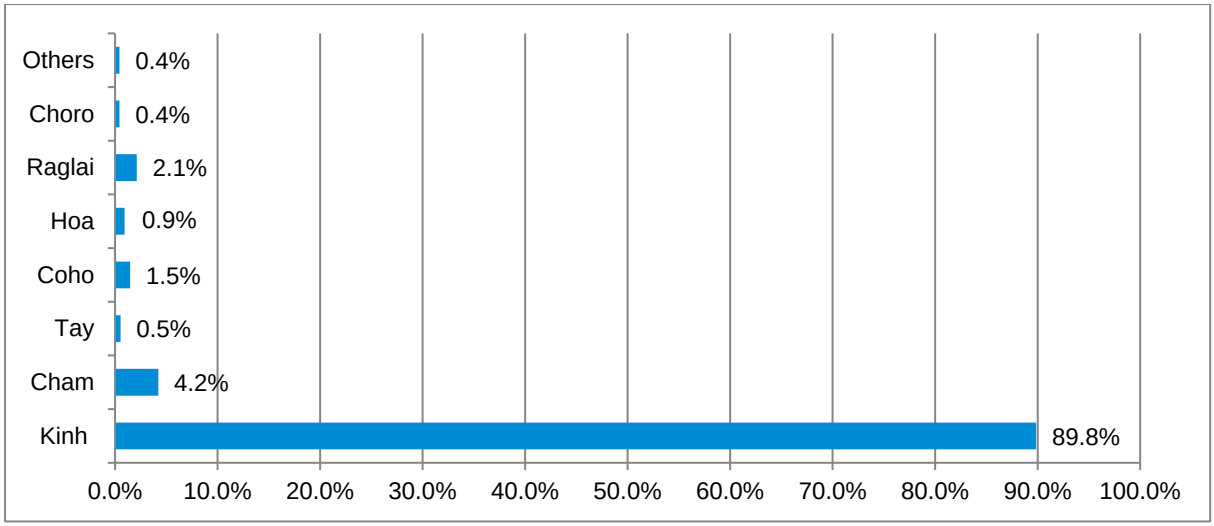


Source: Binh Thuan Statistical Yearbook 2019

Figure 9.10 Population and Density of City and Districts of Binh Thuan Province in 2019

9.7.3 Ethnicity and Languages

Thirty-four ethnic minorities live in Binh Thuan, comprising Kinh (89.9%), the dominant ethnic group in the province; the others account for 10.1% (101,733 people). The second crowded ethnic group after Kinh is Cham, which accounts for 4.2% (34,226 people). The others (Thai, Muong, Khmer, Nung, Gia Rai, Hre and Ngai) have small percentages, as detailed in Figure 9.11.



Source: Binh Thuan Statistical Yearbook, 2016.

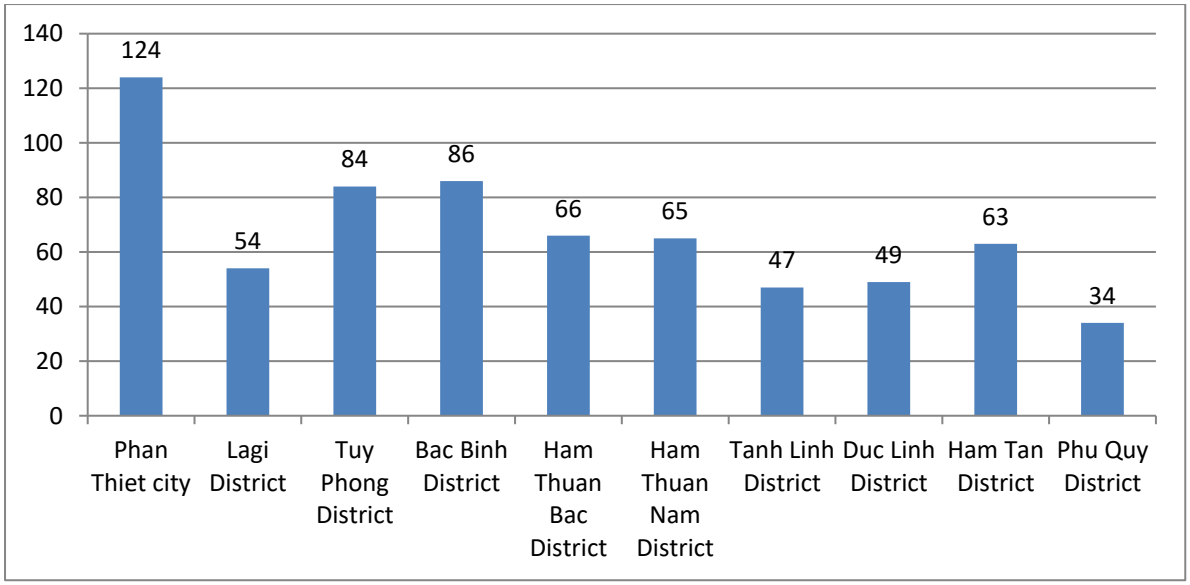
Figure 9.11 Structure of Ethnic Groups in Binh Thuan Province

As the ethnic minorities and the Kinh groups live together in Binh Thuan, the official language in Binh Thuan is the Vietnamese language and is not an issue for ethnic minority people. Most ethnic minority people use the Vietnamese language to communicate with people from other groups while still using their languages to communicate with each other in their communities. While Raglai and K'ho do not have their scripts, Cham and Ede both have their own writing. The Ede in Binh Thuan have to use the Vietnamese handwriting script as they do not know their writing, while Cham people do. Cham people in many places like Tuy Phong district still maintain the use of their language[15].

9.7.4 Religions

Over the past years, along with Binh Thuan province's development, the religious people's material and spiritual life have gradually improved. The religious activities of believers follow the doctrine of the religions, taking place smoothly, religious festivals tend to be organized on a larger scale but still ensuring safety. Currently, the province's beliefs are quite diverse and plentiful, such as worshiping ancestors, worshiping Thanh Hoang village and pre-gentle models, and worshiping Ca Voi (Nam Hai) worshiping Hung Vuong, worshiping Mother, and other gods. According to Binh Thuan Statistical Office 2019, as of April 1, 2019, the whole province has 12 different religions reaching 386,223 believers. The most is Catholics with 188,996 people, followed by Buddhism with 130,016 people, Islam with 29,550 people, Brahman has 25,110 people, Protestantism has 9,956, Cao Dai religion has 2,403 people. Six hundred seventy-two religious institutions belong to different religions and beliefs in the province, of which Phan Thiet city has the highest establishments with 124 sites, followed by Bac Binh and Tuy Phong District with 86 and 84 religious institutions, respectively. Details can be seen in Figure 9.12.

[15] National Assembly of the Socialist Republic of Vietnam, online news, retrieved on 30 December 2020 at, http://quochoi.vn/UserControls/Publishing/News/BinhLuan/pFormPrint.aspx?UrlListProcess=%2fcontent%2ftintuc%2fLists%2fNews&ItemID=50247



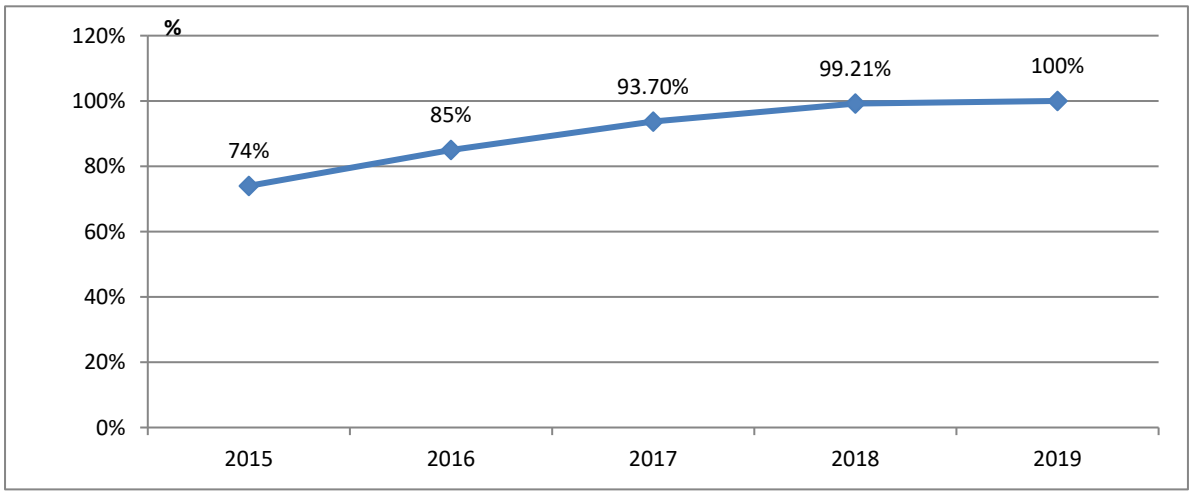
Source: Binh Thuan Statistical Yearbook 2017

Figure 9.12 Number of Religious Institutions by District in Binh Thuan, 2017

9.7.5 Healthcare Facilities and Programs

9.7.5.1 Healthcare Facilities

Regarding healthcare facilities, Binh Thuan province has 100% of communes/wards meeting national health standards in 2019. The statuses went up throughout the year from 2015 to 2019, as reported and shown in Figure 9.13.

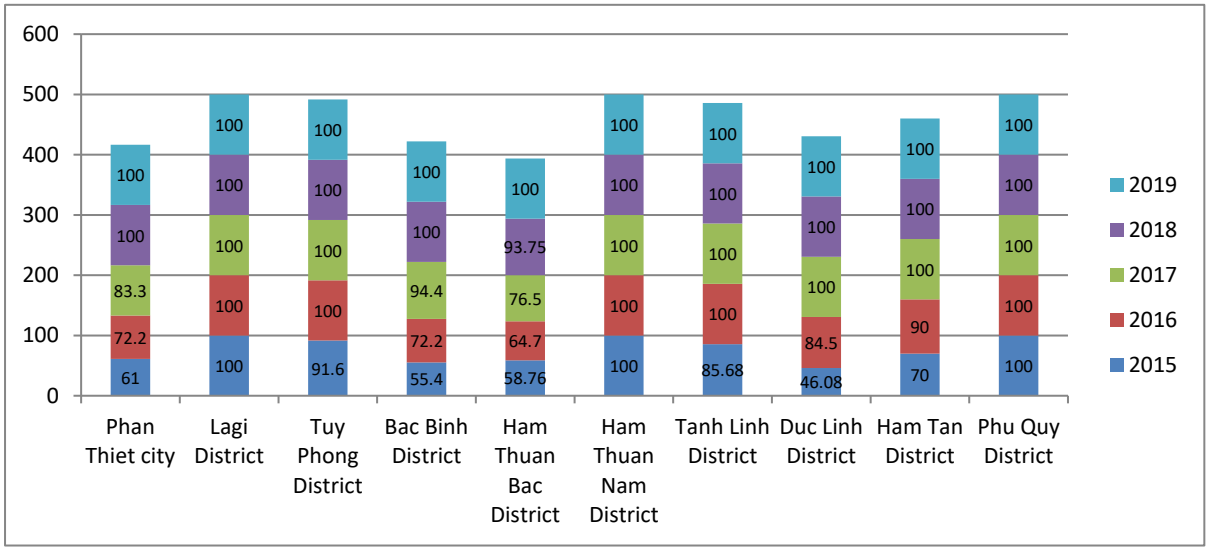


Source: Binh Thuan Statistical Yearbook 2019

Figure 9.13 Rate of Communes/ Wards Clinic Meeting the National Health Standards of Binh Thuan Province, 2015 – 2019

Among the cities and districts of Binh Thuan province, in 2019, all the wards/communes were qualified for the national standards on commune-level health care. Decree 4595/KH-UBND was dated in 2018

to further improve grassroots healthcare systems' quality and efficiency[16]. As a result, it could be seen that Bac Binh and Duc Linh districts had approximately 50% of commune-level health facilities met the national standards in the period of 2015 - 2016; then dramatically successful reaching 100% of qualified communes in 2019. The detailed rate of each city/district is displayed in Figure 9.14. The standards included ten sets of criteria regulated by the Ministry of Health in Decision No. 4667/2014/QĐ-BYT on promulgating national standards on commune's health care workers to 2020. The structure of the standards is summarized in Table 9.8.



Source: Binh Thuan Statistical Yearbook 2019

Figure 9.14 Rate of Communes/ Wards Meeting National Health Standards of Binh Thuan Province by City/District, 2019 (%)

In order to be qualified, a medical service unit in the commune must have at least 80 points, and the points for sub-criteria must be above 50% of the maximum points for that sub-criterion.

Table 9.8 National Standards on Healthcare in Communes, 2011 - 2020, Regulated in Decision No. 4667/2014/QĐ-BYT of Ministry of Health

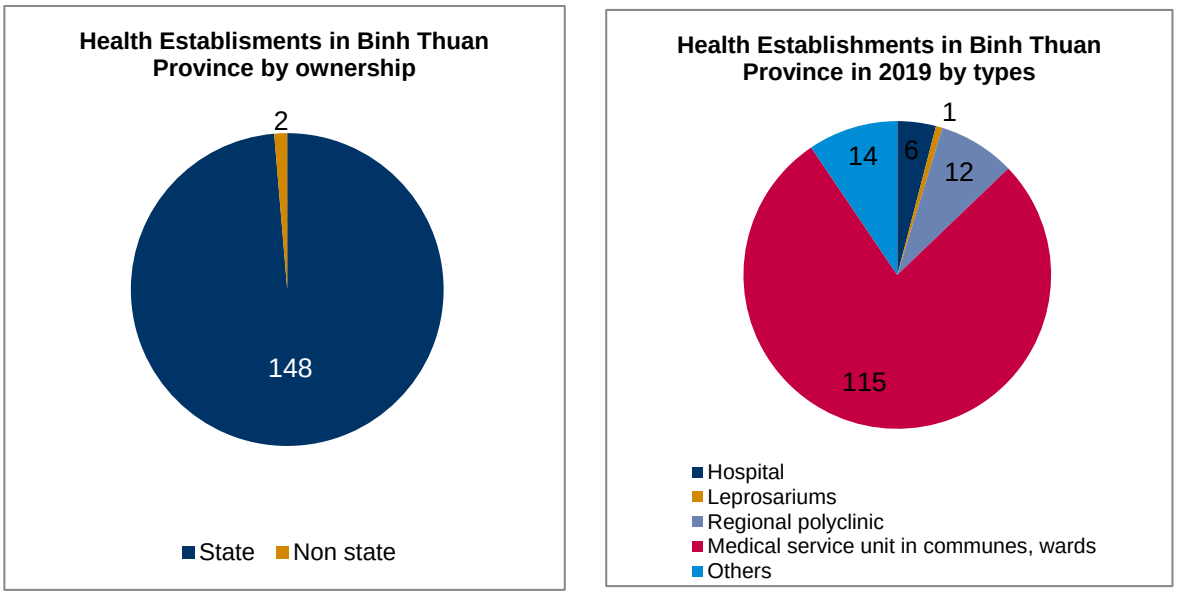
No.	Criteria sets	Number of sub-criteria	Points
1	Directing and operating health care work	2	3
2	Health staff	4	10
3	Health facilities	6	11
4	Equipment, drugs, and other means	6	9
5	Planning - Finance	4	10
6	Preventive medicine, HIV/AIDS prevention and Food safety	6	17
7	Examination, treatment, rehabilitation, and traditional medicine	5	14
8	Maternal - children health care	7	13

[16] Thu vien phap luat, 2018, retrieved on 30 December 2020, at https://thuvienphapluat.vn/van-ban/the-thao-y-te/Ke-hoach-4595-KH-UBND-2018-phat-trien-mang-luoi-y-te-co-so-Binh-Thuan-2018-2025-408201.aspx.

No.	Criteria sets	Number of sub-criteria	Points
9	Population - Family planning	4	9
10	Education & communication on health care	2	4
Total		**46**	**100**

Source: Ministry of Health, 2014.

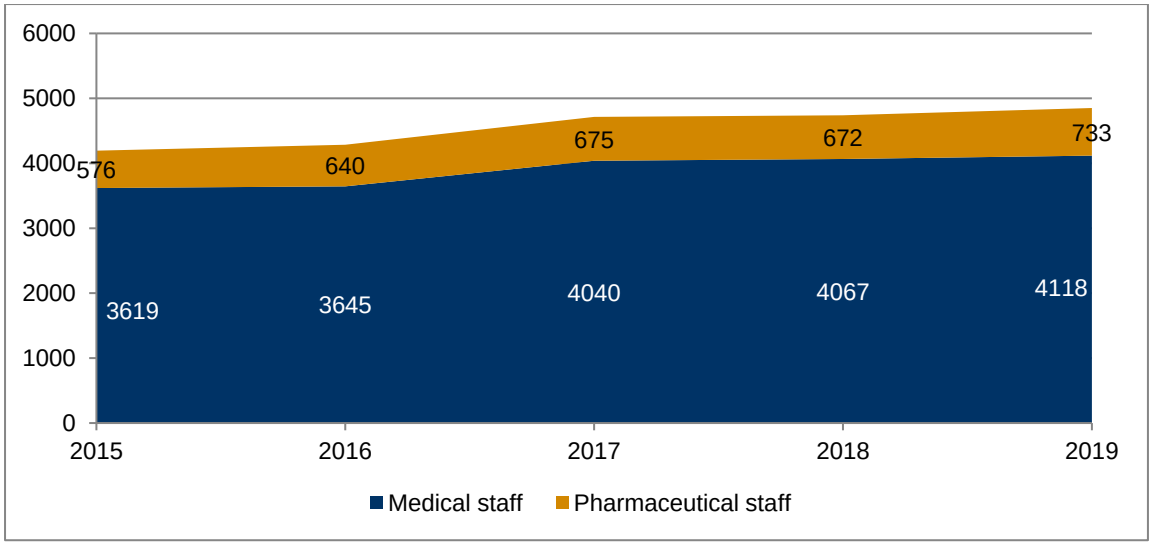
By the end of 2019, 150 health establishments in Binh Thuan province were total, and most of them (115 establishments) are medical service units in wards and communes. There are six hospitals and two other private health establishments. Figure 9.15 shows a brief profile of health establishments in Binh Thuan province in 2019 by types and ownership.



Source: Binh Thuan Statistical Yearbook 2019.

Figure 9.15 Health Establishments by Types and Ownership in Binh Thuan Province, 2019

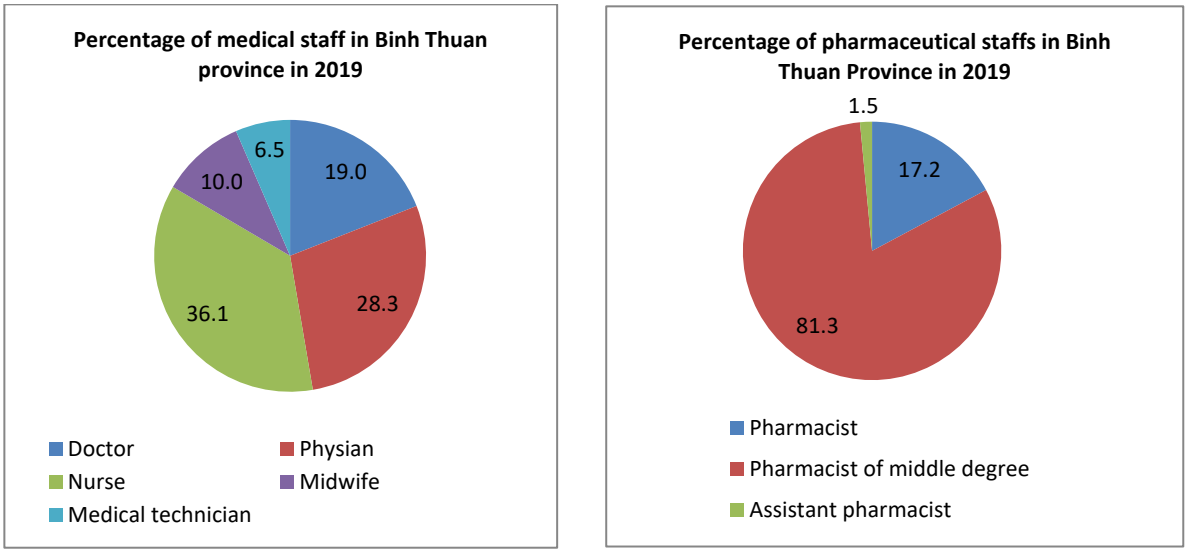
During the period from 2015 – 2019, the number of health staff in Binh Thuan province was increasing. It is observed that the growth rate of medical staff is the same as the growth rate of pharmaceutical staff. The trends of changes are displayed in Figure 9.16.



Source: Binh Thuan Statistical Yearbook 2019

Figure 9.16 Changes of Health Staff Numbers in Binh Thuan Province, 2015 – 2019

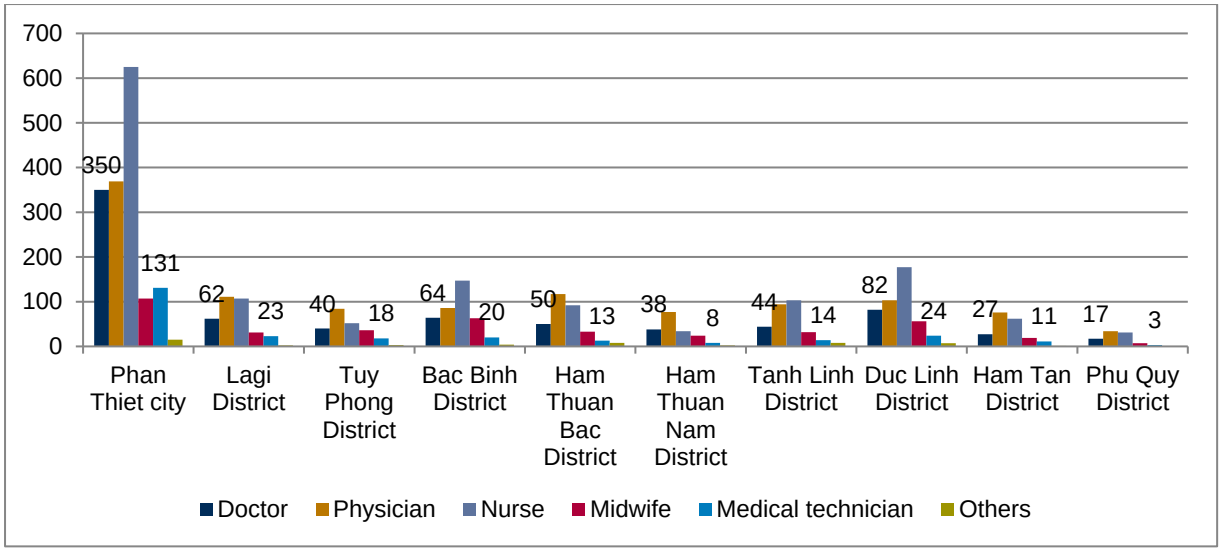
To be more specific, in 2019, doctors and physicians of all the medical staff accounted for 47.3% in Binh Thuan province. Nurses accounted for 36.1%, midwives accounted for 10.0%, and the remaining is the medical technician, 6.5%. Regarding the pharmaceutical staff, the proportion of pharmacists and the assistant pharmacist is 18.7%, while 81.3% of staff are middle degree pharmacists. The structure of the medical staff and pharmaceutical staff are visualized in Figure 9.17.



Source: Binh Thuan Statistical Yearbook 2019

Figure 9.17 Structure of Medical Staff and Pharmaceutical Staff in Binh Thuan Province, 2019

In Binh Thuan province, as of 2019, the ratio of patient beds over 10,000 inhabitants was 29, which is reported to increase by 0.7 beds than that of 2018. There are 7.3 doctors per 10,000 inhabitants, which is lower than the health staff ratio per 10,000 people in the country (8 doctors/10,000). This rate indicates that the healthcare workforce in Binh Thuan province still needs to be enlarged to bring better health service for the habitants; especially, in the mountainous and remote areas have severe shortages of healthcare workers, which merely have 17 doctors in Phu Quy and 27 doctors in Ham Tan province. Figure 9.18 details the number of medical staff by districts in Binh Thuan province.



Source: Binh Thuan Statistical Yearbook 2019

Figure 9.18 Number of Medical Staff by District in Binh Thuan Province, 2019

9.7.5.2 Healthcare Programs

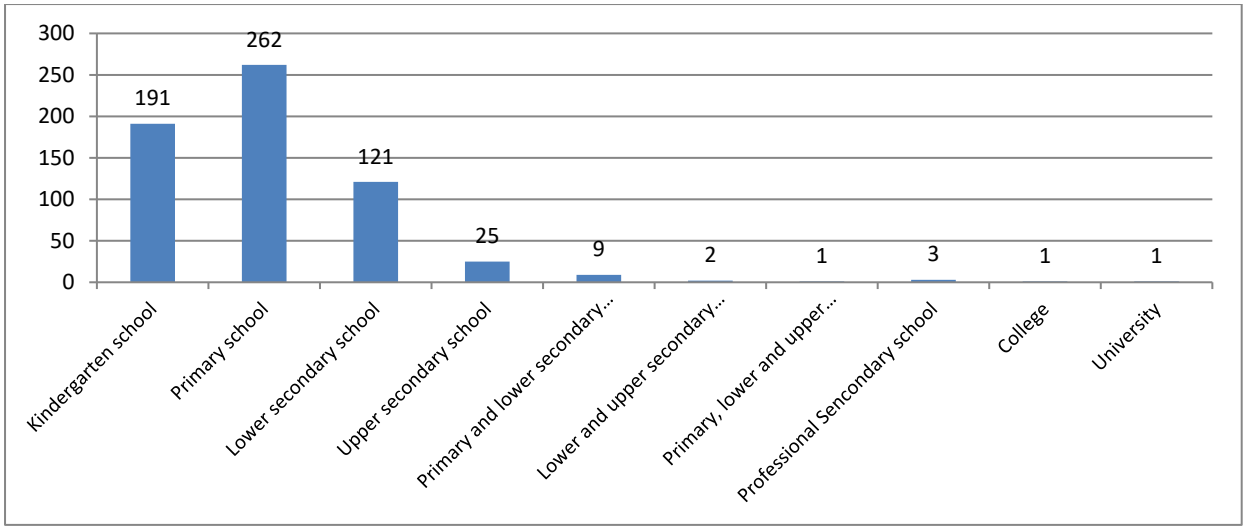
The health care for mothers and children has always been paid attention by organizing the "Micronutrient Day", "Nutrition and Development Week", disseminating media messages those campaigns and implemented Vitamin A supplementation activities for children from 06 to 36 months old, as well as deworming for children from 24 to 60 months of age. The rate of weight malnutrition/age among children under five years old in the province was 7.5, reduced 6.6 percentage points; the height malnutrition rate among children under five years old was 12.8%, reduced 14.3 percentage points (compared to 9.8% in 2018). The rate of people joining Health Insurance in Binh Thuan province in 2019 is 83.6%, with 976,054 people.

9.7.6 Education

Education in Vietnam follows the National Education System Framework, which has four main education levels:

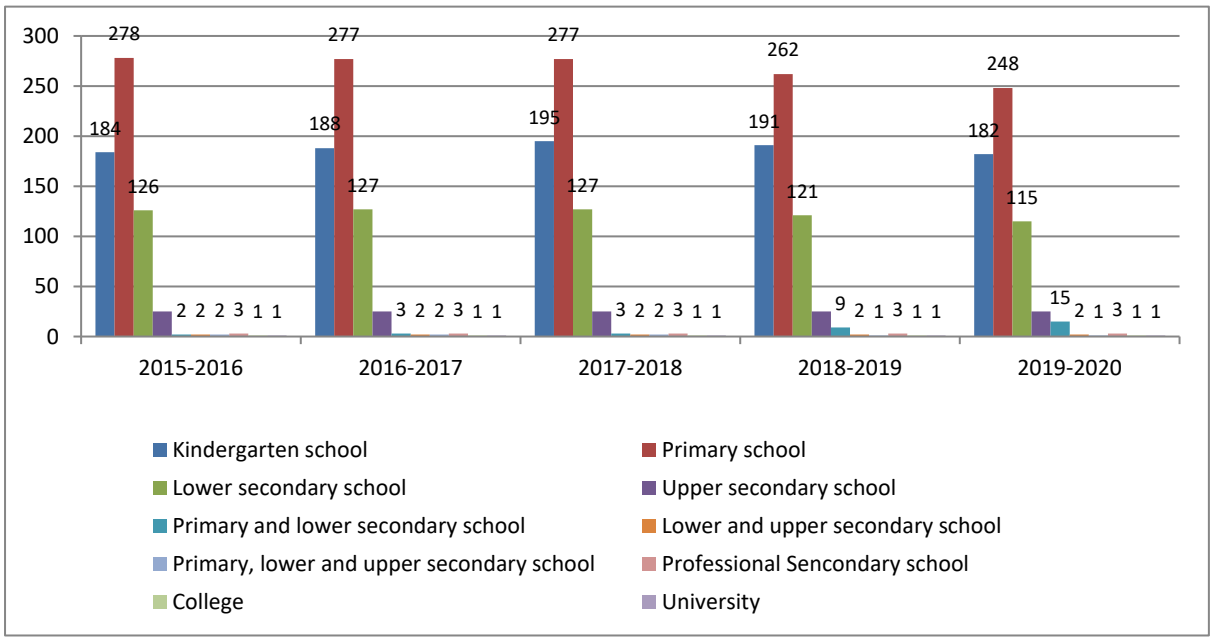
- Preschool Education: Kindergarten
- General Education: Primary Education, Lower Secondary Education, Upper Secondary Education
- Professional Education: Professional/ Vocational Secondary Education, College Education
- Higher Education: Undergraduate Education, Postgraduate Education

There are 191 kindergartens and 420 schools of general education (including primary schools, lower & upper secondary school). There are three professional secondary schools, one college and one university located in cities and town districts for students who have finished his/her general education and preferred to join those institutions or travel to other provinces for higher education. Figure 9.19 shows the number of schools in Binh Thuan province 2019 of all levels.



Source: Binh Thuan Statistical Yearbook 2019

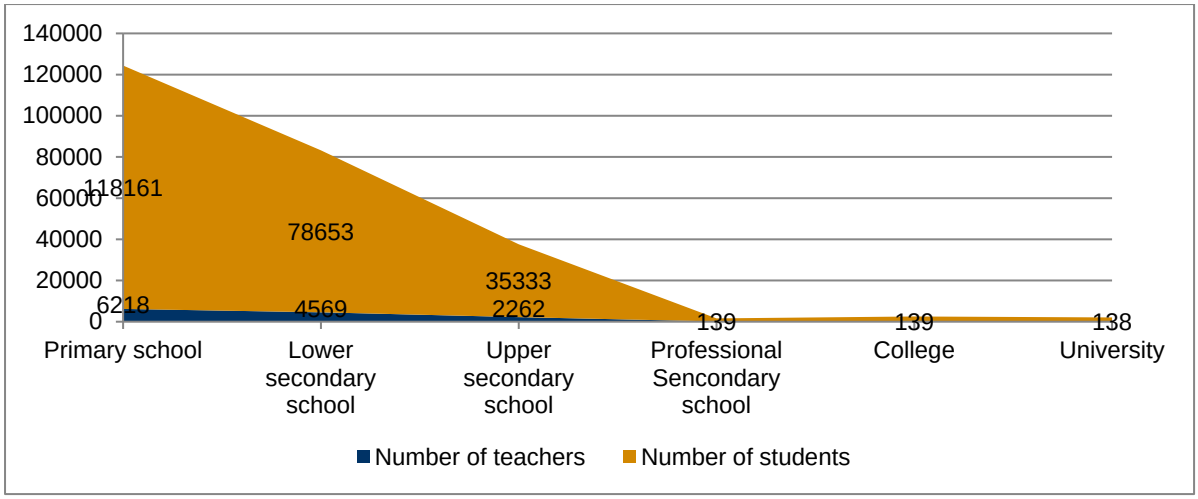
Figure 9.19 Number of Schools in Binh Thuan Province, 2018-2019



Source: Binh Thuan Statistical Yearbook 2019

Figure 9.20 Changes in Number of Schools in Binh Thuan Province by School years, 2015 – 2020

The above chart gives an overview of the changes in the number of schools in Binh Thuan province. It is observed that there are minor fluctuations in different types of schools from 2015 to 2020. In detail, the number of upper secondary schools kept constant at 25. Likewise, the number of professional secondary schools, colleges and universities stayed stable during the time. During the five-year period, the number of primary and lower secondary schools declined from 278 and 126 to 248 and 115, respectively, because of school mergers. Meanwhile, the number of kindergarten schools experienced a slight increase from 2015 to 2018 and reached its top at 195, followed by a slight decrease from 2018 to 2019.

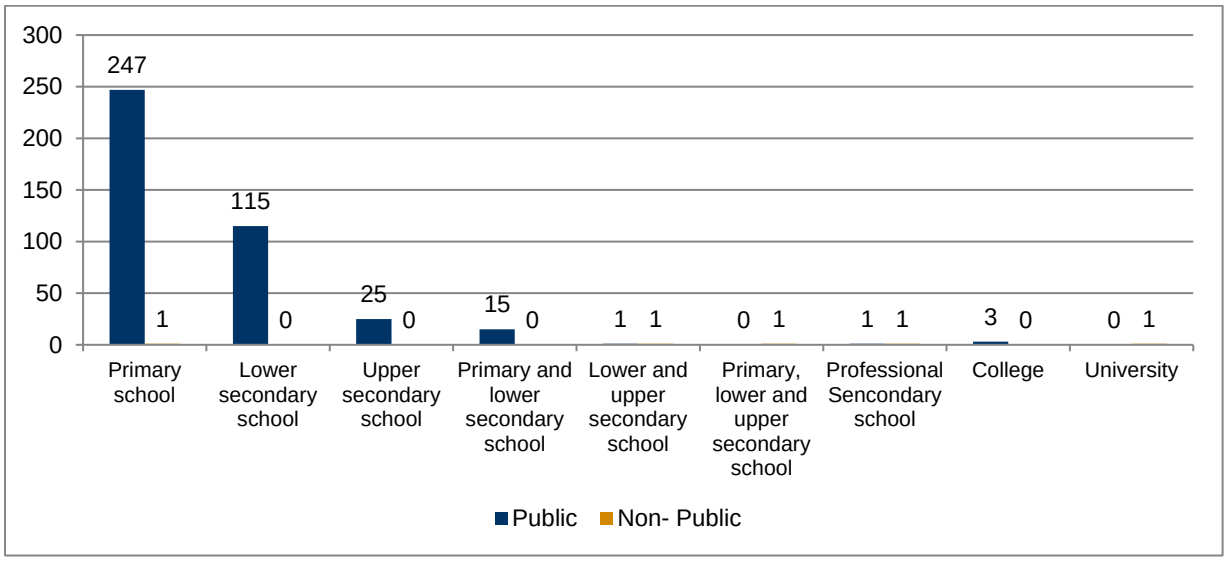


Source: Binh Thuan Statistical Yearbook 2019

Figure 9.21 Number of Teachers and students in Binh Thuan Province by schools, 2018-2019

Figure 9.21 shows that the number of teachers and students in general education schools was higher than that in higher education institutions, given the number of general education schools is more significant than that of higher education. Specifically, it is reported that the crowded schools are primary schools, which had 118,161 pupils and 6,218 teachers in the school year 2018-2019, the second position is lower secondary schools with 78,653 students and 4,569 teachers. The number of students and teachers in professional secondary schools, universities and colleges of Binh Thuan province in the same period was 1,442 students with 139 teachers, 2,438 students with 139 teachers, and 1,945 students with 138 teachers, respectively.

Regarding the schools' ownership in Binh Thuan province, it is noticed that almost all the schools are state-owned. One primary school, one lower and upper secondary school, one primary, lower and upper secondary school, one professional secondary school, one university owned by a private business**.** Figure 9.22 shows the number of public and non-public schools in the Binh Thuan province in 2019.



Source: Binh Thuan Statistical Yearbook 2019

Figure 9.22 Number of Public and Non-public Schools in Binh Thuan Province by Education Levels, 2019.

9.7.7 Economy, Livelihoods and Employment

9.7.7.1 Economic Structure

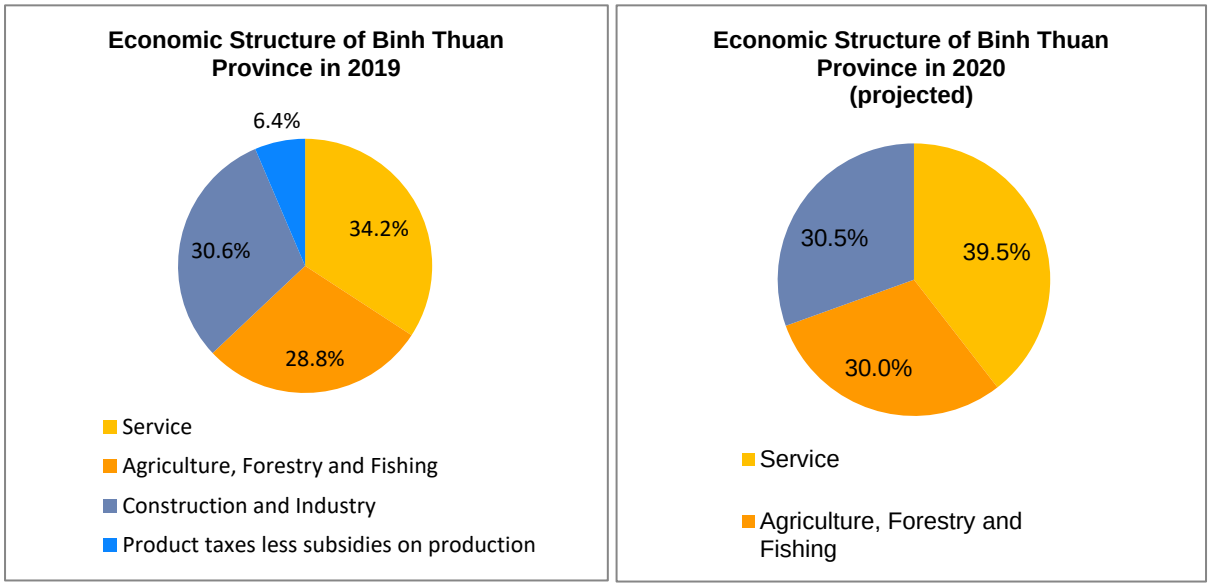
Binh Thuan province is endowed with beautiful natural landscapes and a long coastline. In order to effectively exploit the available potentials and advantages of the locality, Binh Thuan has identified the goal as follow:

- Focus on building a province with a strong marine economy in the South Central Coast region;
- Ensure the sustainable development of the marine economy and make an important contribution to the province's economy.

Exploiting its beautiful long coastline, Binh Thuan has focused on investment in tourism development and quickly became one of the country's tourist centers. The number of visitors to the province increases by an average of 11.0% annually; revenue from tourism has an average growth of 24.8% per year. In order to develop the fisheries economy, the province has focused on promoting the fishing capacity with the investment in large-capacity boats and offshore fishing. The production of seafood exploitation also increases dramatically. The exploitation of natural advantages in the sea has made the production of shrimp seed become the province's dominant strength, accounting for over 25% of the larva in Vietnam.

In addition, industries and services in marine and island areas have been gradually invested and exploited effectively, especially the energy industry in the coastal area and in Phu Quy island district, which has developed quite rapidly with diverse types included hydroelectricity, coal-fired thermal power, diesel power, wind power and solar power with a total capacity of 3,322.5 MW. In addition, there are about 90 solar power projects, 19 wind power projects have been approved to survey or invest in, prepare additional documents for power planning, and do investment projects in the province.

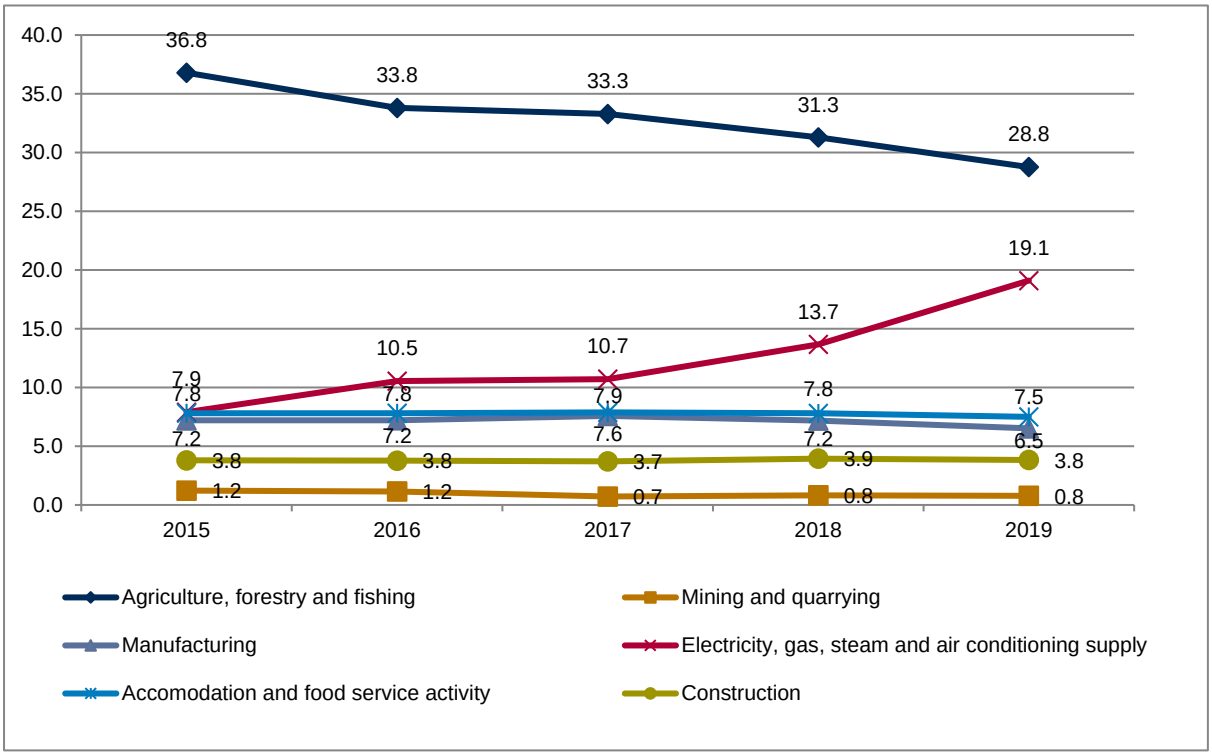
Consequently, by the end of 2019, 34.2% of the GRDP was contributed by the service sector. Construction and Industry contributed 30.6%, Agriculture, Forestry and Fishing contributed 28.8% to the GRDP. However, due to the impact of the COVID-19 epidemic, the GRDP of the province in 2020 decreased compared to last year. It is expected that in 2020, the service and agriculture, forestry and fishing would increase their contribution to the economic structure of the province. Figure 9.23 illustrates the differences in the economic structures of Binh Thuan province between 2019 and 2020.



Sources: Binh Thuan socio-economic report 2019

Figure 9.23 Economic Structure of Binh Thuan Province in 2019 and Projected for 2020.

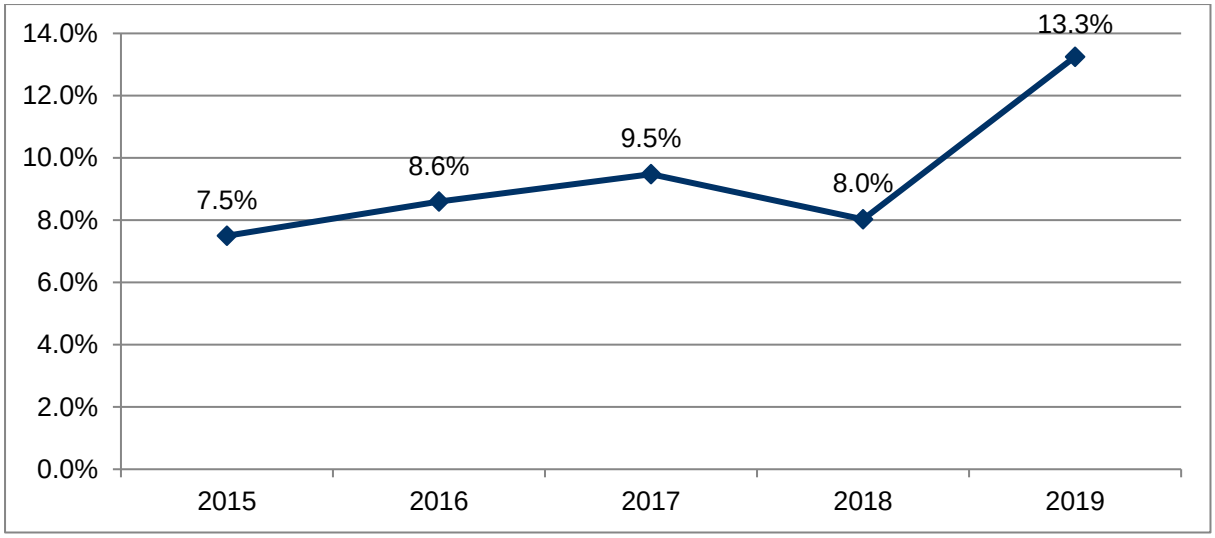
Regarding the gross domestic product structure among economic activities in 2019, Figure 9.24 shows the growth rates of all sectors slightly declined compared to previous years, except for the electricity, gas, steam and air conditioning supply. The agriculture, forestry and fishing sector had a low growth rate, which was 2.5% down (compared to that in 2018). Mining and quarrying stayed at the lowest level (0.8%). Electricity, gas, steam and air conditioning supply maintained increasing during the whole period, making up 19.1% in 2019. The gross output value of accommodation and food service activity, manufacturing continued to contribute to the sector's overall growth to 7.5% and 6.5%, respectively in 2019.



Source: Binh Thuan Statistical Yearbook 2019

Figure 9.24 Structure of Gross Domestic Product at Current Prices of Binh Thuan Province by Kind of Economic Activity (%)

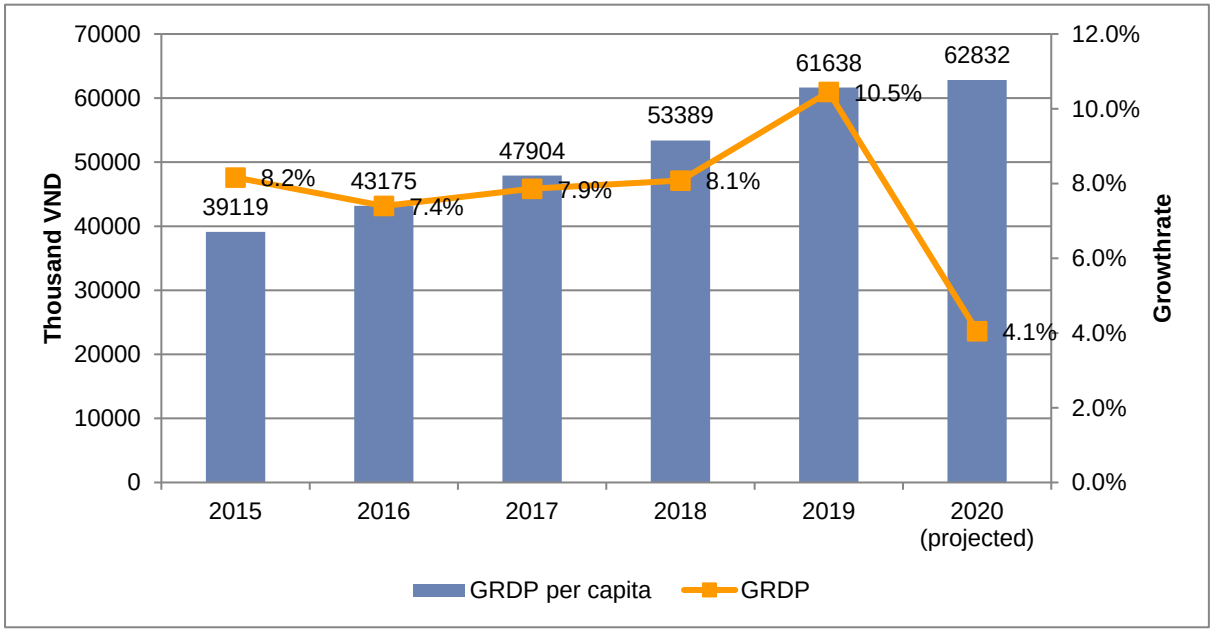
Generally, the economic development of Binh Thuan province went up and down from 2015 to 2019. The GRDP growth rate increased from 7.15% (2015) to 9.48% (2017) after two years, and decreased to 8.03% in 2018, followed by a remarkable rise to 13.25% in 2019. In 2020, the development growth rate is projected to be decreased to 4.05% due to the COVID-19 pandemic. Figure 9.25 shows the trendline of Binh Thuan province in the developing economy through its GRDP.



Sources: Binh Thuan Statistical Yearbook 201

Figure 9.25 GRDP Growth Rate of Binh Thuan Province, 2015 – 2020.

It is positive that the GRDP per capita has been increasing throughout the period from 2015 to 2020, with 31,119 thousand VND in 2015 to 62,832 thousand VND in 2020. The governmental management aimed to increase GRDP per capita up to 70,400 thousand VND in 2020. However, the growth rate of GRDP was unstable, which was 8.2% in 2015, went down to 7.4% in 2016, then to 7.9% in 2017, 8.1% in 2018. After that, there was a dramatic increase to 10.5% in 2019. It is expected that the GRDP growth rate of the province will decrease to 4.1% in 2020 due to the effect of COVID-19.



Sources: Binh Thuan Statistical Yearbook 2019

Figure 9.26 GRDP per Capita & Growth Rate of Binh Thuan Province, 2015 - 2020, and Projected for 2020.

9.7.7.2 Main Types of Livelihoods

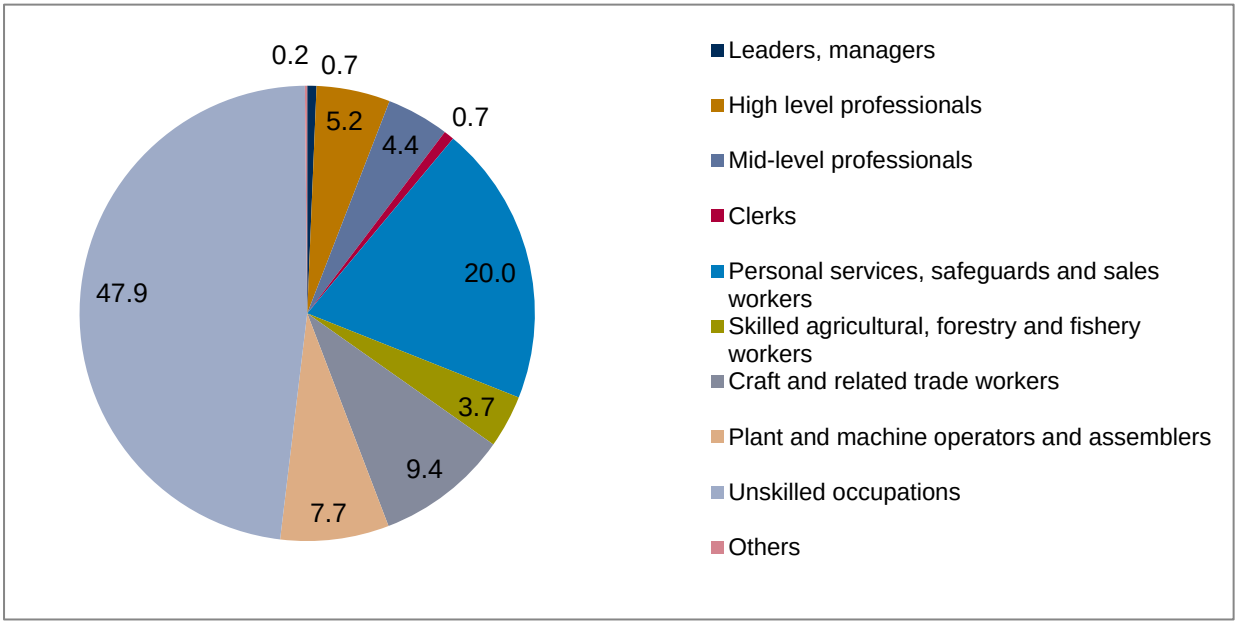
Due to the Binh Thuan province government's economic restructuring, employment of people in the province has also shifted, from activities in pure agriculture to activities in industry and marine services, and the energy industry. Tourism creates jobs for many workers, with an average growth rate of 12.3%

per year[17]. Tourism activities have promoted on-site consumption of agro-forestry-fishery products, and supported other industries and professions to develop, contributing to creating more jobs, increasing people's incomes and budget revenues.

Simple jobs or unskilled occupations are clearly defined in the Appendix of Decision No. 114/1998/QĐ-TCTK on 29 March 1998 by the General Statistics Office of Vietnam[18]. There are three main categories of unskilled occupations:

1. Unskilled occupations on trades and services
2. Unskilled occupations in agriculture, forestry, and fishing
3. Unskilled occupations in mining, constructions, industry, transportation, and others.

There was no further information on unskilled labours in Binh Thuan province, falling into which categories listed above. Apart from the majority, 20.0% of employed people work on personal services, safeguards and sales workers, 9.4% of employed people work on crafts and related trade works. Those are typical popular jobs among people who are earning/working by/for tourists or tourism companies and other services. Another group of jobs that 7.7% of the employed population is working on plant and machine operators and assemblers at factories or industrial areas, and 5.2% of workers working on high-level professionals. Other groups of occupation in Binh Thuan province in minor with details displayed in Figure 9.27.



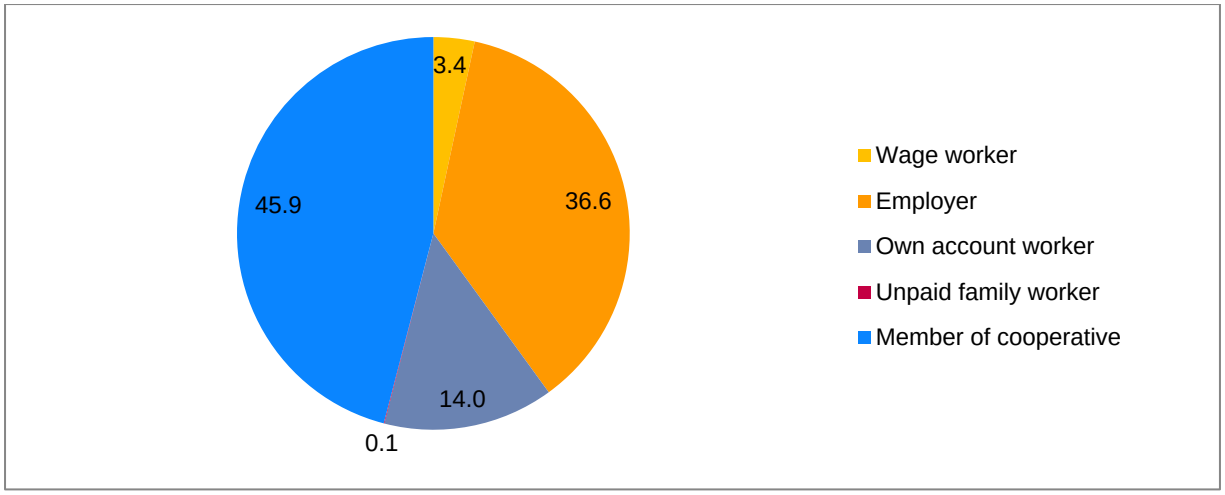
Source: Binh Thuan Statistical Yearbook 2019

Figure 9.27 The Employed Population at Age 15 and above by Occupation, Binh Thuan Province, 2019

From another point of view, when dividing the employed population by the status of employment, there was a large share of members of cooperative (45.9%), then employer (36.6%) and own-account worker (14.0%). There was only 3.4% of the employed population are wage workers and 0.06% are an unpaid family worker. Figure 9.28 visualizes the structure of employment in Binh Thuan province by status in employment.

[17] Tap chi cong san, 2019, retrieved on 23 October 2019, at https://www.tapchicongsan.org.vn/web/guest/thuc-tien-kinh-nghiem1/-/2018/814225/dua-binh-thuan-tro-thanh-tinh-co-nen-kinh-te-bien-phat-trien-manh-trong--vung-duyen-hai-nam-trung-bo.aspx

[18] Tong cuc thong ke, 2019, retrieved on 30 December 2020, at http://www.gso.gov.vn/default.aspx?tabid=405&idmid=6&ItemID=6323



Source: Binh Thuan Statistical Yearbook 201

Figure 9.28 Employed Population at Age 15 and above by Status in Employment, Binh Thuan Province, 2019.

9.7.8 Future Development Planning

9.7.8.1 Economic Development Planning

The Executive Committee of the Party Committee of Binh Thuan province, term 2015 - 2020, has identified the development focus for the province in the period from 2020 to 2025 including three pillars, which are significant areas to develop Binh Thuan province in all aspects, creating a steady upward posture. The identified pillars are the core for the development of Binh Thuan province based on the province's resources and the process of calling for investment attraction in recent years. The first pillar is industry, including energy and processing. The province has well implemented the Action Plan to implement the Project of Restructuring the Industry and Trade Sector, the Energy Center Scheme.

The province focuses on supporting and solving problems related to land, water surface, transmission line planning, and environmental issues to promote the energy industry's development, especially wind power, electricity, solar, electricity, and gas. Aligning with the energy industry, Binh Thuan also focuses on developing the processing industry, increasing the value of agricultural, forestry and aquatic products, especially advantageous products.

The second pillar identified by the province is marine tourism and marine sports. Binh Thuan actively implemented the Project “Building Binh Thuan into a tourism center - marine sport of national stature”, in which Ham Tien, Mui Ne and neighboring areas are used as a place to spread. The locality also focuses on robustly developing types of marine tourism, sea sports, entertainment, relaxation, healthcare, building and forming a network of tourist destinations; improving the quality of existing tourism products, expanding links, and creating new, attractive and high-class tourism products. The province attracts investment in tourism service projects, especially business services, to support tourism at night, maintaining Binh Thuan tourism "Safe - friendly - quality", becoming a top destination in the area.

The third pillar is hi-tech agriculture. The province encourages the development of large-scale agricultural production, application of high technology, and linking production along the value chain; flexible usage of rice land to improve the efficiency of land use; the conversion of new crops and animals with higher economic efficiency, climate change adaptation, disease prevention and management. In addition, the province establishes concentrated commodity agricultural production areas, high- tech agricultural production. The province has a policy of encouraging investment in agriculture, linking production with processing and selling agricultural products, building and replicate advanced and

effective agricultural production models. The localities and units strengthened food hygiene and safety management, improved the quality of goods, and ensured traceability to meet the market requirements.

9.7.8.2 Wind Power Development Planning[19]

Based on the development orientation of the province's energy industry, Binh Thuan province is currently promoting renewable energy projects to add to the National Electricity Development Plan for the period 2021-2030, vision to 2045 (Power Plan VIII). The timely addition of energy projects to the VIII Power Planning will contribute to making the energy sector a spearhead economic sector, making an important contribution to promoting socio-economic development, ensuring national defense, local security.

Up to now, there have been 11 wind power projects proposed by the provincial People's Committee and investors, submitted to the Ministry of Industry and Trade and the Prime Minister for consideration to put into Power Planning VIII (03 projects onshore and 08 projects offshore). Details are provided in Table 9.9.

Table 9.9 Future Wind Power Projects Proposed by the Provincial People's Committee and Investors

Location	Name of the Project	Estimated Capacity
Onshore	Binh Thuan wind power project (Hoa Thang 2.2)	-
	Hong Phong 3.1 wind power project	46.2MW
	Hong Phong 3.2 wind power project	46.2MW
Offshore	Thang Long Wind offshore wind power project	3,400 MW
	Offshore wind power project in La Gan	3,500 MW
	Binh Thuan offshore wind power project	5,000 MW
	Ham Thuan Nam offshore wind power project	900 MW
	Offshore Wind Power Project in Co Thach	2,000 MW
	Offshore wind power project in Vinh Phong	1,000 MW
	Offshore wind power project AMI AC in Binh Thuan province	1,800 MW
	Tuy Phong offshore wind power project	4,600 MW

Source: Binh Thuan Province Portal, 2020

[19] Binh Thuan Provincial Portal, 2020, retrieved on 13 November 2020, at https://www.binhthuan.gov.vn/4/469/37057/583745/tin-chinh-quyen/binh-thuan-kien-nghi-bo-cong-thuong-bo-sung-75-du-an-nang-luong-vao-quy-hoach-dien-viii.aspx

9.8 Overview of Tuy Phong District

Tuy Phong is a coastal district located in the northeast of Binh Thuan, among the province's ten districts and city. It is 270km from Ho Chi Minh city to the East, about 90km from Phan Thiet city to the east, about 150km from Nha Trang city to the south. The Highway 1A, Thong Nhat railway runs through the district, which helps the site be accessible easily to contiguous provinces like Ninh Thuan and Lam Dong, to other provinces in the Central Coast and the Southern key economic region and the Central Highlands. This is also the locality where the Nha Trang - Phan Thiet Expressway project is under construction.

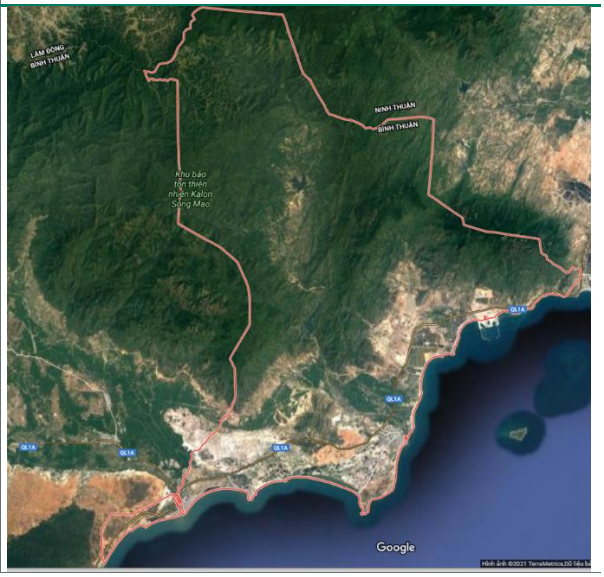
Co Thach-renowned landscape of Tuy Phong

The district has 50 km coastline, having two estuaries flowing into the sea, which is favorable for constructing a fishing port and a fishing logistics center. Notably, Tuy Phong district's coastal area has a tight relation with the coastal area of Bac Binh District, Phan Thiet City and Ninh Thuan Province, which brings many benefits in promoting a linkage and cooperation in developing the marine economic sector for the locality. Moreover, thanks to the beautiful and pristine beaches such as Co Thach, Doi Duong, and Ghenh Son (or Ganh Son) beaches, the district has a potential for developing tourism.

The district has two plain towns (Lien Huong and Phan Ri Cua) and ten highland, mountainous and midland communes (Phan Dung, Phong Phu, Vinh Hao, Vinh Tan, Phu Lac, Phuoc The, Hoa Minh, Chi Cong, Binh Thanh, and Hoa Phu). Its centre is located in Lien Huong town.

Table 9.10 Tuy Phong District Overview

Tuy Phong District	
Number of communes, towns	12
Area	795 km^2
Population	144,972
Poverty proportion	0.96%
Ethnic groups	Kinh, Cham, Raglai, Hoa, Nung
Main religions	Catholic, Buddhism, Caodaism, Brahma
Average income per capita 2020	44.6 million VND/person

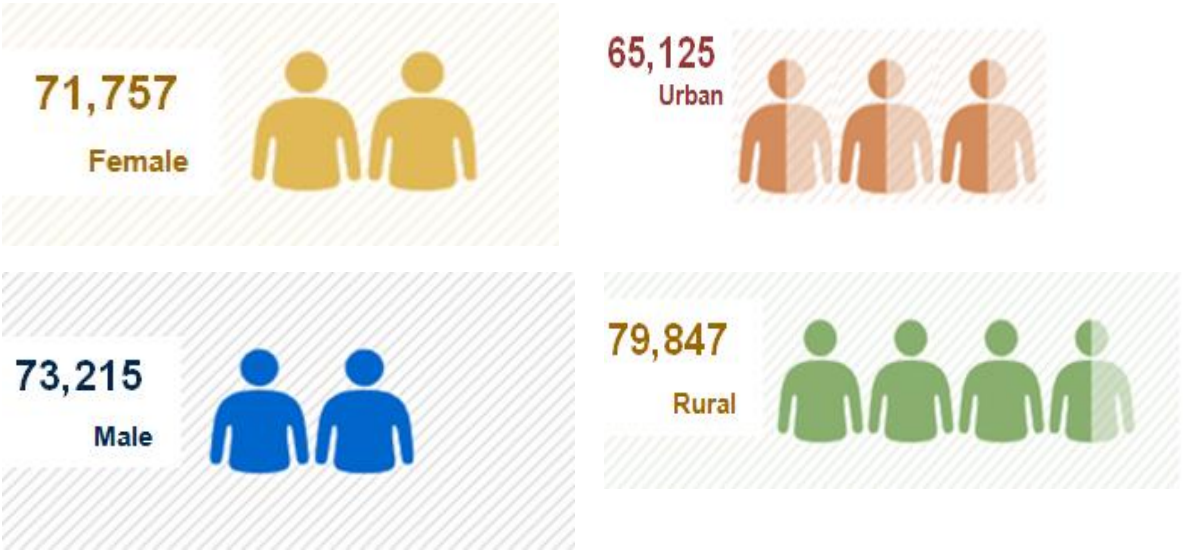


Sources: Binh Thuan Statistical Yearbook 2019; Satellite image from Google Map, 2020.

9.8.1 Demographic Information

The population of the whole district of Tuy Phong is 144,972 people, with a relatively equal ratio of males and females, as shown in Figure 9.29. The district's population is not evenly distributed, concentrated mainly in the East (coastal area) and much sparsely in the Western communes

(mountainous area). There was 44.9% of the population living in the urban area and 55.1% of the population living in the remote area.



Source: Tuy Phong Statistical Yearbook 2020

Figure 9.29 Population by Gender and Distribution in Tuy Phong District, Binh Thuan Province, 2019

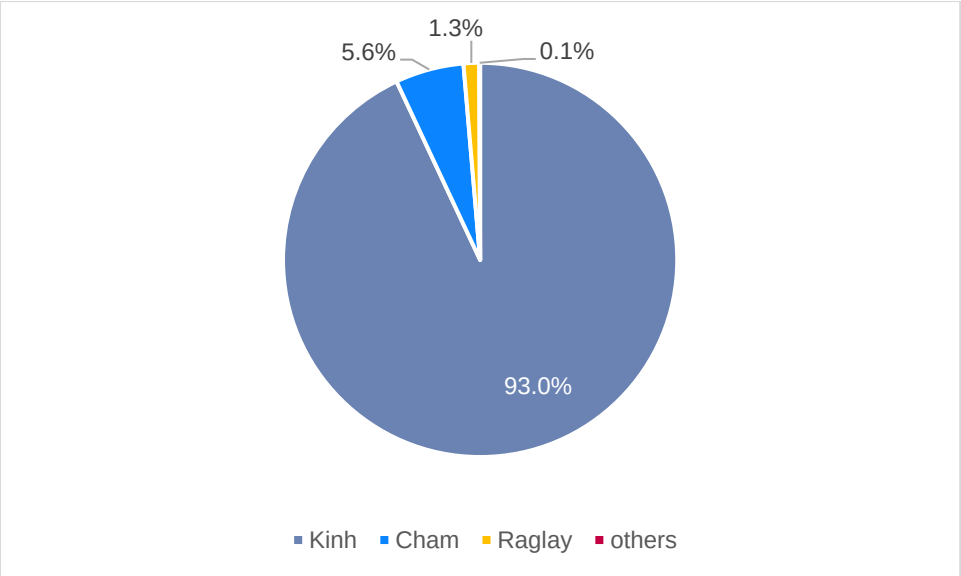
Table 9.11 Population in Communes/Town of Tuy Phong District, Binh Thuan Province

No.	Town/Commune	Area (Km^2)	Population (people)
1	Phan Ri Cua town	14.92	35,507
2	Lien Huong town	10.12	29,618
3	Chi Cong commune	25.02	20,962
4	Phuoc The commune	10.41	11,533
5	Phu Lac commune	79.06	8,972
6	Phong Phu commune	118.67	7,400
7	Vinh Hao commune	79.06	7,175
8	Hoa Phu commune	2.38	6,739
9	Hoa Minh commune	16.4	6,513
10	Vinh Tan commune	59.08	6,031
11	Binh Thanh commune	26.68	3,576
12	Phan Dung commune	353.2	946

Source: Report from Bureau of Statistics Tuy Phong district, 2019

The population of the district is mainly Kinh people, accounting for 93.0% (138,451 people). Nine ethnic minority groups are living in the district. Cham people are the largest among ethnic minority groups in

Tuy Phong, with 4,696 people accounting for 5.6%, while Raglai has about 1,072 people, occupying 1.3% of the district's population. The other ethnic groups include Hoa, Thai and Muong, accounting for 0.1% (753 people) in total.



Source: Tuy Phong Statistical Yearbook 2019

Figure 9.30 Population by Ethnic Groups in Tuy Phong District, Binh Thuan Province, 2019

The Kinh people live throughout the district, occupying many communes and towns, except Phan Dung and Phu Lac. Phan Dung is a mountainous commune with 94.3% Raglai people, while Phu Lac has approximately 54.0% of its population is Cham people. The other ethnic minorities scatter throughout the district with a small percentage of the population.

Ethnic minorities in the district have high educational attainment, which accounts for a reasonably high proportion each year, reaching the standard of universal primary and secondary education. Each year's number of secondary students is 480- and upper secondary school students is 540. Students who graduated and studied at universities, colleges, and professional secondary are 90, 110 and 491, respectively[20].

Ethnic minorities live mainly on agriculture, of which wet rice is the main crop, as well as cultivating crops, grapes, apples, dragon fruits, fruit trees, and raising cows, goats, pigs, chickens, ducks, contributing to the economic development of the locality. Every year 10,000 tons of rice are harvested, livestock and poultry, including 5,543 cows, 2,087 goats, 283 pigs, 18,500 chickens, and ducks, are raised[21].

One of the ethnic policies that has brought the most effective is the implementation of Program 135 (Decision No. 1722 / QD-TTg), which has linked to other programs, especially Resolution No. 04-NQ / TU of the Provincial Party Committee on building and developing the socio-economic for people in ethnic minority areas and the Resolution No. 17/2011 / NQHĐND of the Provincial People's Council which has attracted the attention of leaders in all levels, departments and branches from province to district and commune.

9.8.2 Healthcare Facilities and Programs

By the end of 2019, there were 13 health establishments in Tuy Phong district, and most of them (11 establishments) are medical service units in wards and communes. All health units in the district were

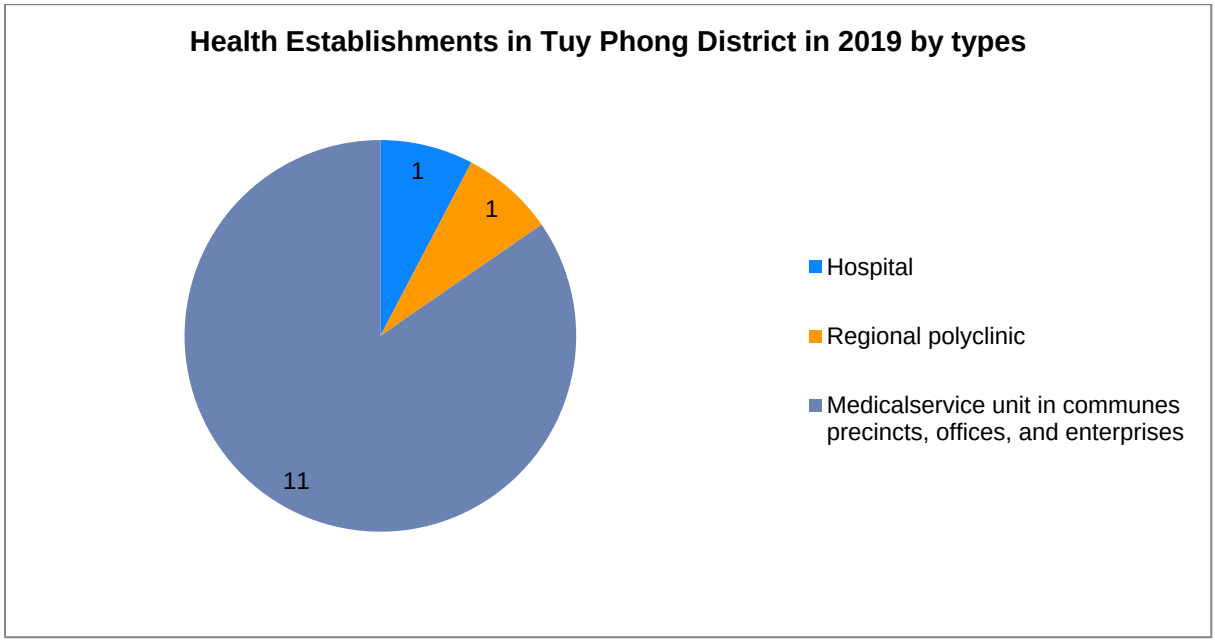
[20] Report on the socio-economic of Tuy Phong district in 2019

[21] Data from the People's Committee of Tuy Phong, 2020.

satisfied with the national health standards[22]. Besides, there was merely one hospital and one regional polyclinic in the district. Figure 9.31 shows a brief profile of health establishments in Tuy Phong district in 2019 by types.

The ratio of beds per 10,000 inhabitants in Tuy Phong is 17.6, still lower than that number of the whole province, 29 beds per 10,000 inhabitants. Moreover, Tuy Phong has 2.8 doctors per 10,000 inhabitants, much lower than the ratio of health staff per 10,000 people in the province and the country (7.3 doctors/10,000 and 8.0 doctors/10,000, respectively). This rate indicates that the healthcare workforce in the district needs to be extended to bring better health service for the residents.

A family member of patient Nguyen Thi L., currently being treated in internal medicine of The Medical Center of Tuy Phong claimed that the centre has too many patients but not enough beds, while the patients are too weak and needed to stay in the centre for more days. She suggests building more rooms and beds for patients.



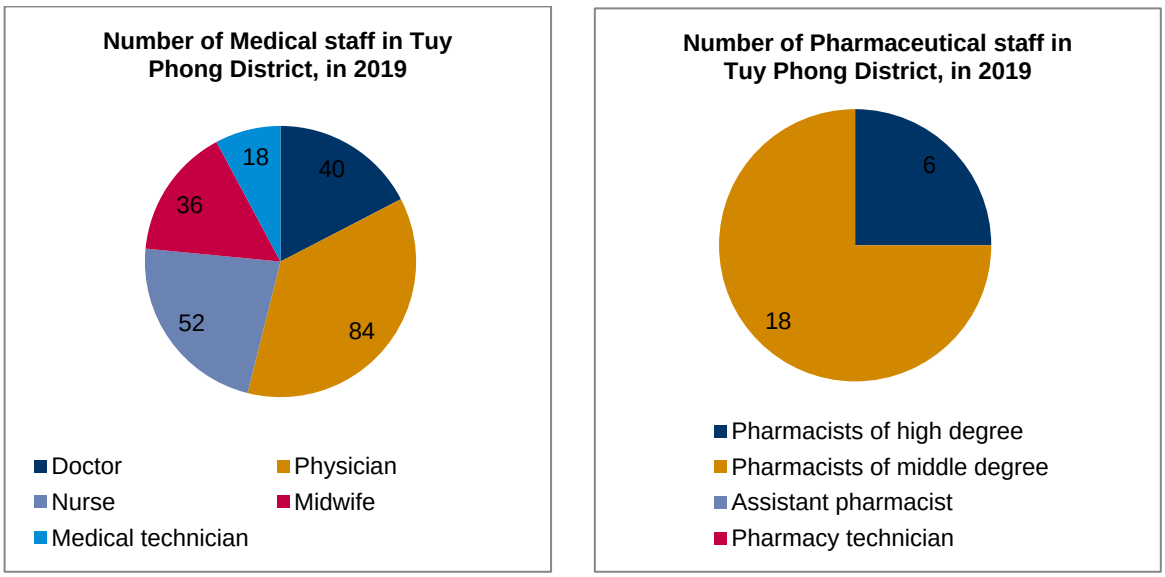
Source: Binh Thuan Statistical Yearbook 2019

Figure 9.31 Health Establishments by Types in Tuy Phong district, 2019

The structure of health staff in Tuy Phong district was similar to that of Binh Thuan province, where the number of physicians and nurses was the largest. Of all the medical staff in Tuy Phong district, doctors and physicians accounted for 53.9%(n= 124), nurses accounted for 22.6% (n=52), and the remaining was the midwife (15.7%) with 36 staff and medical technician (7.8%) with 18 staff.

Regarding the pharmaceutical staff, 75.0% (n=18) of the staff are middle degree pharmacists, while the proportion of high degree within the pharmaceutical staff is 25.0% (n=6). There is no pharmacist assistant and pharmacy technician in the district. The structure of the medical staff and pharmaceutical staff are visualized in Figure 9.32.

[22] Decision number 4667/QĐ-BYT issued by the Ministry of Health promulgating the National set of criteria for commune health, 2020, retrieved on 7th November 2014, at https://thuvienphapluat.vn/van-ban/the-thao-y-te/Quyet-dinh-4667-QD-BYT-2014-Bo-tieu-chi-quoc-gia-ve-y-te-xa-giai-doan-den-2020-258367.aspx



Source: Binh Thuan Statistical Yearbook 2019

Figure 9.32 Structure of Medical Staff and Pharmaceutical Staff in Tuy Phong District, 2019.

Tuy Phong habitants use the most common healthcare service as the Medical Center of Tuy Phong district, having 200 beds. As hospital beds' capacity has reached 90%, the centre has improved the quality of medical examination and treatment to help the patients recover quickly. The Center has been equipped with modern medical equipment, such as an artificial kidney dialysis system, automatic biochemical testing machine, automatic hematology, digital X-ray, physiotherapy and functional rehabilitation equipment and immune system automatic. Consequently, the center has reduced patient treatment days, the percentage of patients who need to be transferred to provincial hospitals. Moreover, the medical center of Tuy Phong district did not have fatal patients.

Medical service units in wards and communes have been well implemented to prevent dengue fever, malaria, national health diseases such as measles, tuberculosis, leprosy. However, dengue fever epidemic in 2019 increased compared to previous years with a total number of cases of 377 cases, but there were no deaths caused by this disease. Especially, dealing with the recent complicated COVID-19 epidemic, The Director of Tuy Phong District Medical Center, Doctor Nguyen Ky Thu, has decided to establish 3 Corona Quick Response Teams, standing ready to serve all situations related to epidemics happening in the area. There has been no positive case reported in the district as to the time of developing this report (06 January 2021).

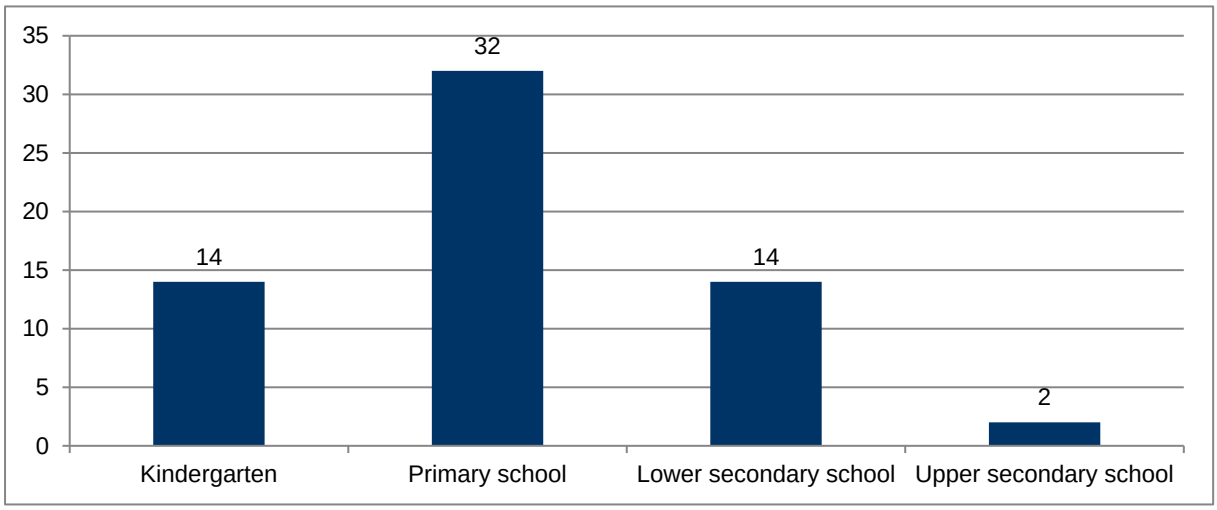
Program on care and improvement of employees' health and prevention of occupational diseases in the period 2020 - 2030 in Binh Thuan province aiming at protecting and take caring of employees' health, and encouraging a healthy and nutritious lifestyle at work, preventing of diseases and occupational diseases for employees, ensuring human resources, contributing to the sustainable development of the province.

Binh Thuan Red Cross Association regularly coordinates with supporting businesses to organize programs of free medical examination and treatment and give "family medicine bags" to poor households, near-poor households, people with disabilities, ethnic minorities Binh Thuan province, including some communes in Tuy Phong district (Hoa Phu, Phong Phu, Vinh Tan).

9.8.3 Education

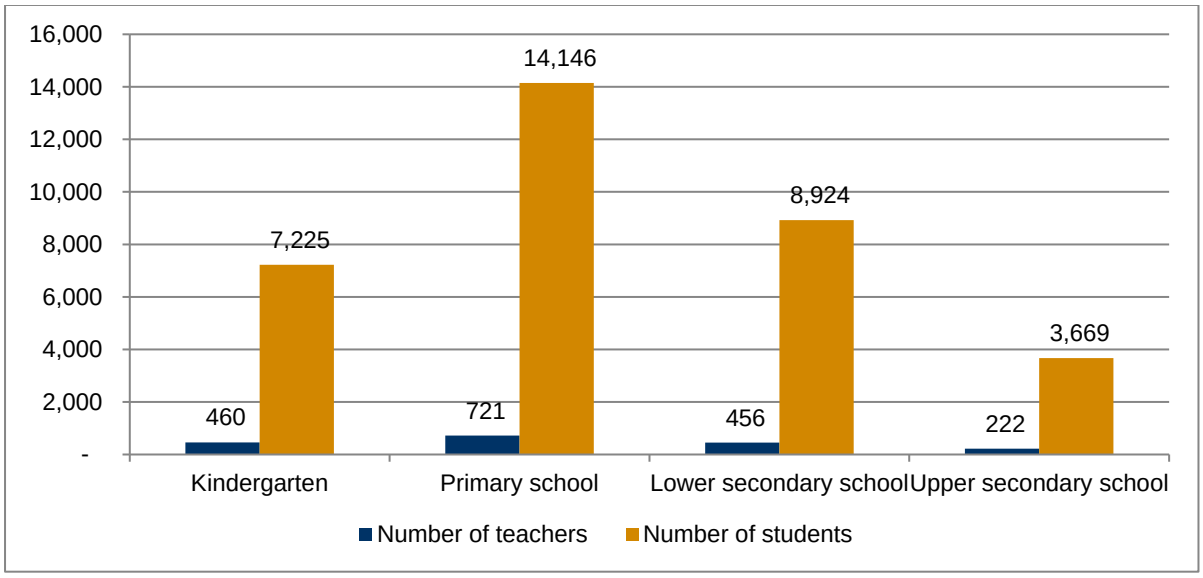
In 2019, there were a total of 62 schools from kindergarten to the secondary school level. The number of kindergartens was 14, and primary schools were 32. There were 17 lower secondary schools and

only two upper secondary schools in Tuy Phong district. Figure 9.33 shows the number of schools in the district by 2019.



Source: Binh Thuan Statistical Yearbook 2019

Figure 9.33 Number of Schools in Tuy Phong District, 2019



Source: Tuy Phong Statistical Yearbook 2019

Figure 9.34 Number of Teachers and Students by Educational Levels in Tuy Phong District, 2019-2020

Generally, in the school year 2019-2020, teachers and pupils' structures by education level share quite the same pattern. In kindergarten, 460 teachers worked with 7,225 children, so the number of students per teacher was calculated at around 15.7 pupils. For primary schools, the number of teachers and students took the largest area with 721 teachers and 14,146 students (each teacher was responsible for around 19.6 pupils). The lower secondary schools have 456 teachers and 8,924 students that were around 19.5 students per teacher and upper secondary school was roughly 16.5 students. Figure 9.34 shows a particular number of teachers and students by educational levels.

The district government has had many solutions to maintain student enrolment, prevent middle school dropouts. For example, education promotion actions to the underperformed students those with underprivileged circumstances including:

- Students having houses too far from the school are ineligible to attend classes, the school will coordinate with the Study Promotion Association to support clothes, books, bicycles.
- Students cannot follow up with their peers, the school organized free tutoring to help them keep up with the program, and encourage their sense of learning so that they do not drop out of school.
- A system of tuition fee exemptions and reductions for children in families with difficult circumstances. Especially, there is a 100% tuition waiver for students who belong to the near poor, poor, remote and mountainous areas.

Consequently, by the end of the 2019 school year, no primary school students dropped out, the number of junior high school students dropped decreased compared to the previous school year. Schools in the district meet national standards level 1 with 21/60 schools, reaching 35.0%. Education universalization for preschool children at five years old, literacy eradication, and lower secondary education universalization continue to be maintained in all the communes for primary school students.

9.8.4 Economy, Livelihoods and Employment

The District Government has just reported that Tuy Phong district's annual average income is 44.6 million VND/person, as much as the provincial average income. The GDP growth rate in the past five years (from 2015 to 2019) of the district is 11.6%/year. If the average rate of poor households in Tuy Phong district 20 years ago (2000) was 10.1%, at the end of last year (2019) this rate significantly reduced, to 1.0%. The district government's total budget revenue from 2015 to 2020 is 1,462 billion VND, higher than that amount in the last period (2010-2015), and exceeding the annual estimate.

9.8.4.1 Economic Structure

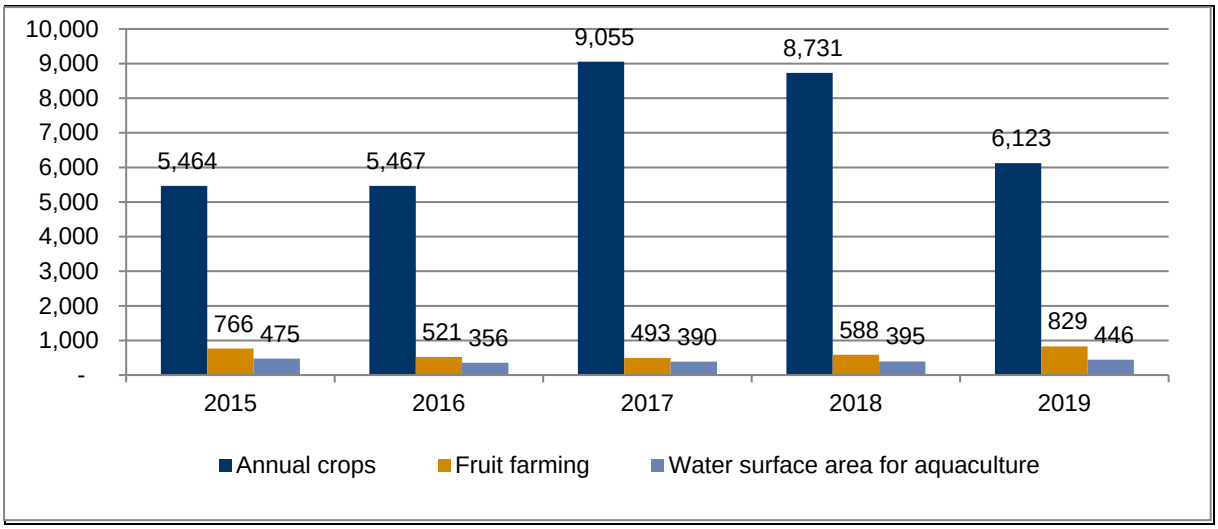
Tuy Phong district develops in parallel both agriculture and industry. In terms of agriculture, the district government aiming at increasing the products having a high value, hence the authority has focused on restructuring the agriculture sector, deploying agricultural cooperatives, developing key products of the district included dragon fruit, grapes, rice, *sterculia foetida* latex, creating a value chain for these products. According to the Department of Statistics of Binh Thuan Province, in 2018, there were eight cooperatives in Tuy Phong district with 93 employees. Thanks to the cooperatives, smallholder farmers linked with each other to change from small, fragmented production to intercropping areas, from which the ploughing and harvest were more convenient and easier for applying for scientific and technological advances, bringing mechanization into the field. Especially, these organizations actively link with enterprises to consume output products, step by step build production, processing and consumption chains for their member's products.

Besides, new technological breakthroughs have been applied in the district to harvest higher yield crops, such as the economic irrigation technology or applying some new varieties (Dai Thom eight rice variety, grape variety NH01-152) in production. In 2019, the area of rice cultivation 2019 was 4,425 ha, vines are 80 ha, dragon fruit is 609 ha.

Figure 9.35 illustrates the farming area of some main agricultural products of the district. For the whole period from 2015 to 2019, annual crops account for a significant area in agriculture, while fruits farming area is nearly double than that of aquaculture. There was a significant increase in annual crops from 2016 to 2017 with 5,467 ha up to 9,055 ha. However, a reverse trend was observed from 2018 to 2019 with 8731 ha down to 6123 ha. This may be caused by the district policy changes aiming to develop the industry, leading to a reduction in farming areas. There were not many significant changes in the areas of aquaculture for the whole period. The fruits farming area also experience the same trend with aquaculture but just from 2015 to 2018, as increasing nearly double in 2019 with 828.5 ha.

Aligning with planting, livestock farms are still maintained and developed. Some main types of cattle in the district are cows, pigs, goats and sheep. The district continues to call for investment in raising high-tech breeds or large-scale livestock using high technology. Besides, Tuy Phong authorities also focused on the prevention of disease, especially African swine fever. In 2019, no cases of African swine fever had occurred in the district.

As having a long coastline, aquaculture is also the district's strength. In 2019, the fishing output was 56,102 tons, reaching 102% of the plan. Tuy Phong post larvae has become a renowned brand not only in Vietnam but worldwide. The number of post larvae in 2019 was 23.7 billion posts, equalling 102.86% over the same period in 2018.



Source: Binh Thuan Statistical Yearbook 2019

Figure 9.35 Farming Area of Some Main Agricultural Products of Tuy Phong from 2015 to 2019 (ha)

In terms of industry, the district authority released a Resolution on developing industries [23], handicrafts in the district for 2016-2020. Tuy Phong district has an industrial park, namely Bac Tuy Phong, located in Vinh Hao commune with 150 hectares. This is a multi-disciplinary industrial park that prioritizes steel rolling, aluminium, mechanical, manufacturing, assembly, pharmaceutical and medical equipment, and processing of agricultural, forestry, and aquatic products, construction materials, household goods, wood, paper. Moreover, the Vinh Tan General Port has been established. The operation of the port contributes to promoting the investment attraction, solving urgent cargo transportation needs of the units and the businesses in the area, increasing the local budget and creating more jobs for workers. These conditions promise to develop the industrial level of the district.

Currently, in the district, there are four Vinh Tan Thermal Power Plants . Following the provincial policy in developing sustainable energy, the district actively calls for investment in wind power and solar power development. According to the People's Committee of Tuy Phong District, Binh Thanh wind power project has finished installing 5 turbines and is connected to the national grid. Another plant is already in operation is the Phu Lac Wind Power Plant Phase 1 (24 MW) located in Phu Lac commune.

According to Decision 4715/QD-BCT on the approval for Wind Power Development Planning in Binh Thuan during 2011-2020, vision to 2030, Tuy Phong is one of the potential wind power development areas of the province in a large area as detailed in Table 9.12 and Table 9.13.

[23] Resolution no. 24/NQ-HĐND dated 22/12/2016 on developing industries, handicrafts in Tuy Phong district for 2016-2020, 2020, retrieved on 30 December 2020, at https://tuyphong.binhthuan.gov.vn/SiteFolders/tuyphong/N%C4%82M%202020/TH%C3%81NG%2012/15%20H%C4%90ND_0001.pdf

Table 9.12 Potential Locations for Wind Power Project Development in Tuy Phong District

District	Wind Speed	Area (ha)	Location (commune/town)
Tuy Phong	6,0-6,5	3.357	Phong Phu, Vinh Tan, Vinh Hao, Phu Lac, Hoa Minh, Chi Cong , Hoa Phu
	6,5-7,0	3.380	Phong Phu, Vinh Tan, Vinh Hao, Phu Lac, Phuoc The, Lien Huong, Binh Thanh, Hoa Minh, Chi Cong, Hoa Phu
	7,0-7,5	1.525	Vinh Tan, Vinh Hao, Phu Lac, Phuoc The, Lien Huong, Binh Thanh, Chi Cong , Hoa Phu
	7,5-8,0	463	Phuoc The, Lien Huong, Binh Thanh,
	8,0-8,5	31	Binh Thanh

Source: Decision 4715/QD-BCT, 2012.

Table 9.13 Wind Power Projects in the Development List as to 2020 of Tuy Phong District

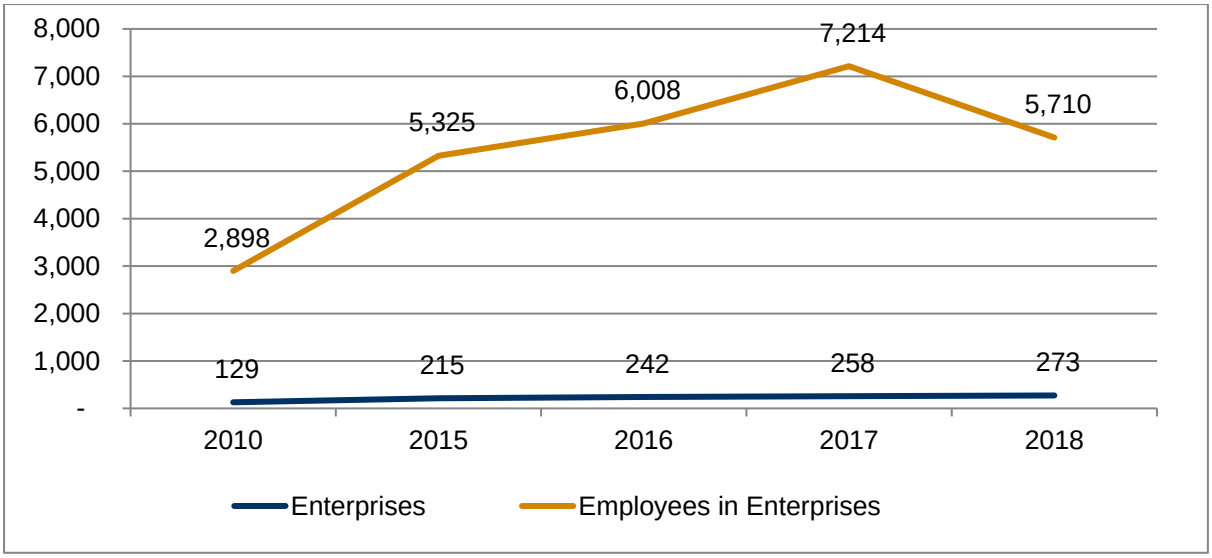
District	Potential Projects	Estimated Capacity (MW)	Commune
Tuy Phong	Phong Dien 1-Binh Thuan	120	Binh Thanh, Chi Cong
	Phu Lac	50	Phu Lac
	Phuoc The	28	Phuoc The
	Phan Ri Thanh	30	Phan Ri Thanh
	Hoa Minh	14.5	Hoa Minh, Chi Cong, Phong Phu

Source: Decision 4715/QD-BCT, 2012

9.8.4.2 Main Types of Livelihoods in the Commune

The district's main types of livelihoods are working in agriculture, fishery, and in the industry such as construction, service, and energy.

Due to the Resolution on the development of industries, handicrafts in the district for the period 2016-2020, the local industry experienced a dramatic development, the number of enterprises and employees in these enterprises are illustrated in Figure 9.36. For the whole period from 2010 to 2018, the number of enterprises increases steadily, meanwhile, the employees in these enterprises have some growth and decline. Due to the policy of the district authority, an outstanding number of enterprises were established from 2010 to 2015 with 129 and 215 respectively, which was followed by a steady increase with no significant changes from 215 new establishments in 2015 to 273 in 2018. As the number of enterprises increased notably from 2010 to 2015, district habitants working for these rose dramatically from 2,898 to 5,325, increasing and reaching 7,214 employees in 2017. However, from 2017 to 2018, there was a reduction in employees, from its highest number down to 5,710.



Source: Binh Thuan Statistical Yearbook 2019

Figure 9.36 Number of Enterprises and Employees in Enterprises in Tuy Phong from 2015 to 2019 (ha)

Although expected to create more jobs for the locality, the industry just provided around 4-5% in the last period (2010 – 2018). There was even a decline in employees from 2017 to 2018, which can be explained by the fact that local employees do not meet the enterprises' requirements, hence more vocational training should be organised. In the past eight years, the district government had vocational training for 8,659 employees, increasing trained workers' rate to 64.5%, creating jobs for 14,246 employees. The labour structure shifted in the right direction, consistent with economic restructuring. Accordingly, the industry's labour rate - construction is 35.5%; the rate of employees in the service industry is 29.0%; the proportion of employees in the agriculture, forestry and fishery sector decreases to 35.5%.

9.8.5 Future Development Planning

To ensure socio-economic development of Tuy Phong district aligning with the provincial, regional development and in conformity with the national socio-economic development strategy, the master plan on socio-economic development of Tuy Phong has been developed and approved[24].

In general, the district aiming at utilizing all resources to accelerate the economic growth, building and developing Tuy Phong District into a developed and dynamic district by 2021. Moreover, the authority also plans to build socio-economic infrastructure and develop rural economy, including transport, small and medium irrigation works, electricity, clean water, school, health center and communication channel, which associated in planning the redistribution of the population toward civilization and modernization. The government also tries to reduce the annual rate of poor households under the new standards by 0.85%.

In terms of educational and medical targets, Tuy Phong district plan to raise the quality of education. By 2021, there will be one more school meeting the national standard; the prevalence rate of preschools is 80%; primary school enrollment at the right age reaches 100%. The government will also consolidate and upgrade the grassroots of the healthcare network, build and upgrade commune health centers up to national standards. There will be 3.0 medical doctors per 10,000 people and this proportion will reach the country's average by 2030. The rate of communes meeting the new national criteria set for

[24] Resolution No. 18/NQ-HDND on socio-economic development plan for the period 2021-2025, Binh Thuan Online, 2020, retrieved on 25 December 2020, at https://binhthuan.gov.vn/1347/33936/66715/588827/van-ban-nghi-quyet/ve-ke-hoach-phat-trien-kinh-te-xa-hoi-nam-2021-2025.aspx

communal health will be 100% by 2020. The malnutrition rate among under-5 children will be kept under 7.5% by 2021.

Regarding agriculture production, Tuy Phong district aims to diversify plants and livestock-associated with processing and market outlets, which are relevant to the local advantages and meet the market demands. Basically, the authority focusses on establishing the concentrated areas for specialized production of perennial industrial, fruit crops and cattle raising to promote the district's advantages. Specifically, the district government aiming at increasing the products having a high value, agricultural output reach 263,000 million VND by 2021 with 30,000 tons of cereals, shrimp post-larvae and juvenile production having the output at 55,000 billion post larvae,

In terms of industry, the district plan to develop industries toward diversification with priority on products with high technological content and value. Exploiting the stunning coastline, the government continues to develop tourism, concentrating on Tuy Phong district's coastal areas, which will provide more capacity for both international and domestic tourists.

Regarding forestry, Tuy Phong authority maintains to protect existing forests and actively plant zone off for regeneration to raise the forest coverage to 54% of the total natural land area by 2021.

9.8.6 Policies/ Plans/ Supporting Programs for Livelihood Development

The state government has implemented plans and projects during different periods to improve poor households or households' livelihoods in remote rural areas. According to Decision 1722/2016/TTg on the national target program on sustainable poverty reduction in the 2016-2020 period[25], there are the following projects:

- ***Project 1: Education and training objectives of Tuy Phong district*** is in line with Decree 29-NQ/TW dated 04 Nov 2013 to develop an education and training plan between 2016 and 2020 including (i) investment in school infrastructure; (ii) improvement on teaching quality and capacity building for teachers; (iii) improvement of enrolment at all level.
- ***Project 2 (also known as Project 135)*** is to support poor communes in mountainous border areas, including (i) investment in infrastructure; (ii) production support and livelihood diversification; (iii) improvement on the capacity of grassroots cadres.
- ***Project 3*** is to support production and livelihood diversification in communes not included in projects 30A and 135. Following the state projects, each province in the country proposes plans and acts accordingly. Project 30A and Project 135 are designed to improve the livelihoods of ethnic communities.
- ***Project 4*** is to communicate on poverty reduction to the poor and improve information access of the poor.

9.9 Overview of Communes within the Area of Influence

9.9.1 Phu Lac Commune

Phu Lac is a mountainous commune with a total natural area of 7,906 km^2. It is about one km from Lien Huong town, the Tuy Phong district's cultural, economic, and political center. It borders Lien Huong town to the East, Phong Phu commune to the West; Hoa Minh commune to the South, Vinh Hao commune to the North. Phu Lac commune has two main terrain types, including mountainous and plain terrain. The mountainous area occupied nearly one-third of the total natural area, concentrating in the southwest and northwest of the commune. Two-thirds of the whole commune's natural area is flat, concentrated in the area along the inter-commune road Phong Phu - Phu Lac - Lien Huong and along the National Highway 1A, and Southern border with Hoa Minh commune.

[25] Industry and Trade Magazine, 2020. *Sustainable poverty reduction policies: Some results and issues*. Available at: http://tapchicongthuong.vn/bai-viet/chinh-sach-giam-ngheo-ben-vung-mot-so-ket-qua-va-van-de-dat-ra-69629.htm

According to the Prime Minister's Decision No. 50/2016 /QD-TTg[26] dated November 3, 2016, the criteria for identifying extremely difficult villages and communes in ethnic minority and mountainous areas in the period 2016-2020, Phu Lac is identified as Area II[27].

Phu Lac's population is 8,972 people, of which the Cham people account for 82% of the population with 7,357 people. The commune's habitants are equally distributed across three villages, including Lac Tri, Phu Dien and Vinh Hanh village. In Phu Lac commune, the Kinh and the Cham people are the two ethnic groups living together. There are 03 religions in the commune, including Buddhism, Caodaism and Braha, (Balamonism and Bani religion).

Table 9.14 Phu Lac Commune Overview

Phu Lac Commune		
Number of villages	3	
Area	7.906 km^2	
Population	8.912 people	
Household	10,162 households	
Poverty proportion	4.17% poor, 4.75% near-poor	
	94 poor households, 107 near-poor households	
Ethnic groups	Kinh, Cham	
Main religions	Buddhism, Caodaism, Brahma	
Average income per capita 2019	33.4 million VND per person	

Sources: Binh Thuan Statistical Yearbook 2019

[26] http://csdl.ubdt.gov.vn/noidung/vanbandt/SiteAssets/Lists/UBDTVanBanDen/EditForm/binhthuan.pdf

[27] A commune area II is a commune with 1 of the following 3 criteria:

a) The total percentage of poor and near-poor households is at least 55% (provinces in the Southeast region, the Mekong River Delta region is 30% or more) according to the multidimensional poverty line in the period 2016-2020 and having not enough 3 out of 6 conditions (for communes with ethnic minority households 60% or more, having not enough 2 out of 6 conditions) specified at Point c, Clause 1, Article 3 of this Decision;

b) The total rate of poor and near-poor households is from 15% to less than 55% (provinces in the Southeast region, the Mekong River Delta region from 15% to less than 30%) according to the multidimensional poverty line 2016 - 2020;

c) The total percentage of poor and near-poor households is below 15% according to the multi-dimensional poverty line in the 2016-2020 period, and there is at least one extremely difficult village.

9.9.1.1 Economy, Livelihoods and Employment

9.9.1.1.1 Economy, Livelihoods

In Phu Lac, people live mainly on farming. Although protection forest land occupies the largest area of the commune, local people's livelihoods do not rely on the protection forest.

According to the Phu Lac People's Committee, the food production in 2019 reached 8,128 tons. The most popular crop in the commune is rice, followed by purple onion and grapes. Traditionally, there is three crops season cultivated rice in the district. However, due to the prolonged drought leading to the low water volume in reservoirs, the district must cut a significant area of rice and crops in the winter-spring crop, changing to the model of two rice crops and one winter-spring crop (e.g. sesame, peanuts, chili, and okra).

According to the report of the People's Committee of Phu Lac commune, the total herd of cattle in the whole commune is 1,178 heads, of which 685 cows, 410 goats, 83 pigs, and 12,350 poultry. The prevention of epidemics in cattle and poultry is well implemented, so that in 2019 there was no disease outbreaks in livestock and poultry.

The commune has the most extensive rice area in the district, about 700 ha, concentrated in five cooperatives and two rice cooperatives in the area. Thanks to the natural mineral water of Vinh Hao, the paddy fields downstream have produced sweet and fragrant rice that brings a distinction with other breeds of rice, making a renowned brand of rice for the locality. In order to maintain and stabilize prices for local agricultural products, the commune authority has maintained a stable linkage of consumption and production with farmers. The Provincial Department of Quality Management of Agriculture, Forestry and Fisheries has chosen some establishments in the commune to join a chain of safe rice production-consumption. Moreover, farmers in these establishments also were trained in food safety knowledge. Farmers in the commune are supported with fertilizers, seeds and signed a commitment to comply with safe production regulations when participating in the chain.

Regarding the construction of a new rural program, for the achieved criteria, the commune has periodically held a meeting to evaluate the sustainability, and solutions to maintain the criteria. For the unsatisfactory criteria, the commune plans to implement measures to achieve the criteria. As of 2019, the commune has achieved 15/19 criteria[28].

Phu Lac is a commune without many geographical advantages, the natural conditions are quite harsh for economic development. However, with the Party and State's attention, the commune has had a number of significant projects invested and exploited in some industrial sectors such as energy (Thuan Binh Wind Power Company project) over the past years. There also is a Bac Tuy Phong industrial cluster in the commune, which brings more opportunities for the locality to improve its industry, creating more jobs for its inhabitants. To illustrate, in that industrial cluster, the Binh Thuan - Nha Be Garment Company invested in the Industrial Garment Factory in 2016, with an area of 4.7 hectares, creating jobs for 1,500 workers. In 2017, the company expanded the factory by two hectares and created more jobs for about 500 workers. On the other hand, these projects also impact residents' lives. The land acquisition for site clearance to construct the projects directly impacts the custom, lifestyle, rights, and jobs of many individuals and organizations in the locality

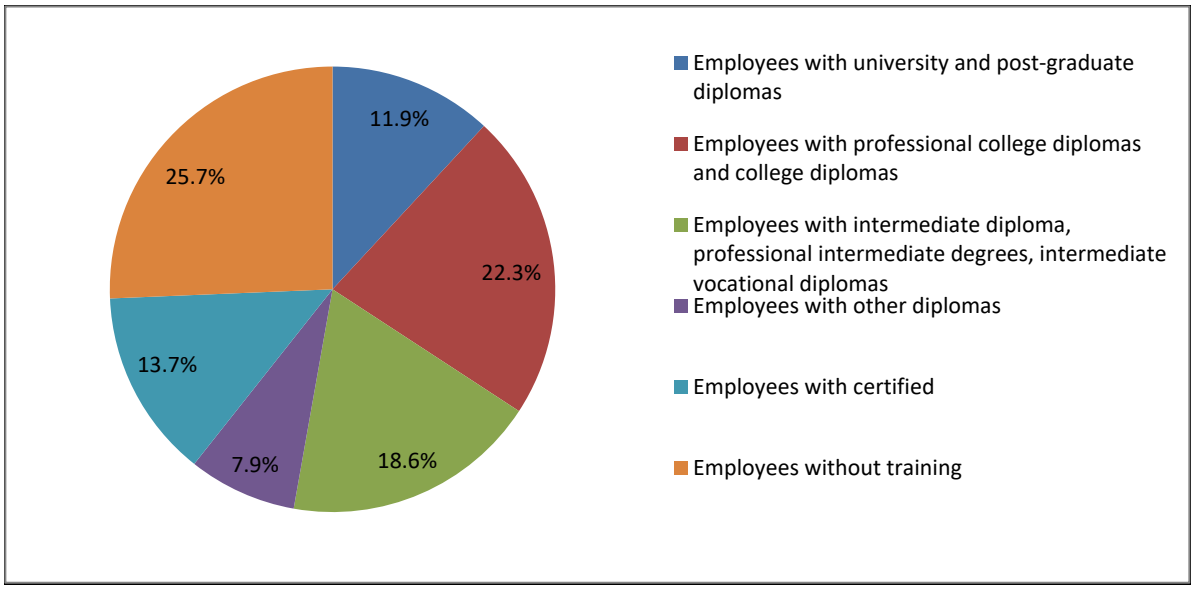
9.9.1.1.2 Labour Force and Employment

The number of people of the working-age of the commune is 7,690, accounting for 86.3% of the total population. According to the People's Committee of the commune, nearly 94.7% of people in the working-age are employed, of which 4,512 people are working in agriculture - forestry - fishery,

[28] Decision No. 1980 / QD-TTg dated October 17, 2016 of the Prime Minister promulgating the national set of criteria for new rural communes for the period 2016-2020, Thu vien phap luat, 2020, retrieved on 30 December 2020, at https://thuvienphapluat.vn/van-ban/Van-hoa-Xa-hoi/Quyet-dinh-1980-QD-TTg-bo-tieu-chi-quoc-gia-xa-nong-thon-moi-2016-2020-325989.aspx

occupying 58.7%; 1,683 people are working in the industry - construction sector, accounting for 21.9% and the remaining percentage of people are working in the trade - service sector with 1090 workers (14.2%).

Education is one of the main measures to improve people's qualifications, thereby helping them get a stable job. In the past five years, the number of trained workers is 5,416 among the 7,285 employed, accounting for 74.3%. Figure 9.37 demonstrates the percentage of employers in Phu Lac commune with diverse educational levels in 2019. It can be seen that the highest level of employee is the university and postgraduate diplomas, accounting for a small proportion of 13.7% (or 867 labourers). The rate of employers with professional intermediate degrees, intermediate vocational diplomas and employers with other college diplomas, accounts for more than half of the total employers with 22.3% (1,625),18.6% (1,354) and 7.9% (573) respectively. Workers without any training account for 25.7% of the employers with 1869 labourers.



Source: Secondary data provided by Phu Lac commune

Figure 9.37 Percentages of Employees Classified by Educational Level in Phu Lac, 2019

9.9.1.2 Education

There are one kindergarten, three primary schools, one secondary school in Phu Lac commune, merely one primary school meeting the national standards[29]. In the past years, the commune authority has changed education at all levels positively in order to enhance the quality of teaching and learning. One of the commune's main objectives in education is giving efforts in maintaining and improving the enrolment rate. In 2018-2019, the number of students dropping out of school in the middle of the year was 04 cases, down 1 case over the same period. The rate of students graduating from middle school is 100%. The percentage of students graduating from lower secondary schools continues to study high school and vocational training is 79%.

[29] The Ministry of Education and Training regulated the evaluation and grading of schools across the country, in which, schools will be evaluated based on 5 criteria: school function and management; administrators, teachers, staff, and students; facilities and teaching equipment; the relationship between school, family and society; educational performance and results.

Phu Lac Kindergarten

Lac Tri Primary School

Phu Dien Primary School

Phu Lac Secondary School

Figure 9.38 Photos of Some Schools in Phu Lac Commune

9.9.1.3 Health

Regarding primary health care facilities at Phu Lac commune, the Commune Health Center (CHC) is reportedly prioritized by local people whenever they have health problems. Basically, malaria and dengue fever in recent years are under control in the commune. According to the socio-economic report 2019 of Phu Lac commune, as to the end of 2019, 3,037 patients visit the CHC per year because of some common diseases such as fever, headaches, stomach-aches, or diarrhea. If local people get serious health problems, they will go to the district-level hospital located in Lien Huong town. The report also mentioned:

- The rate of people participating in health insurance reaches 87.4%.
- The rate of stunting children under five years old is 8.9%.
- The number of cases of dengue fever is 40.

Figure 9.39 Commune Health Centre of Phu Lac

The CHC has met the national standard of Commune Health Center[30] for the past ten years. The communication activities on preventing common health diseases are being conducted regularly through different channels, including broadcasting on loudspeakers and via health hamlet/village collaborators. The CHC also focuses on public health care activities, including:

- Child malnutrition prevention and control activities are always carried out by activities such as chart of height and weight monitoring for children under five years old, monthly measuring to assess malnutrition.
- Supplementation of vitamin A for postpartum mothers and children from 6 months to under 36 months of age.
- Communication of scientific model for baby and childcare and nurturing.

Regarding to the safety and order of society, the commune government strives to maintain local security and order. In 2019, there are 23 cases of social safety violations (an increase of five cases compared to 2018), there are 3 traffic accidents (down four cases compared to 2018), causing four deaths.

9.9.1.4 Infrastructure and Public Services

9.9.1.5 Road

Many inter-village and inter-commune roads have been concreted, some were in construction with the completion rate varied from 30% to 71% as to September 2020 as specified in the New Rural Development report of Phu Lac PC. From 2016 to 2020, the commune has been concreted 34 routes of rural roads with 5.4 km. The total length of the village and inland trunk roads is 26.2km. Up to now,

[30] The Ministry of Health has issued a directive and administer Decision No. 4667 / QD-BYT dated November 7, 2014 on promulgating the national set of criteria for commune health in the period to 2020, Accordingly, medical stations Communes are valuated and classified based on 10 criteria, including: Health care; Human resources for health; Infrastructure of CHSs, equipment, drugs and other facilities; Planning - Finance; Preventive medicine, HIV / AIDS prevention and control, sanitation and food safety; Medical examination, treatment, functional rehabilitation and traditional medicine; Maternal and child health care; Population - Family planning

12.3km of those have been hardened with concrete, meeting the Ministry of Transport's technical standards, 8,5km have been filled with red gravel, and 5.4 km had not been concreted.

However, the residents complained that even covered with asphalt concrete, many sections have deteriorated, challenging to travel. It is thought that the transport industry should have an investment plan to repair and upgrade damaged sections, especially the sections crossing the stream. Because those sections are usually flooded after heavy rain at 0.5 - 0.7 m, leading to traffic jams on those routes. Consequently, it is needed to have a bridge crossing for people to travel more safely and conveniently.

Figure 9.40 A Paved Road in Phu Lac Commune

9.9.1.6 Electricity

The rate of households using the national electricity grid regularly throughout the commune is 100%. However, the household's number having an official electricity meter is 9,968 over 10,162 households, accounting for 98.09%. The popular price that rural residents have to pay for electricity is 1,403 VND per kWh.

9.9.1.7 Water Supply

The rate of households in Phu Lac using hygienic water, meeting the national regulations QCVN 02:2009/BYT, reaches 100%. In the area, households mainly use domestic water from Tuy Phong Water Supply Plant, managed and exploited by the Management Board of Public Works. The rest use water from wells and boreholes and have water tanks for domestic usage.

The Tuy Phong Water Supply Plant is located in Phong Phu commune, approximately seven kilometres from the Phu Lac commune center. The capacity in 2016 was 15,000m^3/day, and planning to increase

the capacity to 20,000 m^3/day[31]. The popular price that rural residents have to pay for clean water is 5,000 VND per m^3.

9.9.1.8 Irrigation System

The area of agricultural land that is actively irrigated is 1158,7909 ha, accounting for 80.45%. During the production process, water supply is guaranteed; local farmers also switched to other crops that need less water to adapt to the current situation. Although Phu Lac commune is not included in the solidification of the in-field canals project, 29 routes with 81,842 km of the commune in-field canals have also been solidified with the capital from other sources.

Figure 9.41 Irrigation System in Phu Lac commune

9.9.1.9 Internet Access

The commune has telecommunications and internet service points. There are currently three telecommunications service providers in the three villages, providing two telephone services, including telecommunication fixed ground and mobile ground telecommunications. In addition, these above units also provide two types of internet services, which are fixed ground broadband and mobile terrestrial telecommunications. There are three over three villages having telecommunication stations providing internet access services on mobile terrestrial networks.

9.9.1.10 Waste Management

All the villages in Phu Lac commune have a sanitation team that regularly collects garbage to a concentrated point. The waste then will be collected by the Public Works Management Board of Tuy Phong District to the Nui Nang sanitary landfill in Phong Phu commune.

The garbage collection frequency is six days/week at households in two towns and the garbage gathering points at the front of the road or the beginning of the small roads in the remaining communes. In each location, on average, waste is collected once every two days. According to Mr. Le Van Hung, Deputy Head of Natural Resources & Environment Department of Tuy Phong district, the domestic waste cannot be collected every day due to the shortage of collection vehicles[32].

In the long term, Tuy Phong is calling for socialization, encouraging businesses and private individuals to invest a large capital source to build a treatment plant and process all kinds of waste into microbiological fertilizers, ensuring hygiene for the environment. The proportion of households with hygienic bathrooms in the commune reaches 100%. All residential areas have drainage systems for rainwater and wastewater, which are operating correctly. In terms of wastewater treatment, domestic

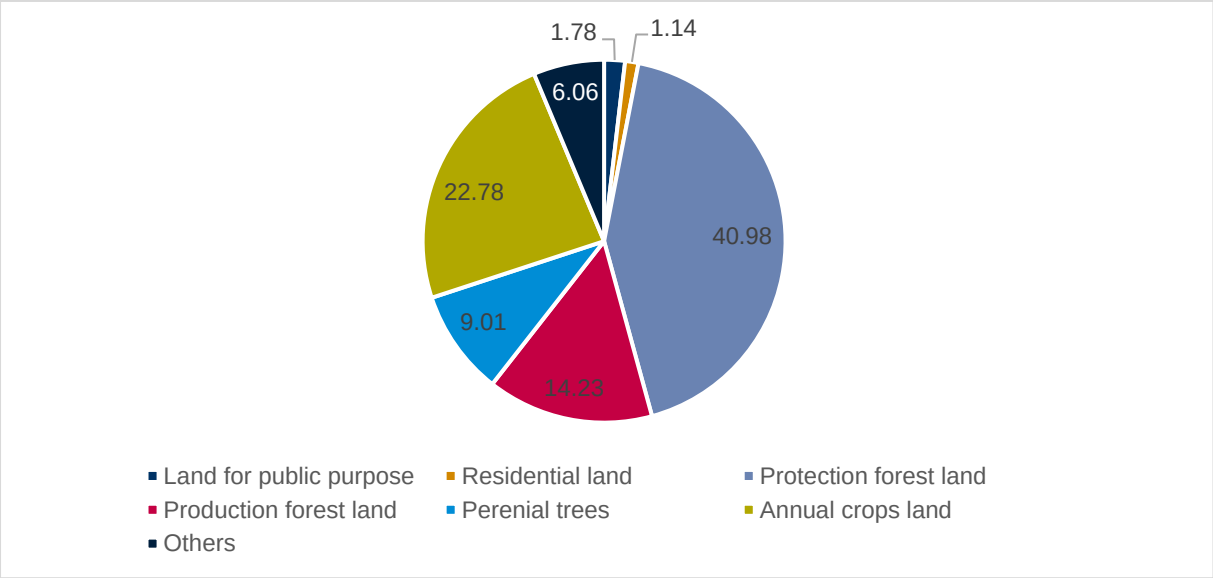
[31] Binh Thuan Online News, 2016, retrieved on 9th June 2016, at http://www.baobinhthuan.com.vn/kinh-te/tuy-phong-can-cai-tao-nang-cong-suat-nha-may-nuoc-87615.html

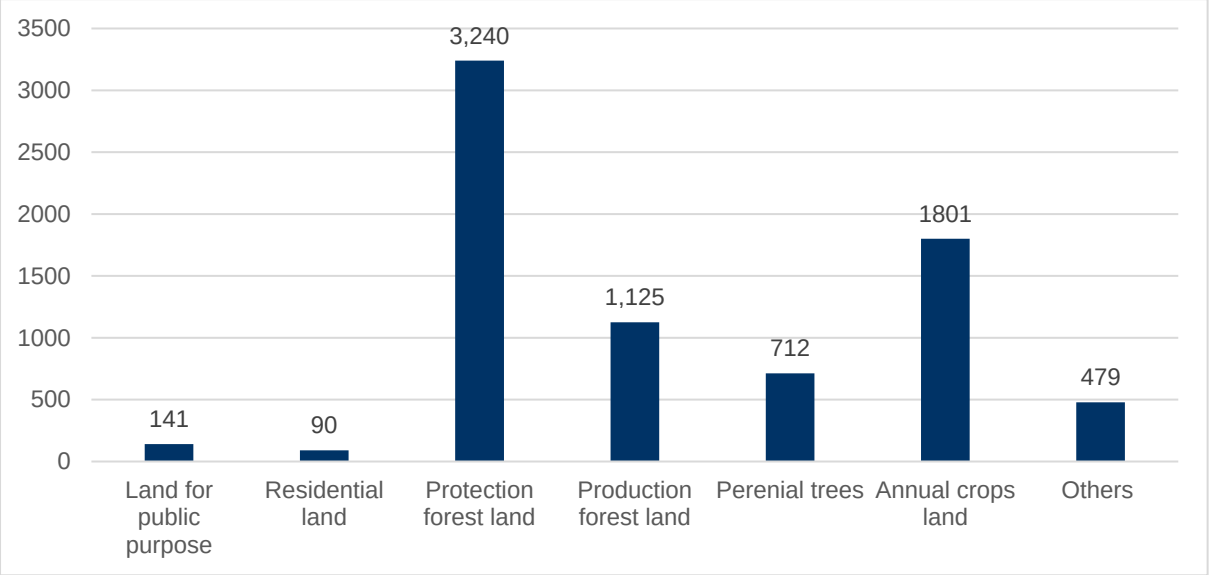
[32] Binh Thuan online, 2020, retrieved on 27 July 2020, at http://www.baobinhthuan.com.vn/doi-song/tuy-phong-xa-hoi-hoa-dau-tu-xu-ly-rac-thai-129640.html

wastewater is treated at households with a three-compartment septic system and then transferred to the general wastewater collection system.

9.9.1.11 Land Use

Phu Lac has approximately 7,906 ha of all purposes of land use, including agricultural land, forest land, land for a public purpose, and residential land. There is no aquaculture land in Phu Lac. Protection forest land is the largest proportion of land use in Phu Lac, account for 40.98% with 3,240 ha. Annual cropland is the second, with 1,801 ha, and accounts for 22.4%.





Source: Secondary data provided by Phu Lac Commune

Figure 9.42 Land Use Structure (%) and Areas (ha) of Phu Lac Commune

9.9.1.12 Ethnic Minority

Phu Lac's population is approximately 8,912 people, and Cham ethnic people make up 54.26%. with 4,385 people.

Cham People in Phu Lac Commune

PROFILE

History

The Cham community was previously a native of Tuy Phong district, but after merging with the Kinh people of the Dai Viet era, Vietnamese men married Cham people, creating a positive harmony in social and cultural life among the Kinh people and the Cham people.. The Cham community live mostly in Phong Phu commune and Phu Lac commune. In Phu Lac commune they concentrate in Lac Tri village which account for 80% of the village population.

Language

The Cham language is part of the Austronesian language family. As a result of their contacts with Kinh people, the Cham people are bilingual or multi-lingual. Cham people in Phu Lac commune can use both Kinh language and their native language. They speak Cham language at home and within Cham community. At school, office, or speaking with Kinh people, they communicate in Kinh language.

Clothing

Culture

100% of the Cham people in Lac Tri Village follow Ba La Mon religion. There is only worshiping ceremony at the beginning of the 3rd month of lunar year, called Kate Tet. They also have shrines to pray god and the Kate festival is celebrated in shrine.

The Cham people reported in the FGD with them that they followed a matriarchy. During the liberation, before 1945, they followed the father's family name, before that they followed the mother's family name

LIVING AREA IN PHU LAC COMMUNE

Livelihoods

Traditional marine based livelihood has been narrowed, so the Cham people gradually moved inland, some of them mixed with mountainous ethnic groups and live on cultivation and husbandry.

On average, each household has 3 sao of cultivated area, and their main crop is rice with two seasons a year. They also cultivate grapes, dragon fruit, and peanuts. Main livestock include cow, goat, chicken and duck. Some people, especially young people, live on wage-based activities such as workers in garment factory and construction workers.

9.9.2 Chi Cong Commune and Lien Huong Town

Chi Cong

Chi Cong is an east coastal commune, located in the southwest of Tuy Phong district - Binh Thuan province. 13 km northeast of the district center and 75 km southwest of the province center, including 07 villages (Thanh Tan, Hiep Duc 1, Hiep Duc 2, Ha Thuy 1, Ha Thuy 2, Ha Thuy 3, and Thanh Luong village). Its natural area is about 2,502.50 ha. It has a relatively large population with 4,796 households (20,962 people), mainly Kinh people (99.9%) with 20,941 people, living in all the seven villages other ethnic groups (Cham, Hoa, Khmer) account for approximately 0.1% with 21 people.

Table 9.15 Chi Cong Commune Overview

Chi Cong Commune	
Number of villages	7
Area	25.02 km^2
Population	20,962 people
Poverty proportion	48 poor household, 235 near poor household
Ethnic groups	Kinh (99.9%), Cham, Hoa, Khmer
Main religions	Buddhism, Catholic, Brahama
Average income per capita 2019	N/A

Sources: Binh Thuan website, 2020 [33]

Lien Huong

Lien Huong town is the economic - political - cultural center of Tuy Phong district. It has a quite favorable position along the National Highway 1A, having 1,012 ha in area and nearly 1.5 km long coastline. The population of the whole town is 32,636 people with 7,097 households, the average population density is 15.94m^2/person. The annual population growth rate is 1.1%.

Lien Huong town is divided into 14 quarters (Quarters 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, and 14). The town has contiguous roads, to the East bordering East sea, to the West bordering National Road 1A and Phu Lac commune, to the North being adjacent to Phuoc The commune, to the South bordering Binh Thanh commune. Due to its geographic position, it has advantages to develop activities in the economic, cultural and political fields of the locality. The majority (99.9%) of Lien Huong town's residents are the Kinh people (32,606 people) and only 30 people accounting for 0.1% are Cham and Hoa people (Meeting with Lien Huong town People's Committee, October 2020).

[33] Binh Thuan portal website, 2020, retrieved on 21 March 2020, at https://binhthuan.gov.vn/1347/33936/66425/569946/xa-chi-cong/xa-chi-cong.aspx

Table 9.16 Lien Huong Overview

Lien Huong Town		
Number of quarters	14	
Area	10.12 km^2	
Population	29,618 people	
Poverty proportion	174 poor households, 565 near-poor households.	
Ethnic groups	Kinh (99.9%), Cham and Hoa	
Main religions	Buddhism, Catholic	
Average income per capita 2019	N/A	

Sources: Binh Thuan website[34],2020

9.9.2.1 Economy, Livelihoods and Employment

Chi Cong

The economy is basically based on fishing, with more than 519 boats. In addition, people in the commune also live by aquaculture, trading, farming, gardening, afforestation, and animal husbandry. In 2020, the total output of fishing was 10,420 tons. The shrimp farming area is 11.7 ha, the meat production is 59 tons with 11 farming households. Post larvae production is 601 million posts with seven farms. The dragon fruit planting area is 148.3 ha, with a yield of 2,158 tons. The peanut planting area is 12.5 ha with a yield of 28 tons. The total herds of cattle include 1,015 cows, 2,850 sheep, 120 goats, 2,070 chicken and duck, and 108 pigs (Socio-economic report of Phu Lac commune, September 2020).

In the past years, pig prices are not stable due to the African swine fever, hence households did not expand the scale of raising pigs.

The rate of employed workers is 91.2% with 13,183 employees. The main source of income for the people in the commune is fishing, processing, seafood processing and aquaculture. A small number of people work in salt production, agriculture and service business.

For the new rural development program, the commune has achieved 12/19 criteria, including transport, irrigation, rural electricity, schools, information and communications, housing, income, poor households, employed workers, planning, cultural and cultural facilities. Currently, the commune is striving to achieve the criteria of rural infrastructure and commerce, the political system and access to law, defense and security.

The commune faced some hurdles in 2019. The situation of exploiting seafood is sometimes difficult, the output of dragon fruit has not reached the plan, the implementation of new rural criteria still faces many difficulties. Taking advantage of the benefits brought by the long coastline, Chi Cong commune has promoted the local marine economy in recent years. However, the commune as well as the whole province of Binh Thuan also faces a number of challenges in breeding shrimp seed, which is the shrinking area for breeding shrimp due to the inadequate clean water resources used for shrimp farming. Therefore, fishers in the province have proposed to build a planning area for breeding shrimp in Chi Cong commune, which promises to help increase the production of shrimp seed in the commune.

[34] Tuy Phong online news, 2020, retrieved on 21 March 2020, at https://binhthuan.gov.vn/1347/33936/66416/569948/thi-tran-lien-huong/thi-tran-lien-huong.aspx

Lien Huong

The economic structure of the town, reported by the Lien Huong town People's Committee in the meeting with ERM, October 2020, is led by the agriculture (40%) and fishery (30%) activities and followed by trade and services (20%), and other industries (10%). The fishery will be the focus in the coming years for the town's economic development.

The total number of motorboats is 224 boats, and the total fishing production is 7,605 tons. The yield of grain food is 5837.5 tons. The rice cultivation area is 467 ha, dragon fruit is 169.38 ha, grapes are 6.74 ha, and crops are 30 ha. The number of poultry flocks is 3,700 and 2,800 cattle. The proportion of non-agricultural workers accounts for 24.95%.[35]

Moreover, the handicraft and service industries strongly developed with 1266 establishments. The number of establishments in industry-construction is 212, in transportation is 89, in trade and service is 965.

The proportion of non-agricultural workers accounts for 24.95%. The rest are workers in the agriculture, forestry and fisheries sectors and are equally divided across 14 quarters.

The town also faces some difficulties in recent years. Fishers cannot afford to invest in fishing equipment suitable for fishing grounds but also depend on near-shore fishing by small-capacity boats, hence the fishing production cannot improve. The weather conditions with prolonged drought and heavy rain cause flooding in the last months of the year have seriously affected agriculture and fisheries. Consequently, the food output is lower than the target because farmers only work two crops/year.

9.9.2.2 Education

Chi Cong

There is three primary schools and one high school in Chi Cong commune. The commune continues to maintain and reach national standards on education universalization and illiteracy eradication. The graduation rate in the Lower secondary level is 99.56%; the dropout rate is 1.07%. In the elementary level, 100% of students completed. In 2019, the commune community learning centre opened 11 classes with 406 participants, educating about drug prevention, traffic safety, fisheries law, and domestic violence prevention.

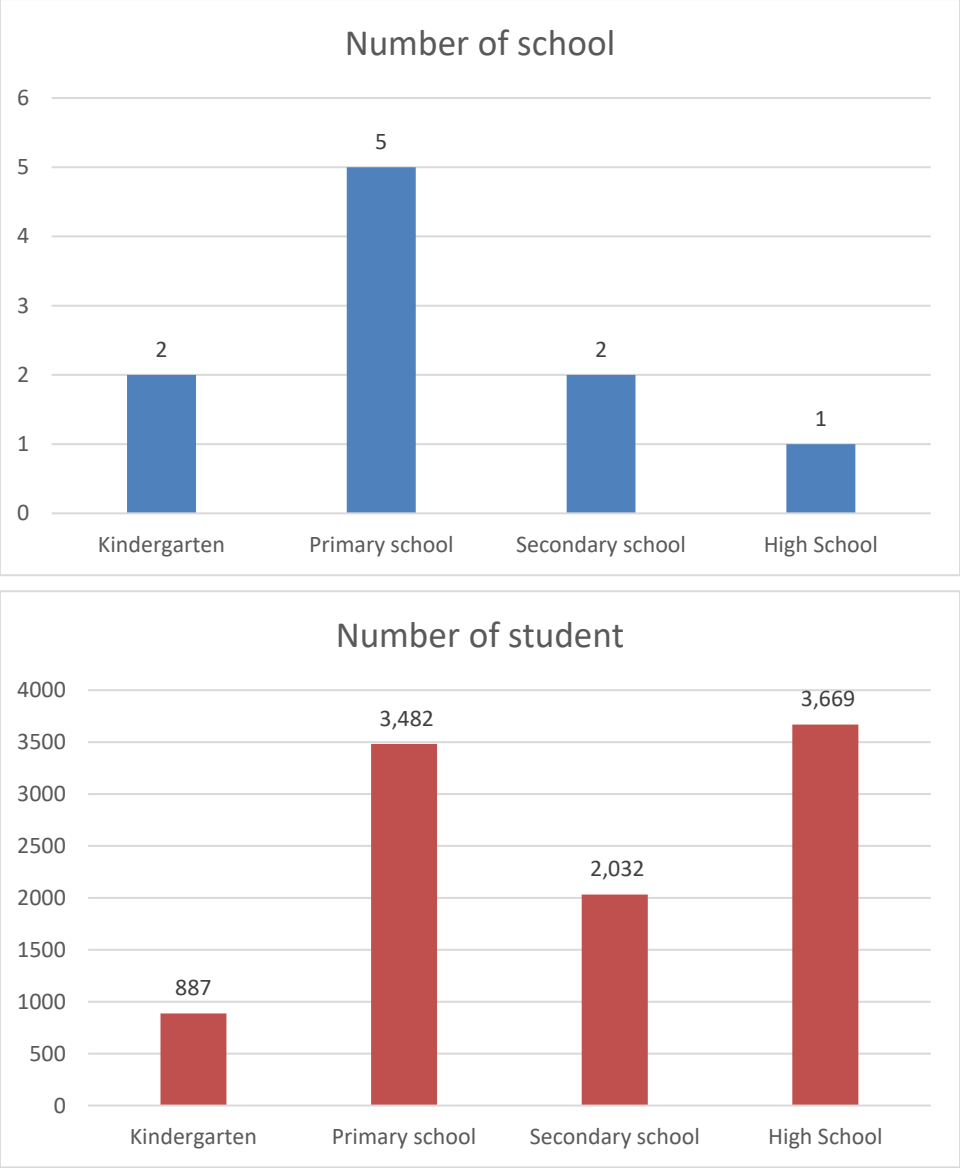
There were 14 drop-out cases at lower secondary school in Chi Cong commune in 2019, accounting for 1.07% of the lower secondary students, increasing four cases than the previous year. While the drop-out rate was 0% at primary school, yet the repetition rate was 2.0%.

Lien Huong

There are 11 public schools in Lien Huong town, including two kindergartens, five primary schools, two secondary schools and one high school. Merely one primary school meeting the national standards for education. There were 887 infants in two kindergartens, 3,482 primary students, 2,032 junior secondary students and 3,669 high school students enrolled in 2019. For high school, given Lien Huong is the center of the district, students are from Lien Huong town and other communes of Tuy Phong district are studying in the Tuy Phong high school. This also explains the high number of high school students in Lien Huong town (See Figure 9.43).

The vocational training for rural workers in livestock and poultry raising, nutritional cooking is organized by Bac Tuy Phong Vocational Training Center and the town's authority with three free of charged classes each year.

[35] Report on the socio-economic situation in 2019 Lien Huong town



Socio-economic baseline conducted by ERM, 2020

Figure 9.43 Number of Schools and Students in Lien Huong Town

9.9.2.3 Health

Chi Cong

Chi Cong commune has one communal clinic. No details of the number of health staff available for discussion.

The total number of medical examination and treatment is 5,732 times. The vaccination program for children has 304 participants in 450 children of the commune, reaching 76.03%. The program for taking vitamin A for children achieved 99.59% (2,461/2,471). The child malnutrition rate is 7.03% (Chi Cong socio-economic report, 2019).

Lien Huong

According the information collected in the meeting with the town People's Committee, the town has one communal clinic and the district level health center is placed in the town. In the communal clinic, five physicians[36] are allocated to be in charge of the health care activities of the clinic.

The total number of patients in nine months in 2020 was 1334. The immunization for children has 641 participants in 650 children in the town, reaching 98.61%. The malnutrition rate is 7.17%, with 159 children (Lien Huong socio-economic report, 2019).

9.9.2.4 Infrastructure and Public Services

9.9.2.4.1 Water Supply

Lien Huong town and Chi Cong commune use water from the district water system with three reservoirs, including Phan Dung, Long Song and Da Bac lake. The district will prioritize this water used for domestic use, animal husbandry, and long-term crops watering, especially in the dry season. No significant shortage of water was recorded in 2019 and 2020.

This locality currently has three domestic water supply systems belonging to Tuy Phong Water Plant, located in Phong Phu commune, with a design capacity of 15,000 m^3/ day and night, supplying water to eight communes and towns. However, local water shortage in some residential areas still occurs due to the insufficient supply.

9.9.2.4.2 Waste Management

Currently, the Public Works Management Board of Tuy Phong District manages the collection of rubbish of the district, except for Vinh Hao and Vinh Tan communes, which are in charge by two private collection companies.

The garbage collection frequency is six days/week at households in two towns and the garbage gathering points at the front of the road or the beginning of the small roads in the remaining communes. In each location, on average, waste is collected once every two days. According to Mr. Le Van Hung, Deputy Head of Natural Resources & Environment Department of Tuy Phong district, the domestic waste cannot be collected every day due to the shortage of collection vehicles.

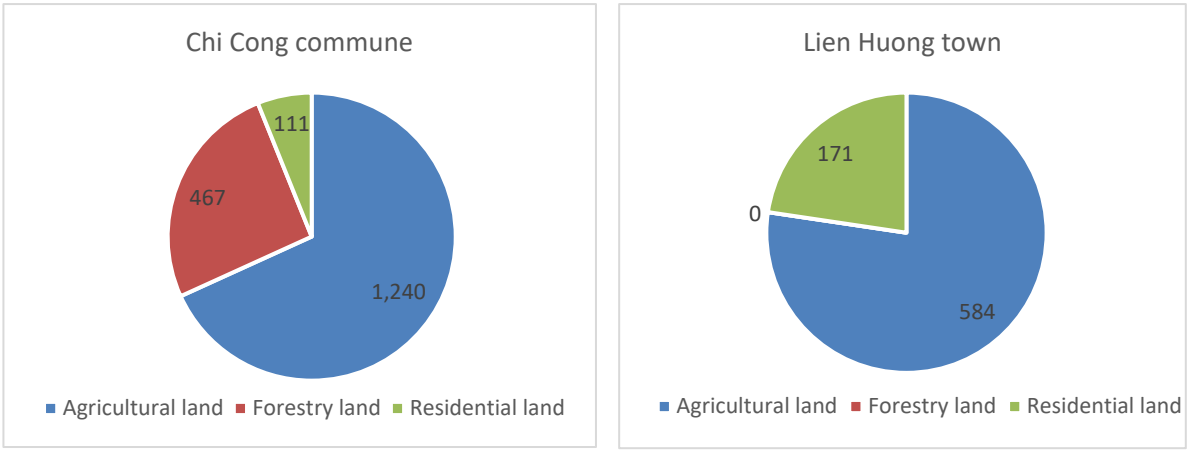
Currently, the garbage is transported to Nui Nang sanitary landfill in Phong Phu commune. The landfill is 8 ha wide and for domestic waste treatment only[37].

9.9.2.5 Land Use

In the absence of land use information from the Socio-economic report of Chi Cong commune and Lien Huong town, these areas' land use structure is presented based on Decision 664/2020/QD-UBND on Land use planning for 2020 of Tuy Phong District. The majority of land in these communes is agricultural land with 1,240 ha (68,2%) in Chi Cong commune and 584 ha (77.4%) in Lien Huong town. There is no forestry land in Lien Huong town, while 467 ha (25.7%) of forest in Chi Cong commune. As a centre of the district, Lien Huong has a significant area for residential land with 171 ha (22.6%); this area in Chi Cong commune is 111 ha (6.1%).

[36] No information on number of doctor and nurse is specified.

[37] Binh Thuan online, 2020, retrieved on 27 July 2020, at http://www.baobinhthuan.com.vn/doi-song/tuy-phong-xa-hoi-hoa-dau-tu-xu-ly-rac-thai-129640.html



Source: Decision 664/2020/QD-UBND on Land use planning for 2020 of Tuy Phong District, 2020.

Figure 9.44 Land Use Structure of Chi Cong Commune and Lien Huong Town

9.10 Living Conditions of Local People in the Affected Communes

9.10.1 Overview of the Surveyed Population

The socio-economic baseline was carried out in Tuy Phong district where affected households (AHs) whose land is acquired for developing the Phu Lac Wind Power Project (The Project). The AHs mainly reside in three communes/town of Tuy Phong district, including Phu Lac commune, Phong Phu commune and Lien Huong town. See Figure 9.45 for the illustration of the surveyed areas.

This section will analyse the survey results with the sampling of 149 households and 05 FGDs. The study was conducted from 11 to 14 November 2020.

ERM was provided by the Project Owner a list of 39 households who supposedly be affected by the Project's land acquisition (hereinafter as "Affected Households" or "AHs"), but only 33 households were contactable and agreed to provide information, accounting for 84.6%. There were 06 HHs whose agricultural land in the Project area, but the research team could not identify where they lived.

The researcher also recruited 116 other households who are not on the list of affected households into the survey. These households were drawn on the basis of a convenient sample and living within the affected and nearby communes (hereinafter as "Not Directly Affected Households" or "Not Directly AHs"). The purpose of selecting this Not Directly Affected Households group who are living in similar conditions and have similar livelihood sources as a control group is to compare with the AH group and to have an understanding of the overall socio-economic conditions of the surveyed communes.

After data cleaning and validation, the final survey sample is 149 households, with the detailed number analysed by the commune, gender, ethnicity, and religion showed in Figure 9.46.

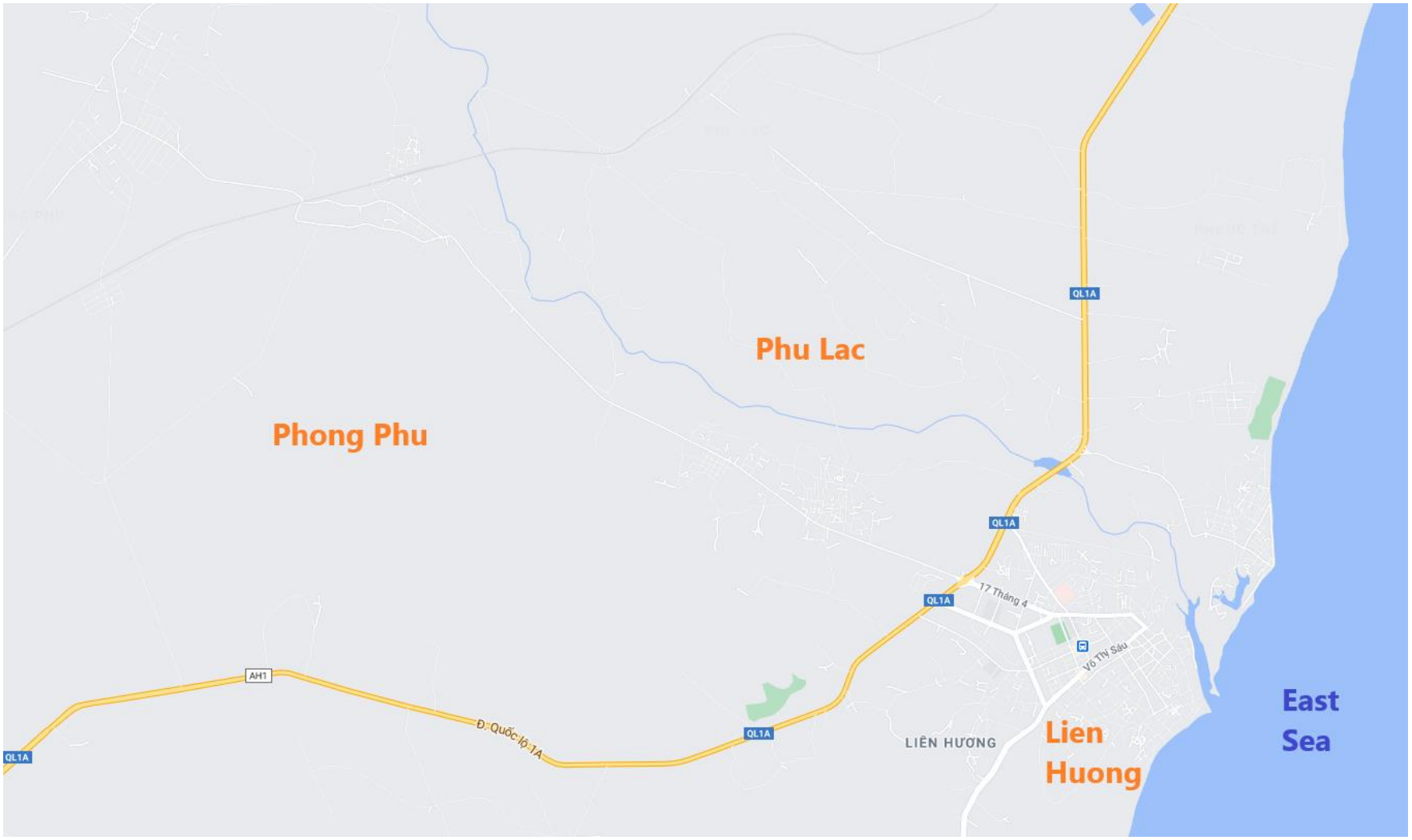


Figure 9.45 Surveyed Areas

Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.46 Overall Information of the Surveyed Respondents

Phu Lac Wind Power Project to be located in Phu Lac commune. However, the landowners currently live in Phu Lac commune and Lien Huong town or Phong Phu commune. Therefore, the surveyed population extended into Lien Huong and Phong Phu in order to cover a viable population who might be impacted by the Project. In the three studied communes/town, there were 113 (75.8%) households from Phu Lac commune, 34 (22.8%) from Lien Huong town and 02 (1.4%) from Phong Phu commune. Male and female interviewees are relatively equally involved in the surveyed households, 49.7% (n=74) for males and 50.3% (n=75) for females.

Table 9.17 Number of the Surveyed Households by Commune

Surveyed Area		AH		Not directly Affected households		Total	
Commune	Village	#	%	#	%	#	%
Phu Lac	Phu Dien	16	48.48%	97	83.62%	113	75.84%
	Lac Tri	0	0.00%	0	0.00%	0	0.00%
Lien Huong	Cluster 1	1	3.03%	1	0.86%	2	1.34%
	Cluster 3	1	3.03%	9	7.76%	10	6.71%
	Cluster 4	3	9.09%	3	2.59%	6	4.03%
	Cluster 5	7	21.21%	1	0.86%	8	5.37%
	Cluster 6	1	3.03%	2	1.72%	3	2.01%
	Cluster 8	2	6.06%	3	2.59%	5	3.36%
Phong Phu	Village 1	2	6.06%	0	0.00%	2	1.34%
Total		33	100.00%	116	100.00%	149	100.00%

Source: Socio-economic baseline conducted by ERM, 2020

As indicated in Table 9.17, more than three-fourth of interviewees were from Phu Lac commune, where AHs mainly reside. The surveyed households included 693 people, with 168 project's affected persons (PAPs), account for 24.2%, and 525 (75.8%) people who are not directly affected by the Project's land acquisition.

On average, each household had 4.7 members, and the average household size of AHs (5.1) is slightly more than that of Not directly AHs (4.5). This average household size was greater than the national average (3.7) reported in Vietnam Household Living Standard Survey 2018 and greater than the province average of Binh Thuan in 2016 (3.8).

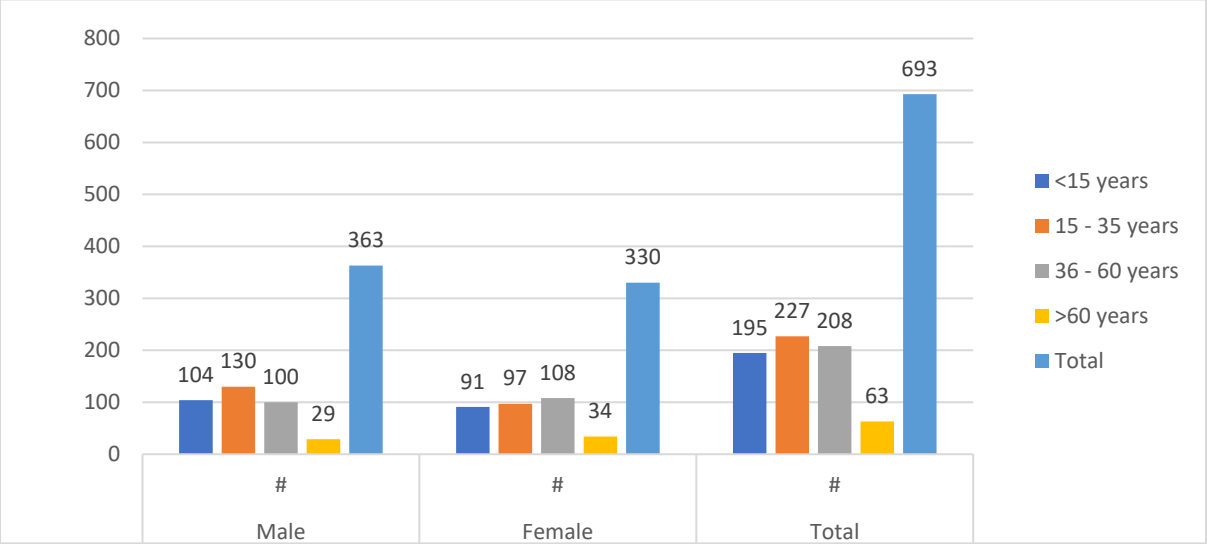
Table 9.18 Number of Surveyed Households

	Number of surveyed households	Total of people	% people	Household size	Minimum of family member	Maximum of family member
AHs	33	168	24.2%	5.1	1	9
Non-directed AHs	116	525	75.8%	4.5	1	10
Total	149	693	100.0%	4.7	1	10

Source: Socio-economic baseline conducted by ERM, 2020

Of 693 household members providing information on age, 498 members (71.9%) aged 15 and above. Of which, 9.1% (n=63) people who are older than 60 years old. There are 28.1% (n=195) under the

working age, which means under 15 years old. Consequently, this group's working population accounts for 62.8% (n=435), lower than that of Vietnam, approximately 70.3% in 2019[38]. (See Table 9.18).



Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.47 Age Structure of Household Members

As indicated in Table 9.19, 79.9%(n=119) of the surveyed households were male-headed HHs. There were only 30 female-headed HHs, accounting for 20.1%. In terms of religion, nearly a half of the surveyed population claimed that they are non-religion[39], accounting for 43.0%, followed by Balamonism with 29.5% (n=44) and Buddhism with 26.2% (n=39). The surveyed households' dominant ethnicity was the Kinh people, accounting for 69.8% (n=104). The Cham ethnic minority comprise the remaining with 30.2% (n=45). Only 17 households (11.4%) reported that they belonged to the poor or near-poor household category regarding household poverty status.

Table 9.19 Socio-Demographic Characteristics of the Surveyed Households by Different Categories

Households' categories	Affected Households		Not directly AHs		Total	
	#	%	#	%	#	%
Population by surveyed area	168		525		693	
Phu Lac	71	42.3%	437	83.2%	508	73.3%
Lien Huong	83	49.4%	88	16.8%	171	24.7%
Phong Phu	14	8.3%	0	0.0%	14	2.0%
HH head's gender						
Male-headed HH	26	17.4%	93	62.4%	119	79.9%
Female-headed HH	7	4.7%	23	15.4%	30	20.1%
Religion						
Non religion	22	14.8%	42	28.2%	64	43.0%
Buddhism	10	6.7%	29	19.5%	39	26.2%
Catholic	1	0.7%	1	0.7%	2	1.3%

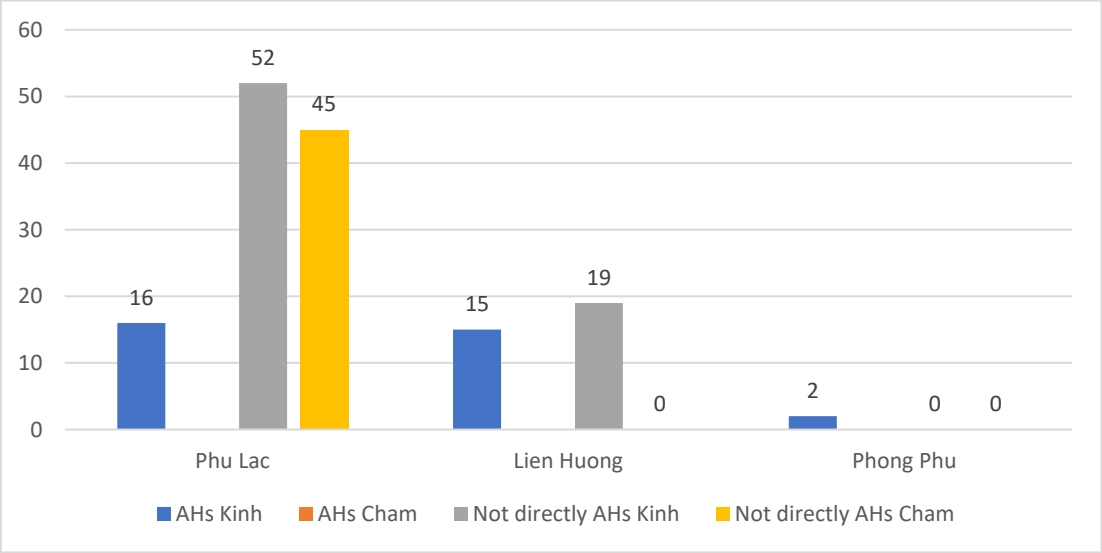
[38]World Bank, 2019, retrieved on 23 December 2020, at https://data.worldbank.org/indicator/SL.TLF.CACT.NE.ZS?end=2019&locations=VN&start=1989&view=chart

[39] The Law on Religion and Folk Belief, No. 02/2016/QH14 Clause 1, article 6, chapter II, retrieved on 30 December 2020, at https://thuvienphapluat.vn/van-ban/Van-hoa-Xa-hoi/Luat-tin-nguong-ton-giao-2016-322934.aspx

Households' categories	Affected Households		Not directly AHs		Total	
	#	%	#	%	#	%
Balamonism	0	0.0%	44	29.5%	44	29.5%
Others	0	0.0%	0	0.00%	0	0.0%
Ethnicity		0		0	0	0
Kinh	33	22.15%	71	47.65%	104	69.80%
Cham	0	0.00%	45	30.20%	45	30.20%
HH poverty status						
Poor/near-poor household	2	1.34%	15	10.07%	17	11.41%
Non-poor household	31	20.81%	101	67.79%	132	88.59%
Family size (people)	5.1		4.5		4.7	
HH head's average age	53		50		51	
Monthly average income (thousand VND)	24,183		11,993		14,693	
Monthly average expenditure (thousand VND)	12,519		12,454		12,469	
Average length of stay in the surveyed area (years)	45.8		46.9		46.6	

Source: Socio-economic baseline conducted by ERM, 2020

There was a significant difference between the affected household and not-directly affected households in terms of average income and expenditure. In contrast, the monthly average income of AHs was roughly 24,183 thousand VND per household, double higher than that of Not directly AHs, 11,993 thousand VND. Whereas the monthly average expense of both groups was similar, 12,519 thousand VND for AHs and 12,454 thousand VND for not directly AHs. It is worthy to notice that Cham people mostly are residing in Lac Tri village of Phu Lac, but the land required for Project development is mostly from Phu Dien village of Phu Lac commune and Lien Huong town where the Kinh people is residing. In short, 100% AHs are the Kinh while 100% the Cham people belong to not directly AHs. (See Figure 9.48).



Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.48 Distribution of Affected Households in Surveyed Areas by Ethnicity

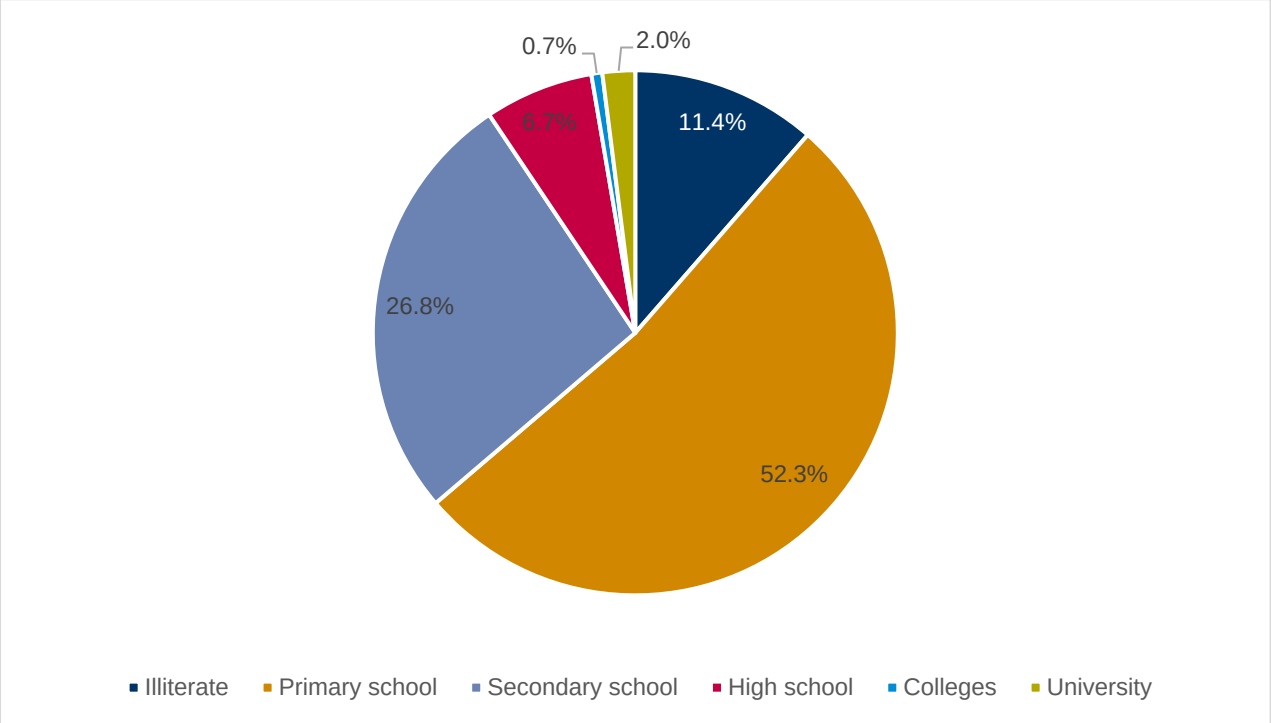
According to the United Nations (UN), there is a significant difference between the majority, the Kinh people and minority people living in the same region, the poverty rate is higher among the EM group in Vietnam. Specifically, the incidence of poverty of Kinh people in the coastal area is as low as 4.1%, while the figure is almost six times larger for ethnic minority people, approximately 25.4%[40]. Moreover, income inequality is more generally related to inequality in all human capital types, such as education and health. Therefore, a more detailed discussion will be made in the following section of "6.2 Human capital".

9.10.2 Human Capital

9.10.2.1 Education Attainment

Education and training play important factors in promoting economic growth and alleviating poverty. Education promotes growth and efficiency, but it can reduce inequality and the impact of disadvantaged backgrounds. According to the World Bank, education is the most effective way to enable young people with poor backgrounds to rise in the economic hierarchy because human capital is the main asset of 90% of any population[41].

Regarding the educational level, the illiterate rate of the surveyed household head is relatively low, as equal to 11.4% for surveyed households. More than half of surveyed household's heads dropped out at primary school, accounting for 52.3%. The survey also reveals that approximately a quarter of household heads achieved a secondary school level (26.8%). Only a few people attained higher education levels, including high school (6.7%), college (0.7%) and university (2.0%).



Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.49. Education Level of the Surveyed Households' Heads

By gender, the highest proportion of household heads was founded to have primary school education (accounting for 49.6% of male-headed households and 63.3% of female-headed households in the

[40]https://www.un.org/development/desa/dspd/wp-content/uploads/sites/22/2019/03/Reducing-rural-poverty-in-Vietnam-Issues-Policies-Challenges.pdf
[41]http://documents1.worldbank.org/curated/en/121791468764735830/pdf/multi0page.pdf

sample), constitute averagely 52.3% of total surveyed households' heads, followed by achieving secondary school, 26.8% of total surveyed HHs. At the higher education level, the female was likely disadvantaged in access to high school, college, or university. For some areas of Vietnam, higher schooling of girls is treated as less of a necessity than the schooling of boys[42]. Within the framework of this baseline, root causes were not identified.

Table 9.20 Household Head's Education Attainment by Gender

Education of HH Head	Male		Female		Total	
	#	%	#	%	#	%
Illiterate	11	9.2%	6	20.0%	17	11.4%
Primary school	59	49.6%	19	63.3%	78	52.3%
Secondary school	37	31.1%	3	10.0%	40	26.8%
High school	9	7.6%	1	3.3%	10	6.7%
Colleges	0	0.0%	1	3.3%	1	0.7%
University	3	2.5%	0	0.0%	3	2.0%
Total	**119**	**100.0%**	**30**	**100.0%**	**149**	**100.0%**

Source: Socio-economic baseline conducted by ERM, 2020

The illiterate rate of AHs (24.2%) was likely higher by affected groups than that of not directly AHs (7.8%). The most popular educational level of household heads in both groups was a primary school. The percentage of AHs who achieved primary school (57.8%) was higher than that of not directly AHs (50.9%). However, the rate of obtaining secondary school of AHs (15.2%) was significantly less than that of not directly AHs, 30.2%. The higher education level graduates, such as high school, college, and university was under 10% for both groups.

Table 9.21 Household Head's Education Attainment by Affected Groups

Education of HH Head	AHs		Not directly AHs		Total	
	#	%	#	%	#	%
Illiterate	8	24.2%	9	7.8%	17	11.4%
Primary school	19	57.6%	59	50.9%	78	52.3%
Secondary school	5	15.2%	35	30.2%	40	26.8%
High school	1	3.0%	9	7.8%	10	6.7%
Colleges	0	0.0%	1	0.9%	1	0.7%
University	0	0.0%	3	2.6%	3	2.0%
Total	**33**	**100.0%**	**116**	**100.0%**	**149**	**100.0%**

Source: Socio-economic baseline conducted by ERM, 2020

Surprisingly, the illiterate proportion of the Kinh household's heads was slightly higher than that of the Cham counterparts, accounting for 12.5% and 8.9%, respectively. Similarly, 25.0% of Kinh HHs achieved secondary school, which was inconsiderably lower than that of the Cham HH's heads with 31.1%. However, more household heads obtained the primary school level of Kinh HH's heads (56.7%) compared to that of the Cham HH's heads (42.2%). In general, getting primary school and secondary

[42] https://fsppm.fulbright.edu.vn/documents/EF6887380842A2E3AC41EC6B950A9AF5.pdf

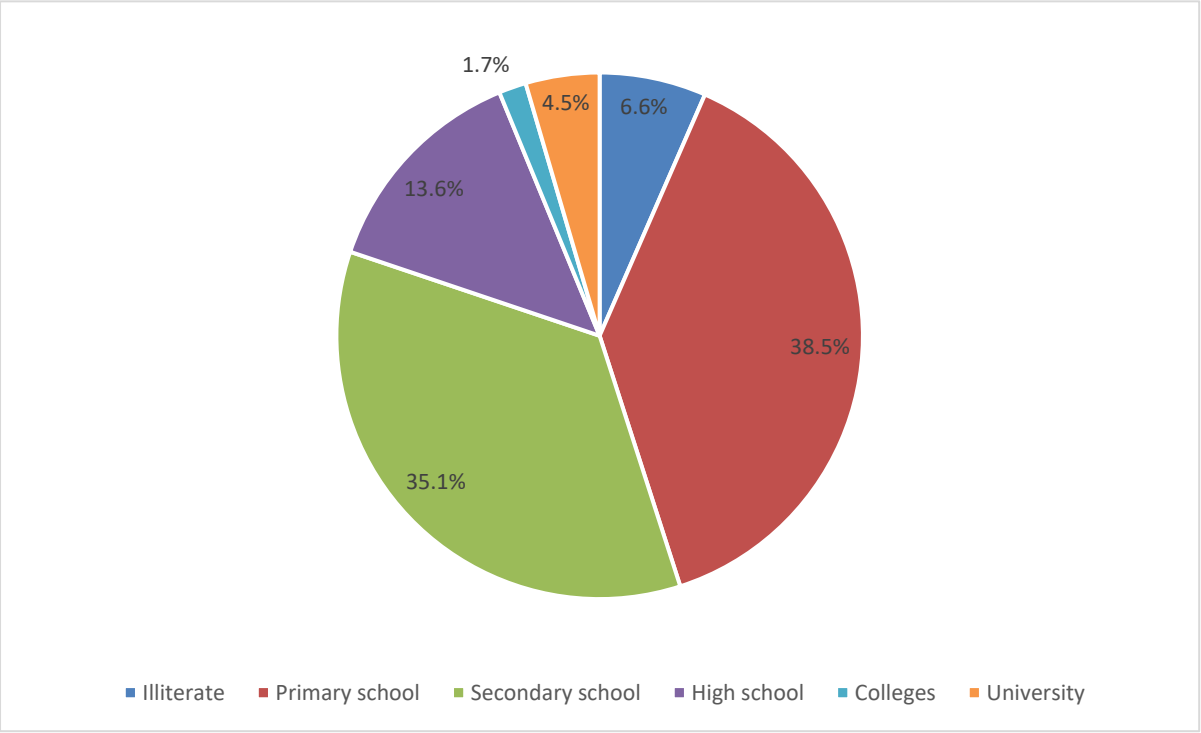
school level was the most popular attainment among household heads of both groups. The reality has shown that many of the Cham people can speak correctly in Vietnamese with Kinh people or other ethnic minority people. FGDs had strengthened this finding because the Cham community seemed confident, not inferior to the Kinh people in communication and education.

Table 9.22 Education Attainment by Ethnicity of Households Heads

Education of HH Head	Kinh		Cham		Total	
	#	%	#	%	#	%
Illiterate	13	12.5%	4	8.9%	17	11.4%
Primary school	59	56.7%	19	42.2%	78	52.3%
Secondary school	26	25.0%	14	31.1%	40	26.8%
High school	5	4.8%	5	11.1%	10	6.7%
Colleges	0	0.0%	1	2.2%	1	0.7%
University	1	1.0%	2	4.4%	3	2.0%
Total	**104**	**100.0%**	**45**	**100.0%**	**149**	**100.0%**

Source: Socio-economic baseline conducted by ERM, 2020

Among 693 households' members, primary school and lower secondary school accounts for a largest proportion, 38.5% (n= 195) for primary school and 35.1% for secondary school. These groups are followed by the high school level population which is recorded at 13.6%. Higher education including college and university is observed at low percentage with 1.7% for college and 4.5% for university (See Figure 9.50). The rate of illiteracy is relatively low in particular with 6.6%.



Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.50 Education Attainment of Household's Members

Table 9.23 Education Attainment of Households' Members

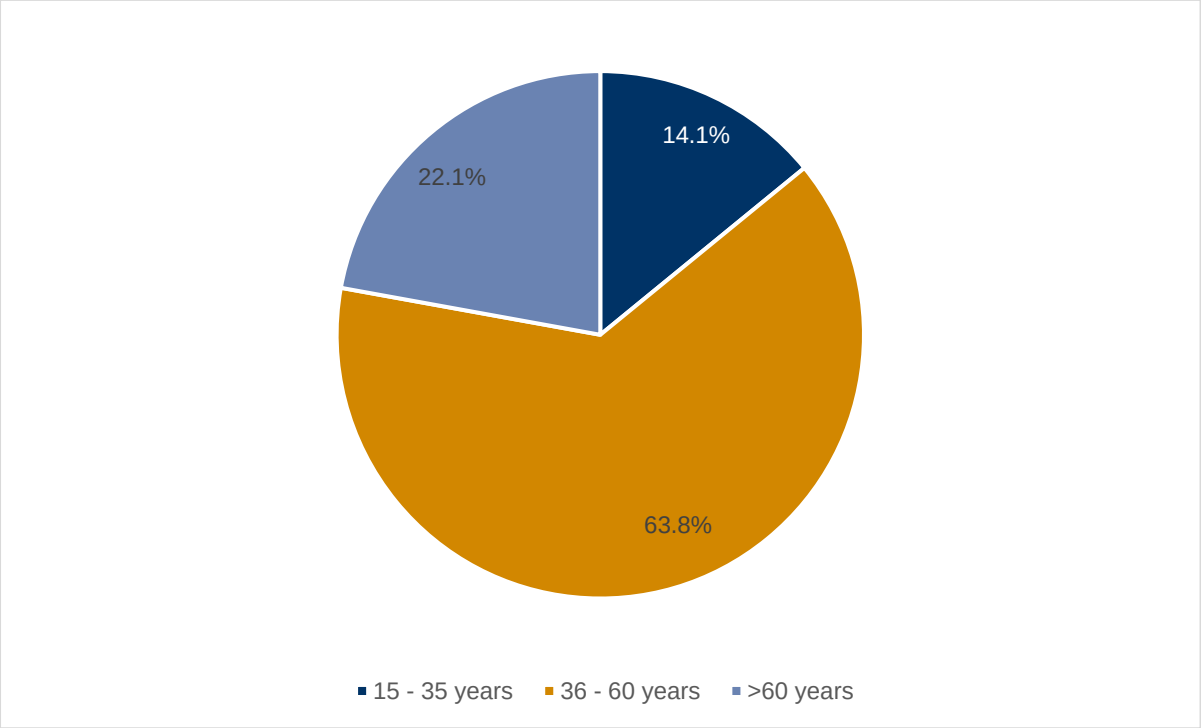
Education of HH Member	Male		Female		Total	
	#	%	#	%	#	%
Illiterate	16	5.1%	23	8.2%	39	6.6%
Primary school	114	36.1%	115	41.2%	229	38.5%
Secondary school	128	40.5%	81	29.0%	209	35.1%
High school	35	11.1%	46	16.5%	81	13.6%
Colleges	6	1.9%	4	1.4%	10	1.7%
University	17	5.4%	10	3.6%	27	4.5%
Total	**316**	**100.0%**	**279**	**100.0%**	**595**	**100.0%**

Source: Socio-economic baseline conducted by ERM, 2020

Regarding total household members, the rate of illiteracy was 7.8%, less than that of HHs heads (11.4%). by gender, as showed in Table 9.23, although female members still reported a higher rate of illiteracy than males (7% compared to 4.4%), more females achieved higher education from high school (13.9% to 9.6%) to university (7.3% to 6.6%) than did males. At primary level, the proportions of two gender groups are relatively similar in particular with 22.9% for male and 26.4% for female.

9.10.2.2 Labour Force

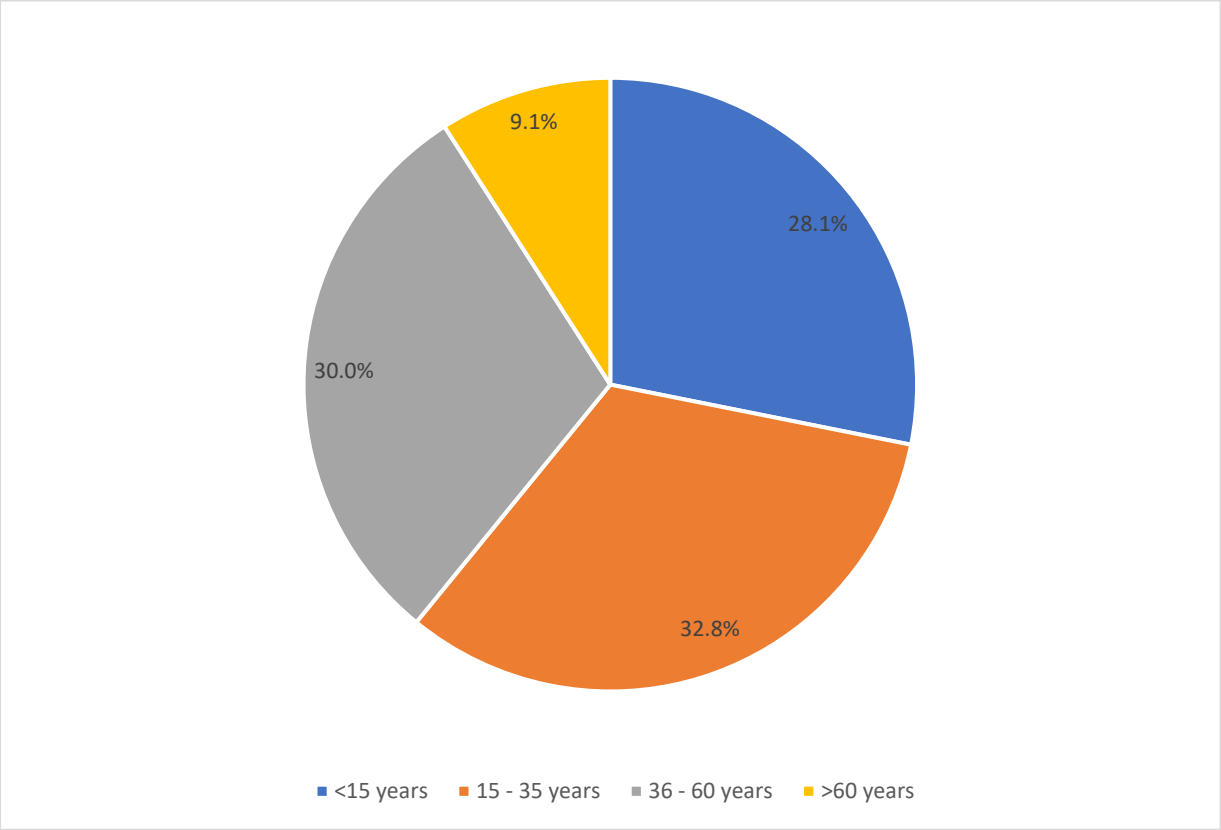
To assess the labour force, it is necessary to know the age structure of the surveyed population (see Figure 9.51). Of 149 household heads, 116 surveyed household heads are of working age (15-60), accounting for 77.9%. The percentage of people over 60 years old is relatively high, at 22.1% (n=33).



Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.51 Age Structure of the Surveyed Households' Heads

In 693 household members providing age information, Figure 9.52 shows that people aged 15-35 years old made up the largest share (32.8%), followed up by members aged between 30 and 60 (30%), then members aged below 15 years old (28.1%), and lastly members of the age over 60 years old (9.1%). This proportion of total household members aged above 60 was slightly less than the national average in 2018, 12.3% and closely the rate of rural older people (10.7%)[43].



Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.52 Household's Members by Age Group

By gender, females' and males' age structure was quite similar to the share of 15-60 years old, accounting for the largest percentage (63.3% for males and 62.1% for females). However, the percentage of members aged above 60 was slightly higher in females than males (10.3% compared to 8.0%).

Table 9.24 Age Structure of the Surveyed Population

Age group	Male		Female		Total	
	#	%	#	%	#	%
<15 years	104	28.7%	91	27.6%	195	28.1%
15 - 35 years	130	35.8%	97	29.4%	227	32.8%
36 - 60 years	100	27.5%	108	32.7%	208	30.0%
>60 years	29	8.0%	34	10.3%	63	9.1%

[43]Help Age, 2019 Ageing population in Vietnam, retrieved on 18 December 2020, at https://ageingasia.org/ageing-population-vietnam/#:~:text=Demographic%20characteristics%3A%20Almost%20all%20older,in%20rural%20and%20mountainous%20areas,

Age group	Male		Female		Total	
	#	%	#	%	#	%
Total	363	100.0%	330	100.0%	693	100.0%
AHs						
< 15 years old	18	21.4%	21	25.0%	39	23.2%
15 - 35 years old	30	35.7%	26	31.0%	56	33.3%
36 - 60 years old	28	33.3%	32	38.1%	60	35.7%
> 60 years old	8	9.5%	5	6.0%	13	7.7%
Total	84	100.0%	84	100.0%	168	100.0%
Not directly AHs						
< 15 years old	86	30.8%	70	28.5%	156	29.7%
15 - 35 years old	100	35.8%	71	28.9%	171	32.6%
36 - 60 years old	72	25.8%	76	30.9%	148	28.2%
> 60 years old	21	7.5%	29	11.8%	50	9.5%
Total	**279**	**100.0%**	**246**	**100.0%**	**525**	**100.0%**

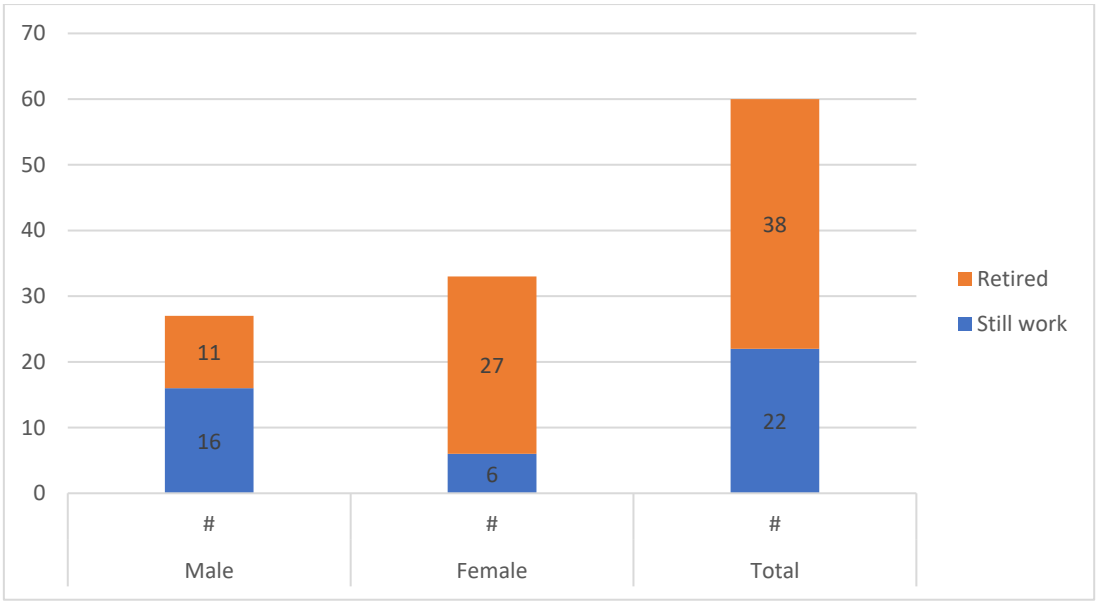
Source: Socio-economic baseline conducted by ERM, 2020

By displacement status, the male and female ratio of two surveyed groups (AHs and Not directly AHs) is relatively identical over the four age groups. The working age population of the two surveyed groups account for the majority of the total surveyed population.

The unemployment rate of the working-age population was 6.0%. This finding is higher than that of the country, 2.04% in 2019, and of Binh Thuan province, 2.56%[44] .

The number of the elderly (>60 years old) participating in the working market was 26 people (34.9%), including 16 males and six females. Most of them work in agriculture. This figure pointed out that it was more common for elderly men to continue working than the female counterparts.

[44] Binh Thuan online, 2020, retrieved on 18 July 2020, at http://www.baobinhthuan.com.vn/en/business/labour-market-rebounding-quickly-labour-minister-129350.html



Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.53 Number of Elderly People by Working Status

9.10.2.3 Livelihoods

As described above, agriculture is the dominant livelihood in the working population of the study. Promoting the advantages of irrigation projects having been invested, especially Long Song lake is responsible for providing water for direct irrigation of Phu Lac cultivated land, its total storage capacity is 36 million m^3. Residents in the commune have expanded production scale, applying scientific and technical advances to agricultural production to increase the yield. The production has focused on food crops such as rice, cassava and maize; short-term industrial crops such as purple onion, peanut; and fruits such as dragon fruit and jujube to serve the Vietnam market. When drainage services are improved, some paddy land will be converted to maize, peanut production. Rice-based production systems will also change, incorporating more rotation crops to improve soils, pest management, and greater specialization—including in various vegetables and other eco-safety production systems. Despite the decline in the rice cultivation area, local farmers will continue to experience production, which provides a significant surplus with a larger share of high quality and specialty products such as purple onion and fruit plants, promising to provide higher profits for farmers and enterprises.

Purple onion

Rice

Dragon fruits

Jujube

Figure 9.54 Main Crops in the Surveyed Areas

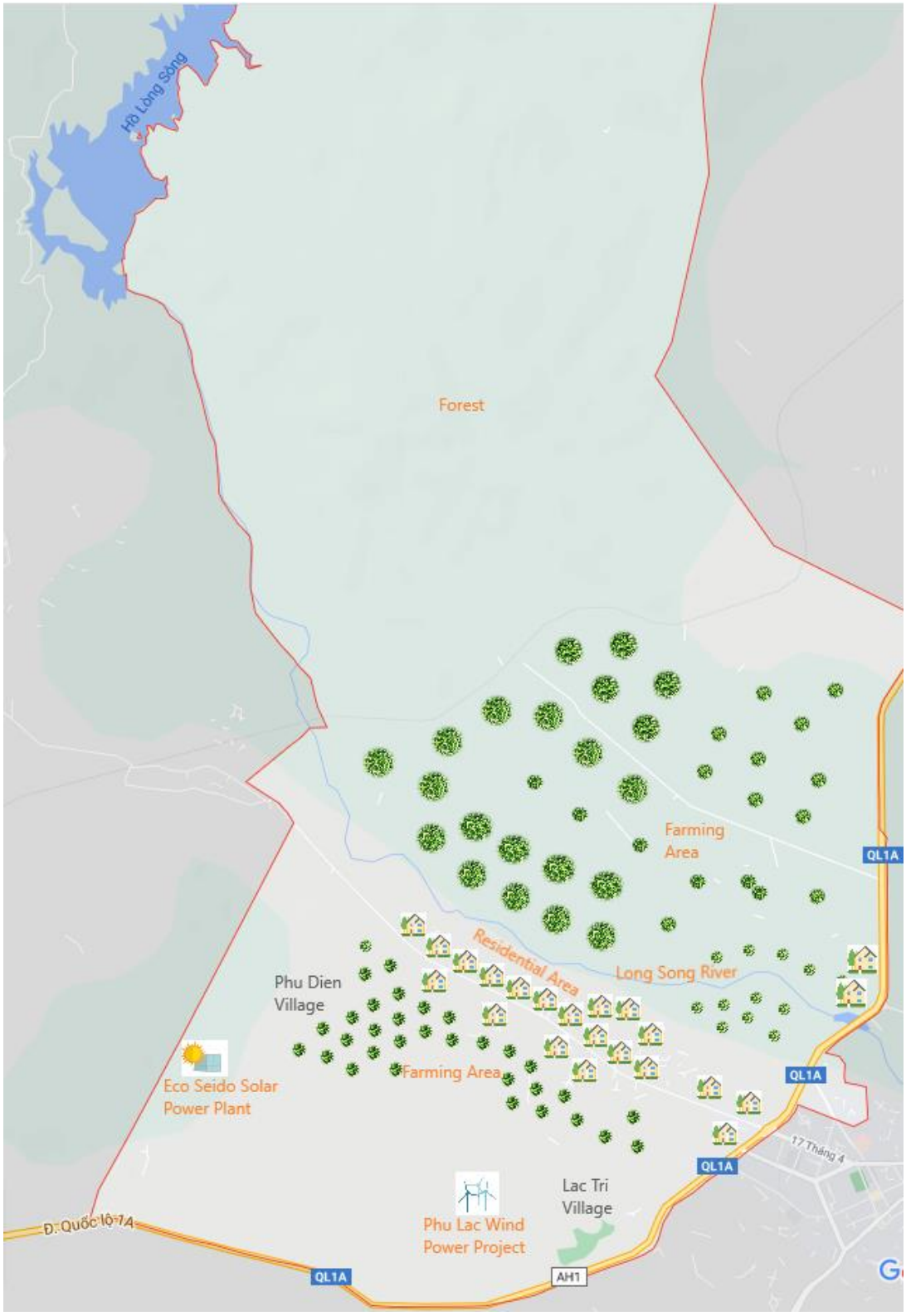


Figure 9.55 Cultivation Area nearby the Project Site

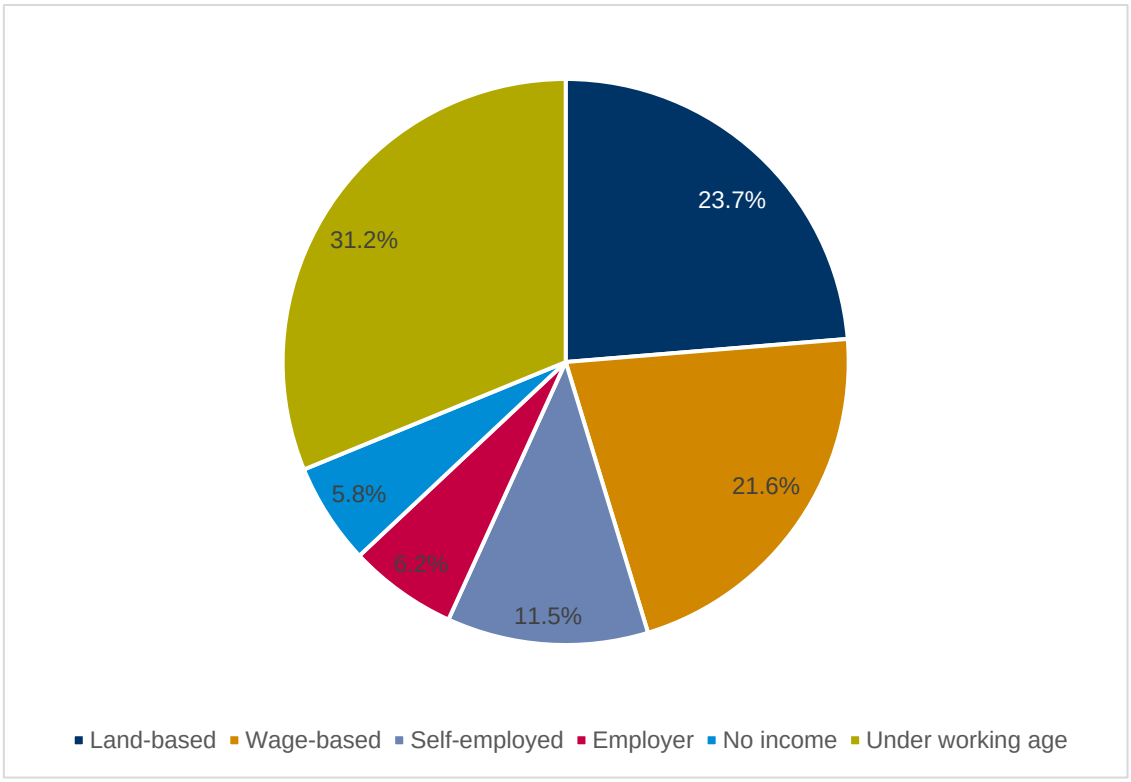
However, recurring crop failures caused by severe droughts or floods, which have brought significant damage to agriculture, have concerned Phu Lac farmers as they could only yield one or two crops per year instead of two or three like before. Specifically, the cultivated rice area in 2020 reached 77.4% of the Phu Lac commune authorities and decreased 15.8% compared to the same period last year. Consequently, many of them switch to other farming productivities such as purple onion, dragon fruit,

or jujube or forcibly do a part-time job such as purple onion processing and farming when having free time to increase their income. They could earn 100-200 thousand VND per day. According to FGDs, paddy fields focused mainly on harvesting spring paddy with the average annual yield at 59 quintals/ha, slightly lower than that of Tuy Phong with 61 quintals/ha. Moreover, due to unfavourable weather and drought, the numbers of autumn and winter paddy fields are decreased to 1 or 2 crops, less than that of 05 previous years (3 crops per year), resulting in the decline of the total planted area of paddy per year.

Purple onions have been grown in sandy soil in this area for over the years, the local residents will keep the onion breeds, so the quality and aroma are unique and preserved. Phu Lac farmers produce around 53.8 hectares of purple onions every year with a yield of over 1.5 tons/ha. Moreover, the market price of purple onion is constantly increasing. As a result, Phu Lac residents' living standards have greatly improved; they feel it secure to grow purple onion. On the one hand, FGD participants revealed that purple onions' current price was 40-45 million VND per ton, hence a farmer could earn up to 150 million/ ha/ per year for profit.

On the other hand, the participants explained a transition from land-based livelihoods to day-labour as drought and flood caused by climate changes have negatively impacted the productivity and number of crops. Nevertheless, many other residents could work for purple onion processing as part-time jobs during spare-time farms. Local people said that their income had been increased from the wage-based job.

In terms of the livelihood structure, these members' labor status revealed some interesting facts. Regarding the overall structure, this survey divided those members into six groups (See Figure 9.56), including land-based, wage-based, self-employed, employer, no income and under-working age. The figure showed under working age account for the largest share of 31.2%, followed by land-based and wage-based livelihoods with 23.7% and 21.6%, respectively. 5.8% of the surveyed population had no income, including housewives, unemployed people and retired people.



Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.56 Livelihoods of the Surveyed Population

It could be seen that land-based livelihoods and wage-based livelihoods are the two main occupations in the community, accounting for 34.4% and 31.4%, respectively. Followed by self-employed accounted for 16.8%, and 9% of surveyed members were employers. The smallest proportion was “no income”, 8.4%. It is noteworthy that the livelihood structure will be excluded 216 people who are under working age, which is under 15 years old by law. Then, the working population will be 477 people. Interestingly, the rate of unemployment and housewife was extremely low, only 0.4%. This information was reinforced through FGDs that local people could participate in light working jobs such as purple onion processing since this kind of job is all year round and labour intensive.

Moreover, there was a similarity in both AHs and not directly AHs group in land-based livelihood, wage-based livelihood, and enterprise-based livelihoods. Regarding wage-based livelihood, their works usually involve working in public and private companies and supporting cultivation for other farmers and food processing. Most of the wage-based male workers were part-time employees or day-labour as seasonal workers. Women are often hired to do light work or work for local food processing, which is not far from their house, whilst men do more physical work for better paid such as land preparation or construction work. However, the retired population in AHs was likely more significant than that of not directly AHs, 14.4% in comparison with 5.7%, respectively. Whereas the employer rate of not directly AHs (10.5%) was roughly double that of AHs (4.8%).

Table 9.25 Main Livelihoods of the Surveyed Population

Livelihood categories	Livelihood types	AHs		Not directly AHs		Total	
		Number	%	Number	%	Number	%
Land-based	Agriculture	46	36.8%	117	33.2%	163	34.2%
	Hunter-gatherer	0	0.0%	1	0.3%	1	0.2%
Wage-based	Worker/staff	19	15.2%	53	15.1%	72	15.1%
	Day labour	13	10.4%	65	18.5%	78	16.4%
Employer	Employer	6	4.8%	37	10.5%	43	9.0%
Enterprise-based	Self-employed	23	18.4%	57	16.2%	80	16.8%
No income	Housewife	0	0.0%	0	0.0%	0	0.0%
	Unemployment	0	0.0%	2	0.6%	2	0.4%
	Retired	18	14.4%	20	5.7%	38	8.0%
Total 15 years old and above people		**125**	**100.0%**	**352**	**100.0%**	**477**	**100.0%**
Under working-age	Student	25		104		129	
	Under school age	18		69		87	
Total surveyed people		**168**		**525**		**693**	

Source: Socio-economic baseline conducted by ERM, 2020

9.10.2.4 Health

Over the last 12 months, some common infectious diseases have been reported by the interviewed households, included influenza, dengue, and hepatitis. However, no interviewees claimed that they and their families had other infectious diseases such as sexually transmitted infections (STIs) or HIV/AIDS. The illness with the highest incidence was flu, which was subjected by 34 surveyed households, accounting for 22.8%. This disease's common symptoms are sinusitis, cough, sore throat, runny nose, nasal congestion, and headache. The next common illness was dengue, accounting for 2.7% (n=4). Dengue is characterized by the mosquito, which thrives in stagnant water, bites, and the dengue virus.

Aiming to minimize dengue, environmental management strategy, which eliminates unnecessary container habitats that collect water such as plastic jars, bottles, cans, tires, and buckets, is recommended. Hand-foot-and-mouth and hepatitis accounted for 1.3% for each. Hepatitis prevention, on the other hand, relates to vaccination and treatment. Indeed, vaccination strategies are critical to halt the spread of infection but identifying current infection is important to refer these patients for treatment and most people who are positive for hepatitis have no symptoms of the illness. Information on hepatitis preventions such as brochures, pamphlets, and posters is not available to the public; hence, the rural population's knowledge on hepatitis illness is limited. Therefore, it is important to note that this answer is based on respondents' provided information only while hepatitis incidences need to be verified via a blood test. Therefore, hepatitis was much lower than that of Vietnam, making up 10-15% population to be positive for hepatitis B virus.

Table 9.26 Common Infectious Diseases of the Surveyed Population

Diseases of HH Head (n=63)	AHs		Not directly AHs		Total	
	#	%	#	%	#	%
Flu	7	4.7%	27	18.1%	34	22.8%
Hand, foot and mouth	1	0.7%	1	0.7%	2	1.3%
Hepatitis	1	0.7%	1	0.7%	2	1.3%
Dengue	1	0.7%	3	2.0%	4	2.7%
Total	**10**	**6.7%**	**32**	**21.5%**	**42**	**28.2%**

Source: Socio-economic baseline conducted by ERM, 2020

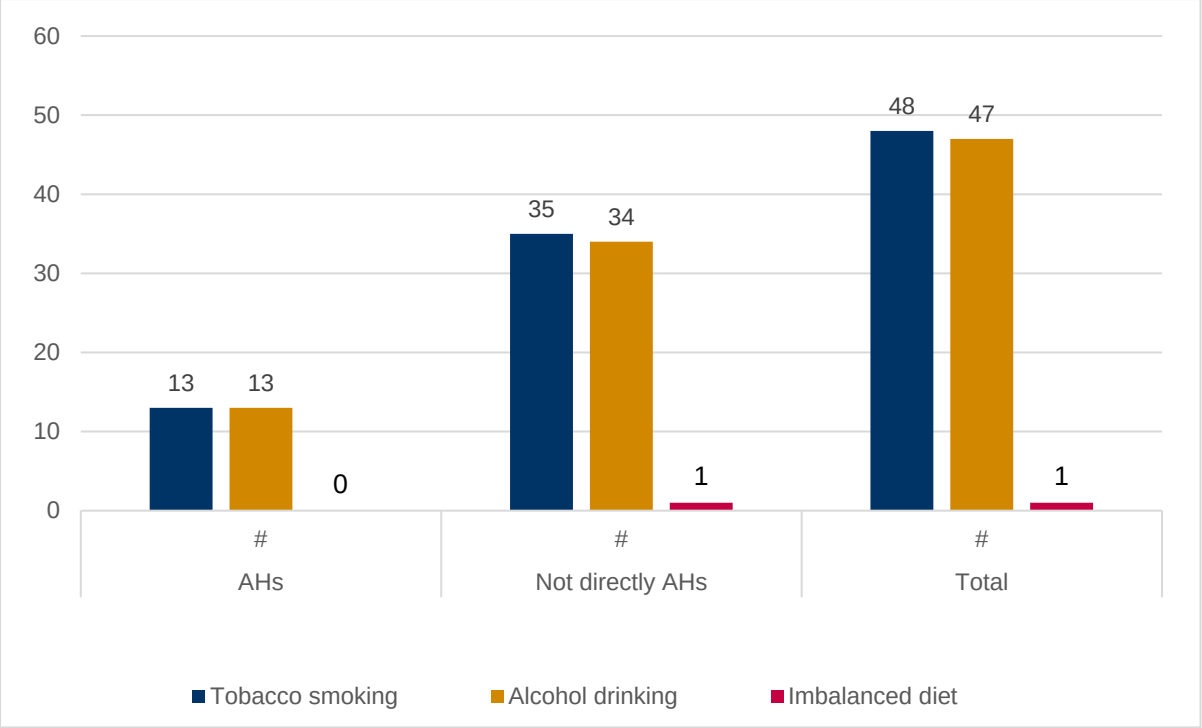
Non-infectious diseases are likely more common in the community, such as respiratory syndrome, sinusitis, diarrhoea, and eye-related diseases (See Table 9.27). 34.9% of surveyed respondents claimed that they or their families' members had a non-infectious disease in the last 12 months. Respiratory is the most common non-infectious disease in the community, accounting for 18.1%, followed by sinusitis at 7.4%. Allegedly eye is getting more common, with a rate of 6.0%. However, the survey could not figure out the causes relating to eye-diseases.

Table 9.27 Common Non-infectious Diseases of the Surveyed Population

Diseases of HH Head (n=52)	AHs		Not directly AHs		Total	
	#	%	#	%	#	%
Respiratory	4	2.7%	23	15.4%	27	18.1%
Sinusitis	3	2.0%	8	5.4%	11	7.4%
Premature birth	0	0.0%	1	0.7%	1	0.7%
Cancer	1	0.7%	1	0.7%	2	1.3%
Eye related diseases	3	2.0%	6	4.0%	9	6.0%
Others	1	0.7%	1	0.7%	2	1.3%
Total	12	8.1%	40	26.8%	52	34.9%

Source: Socio-economic baseline conducted by ERM, 2020

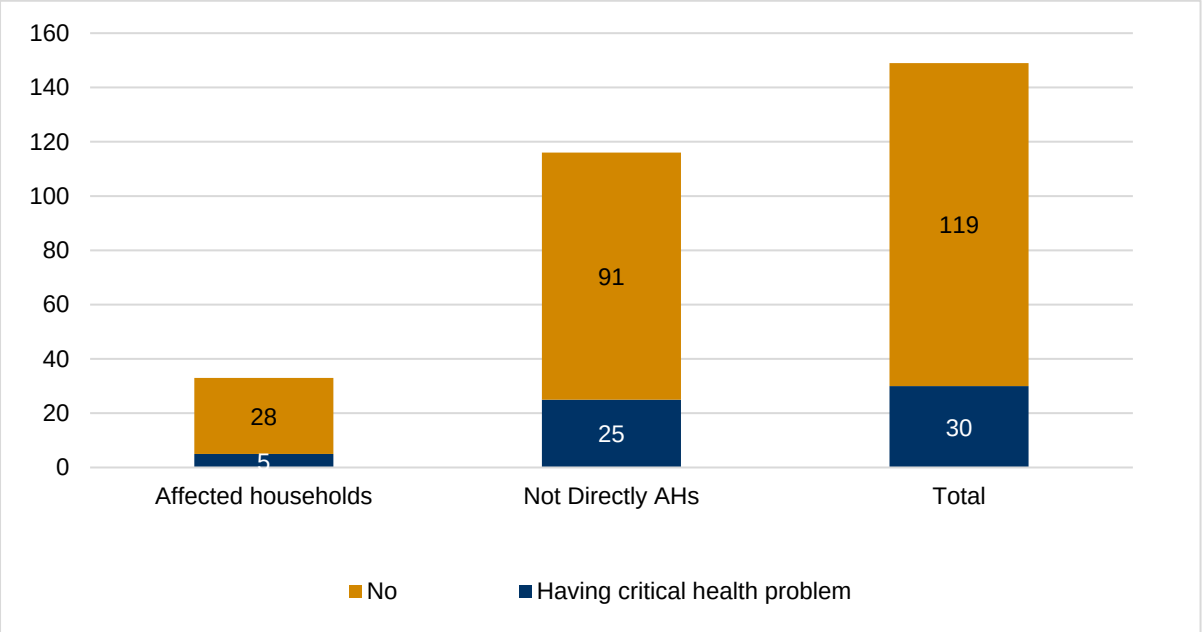
Health behaviours such as the usage of tobacco, alcohol, or drug, and a poor diet importantly contribute to health, mortality as well as expenditure for the community. To illustrate, smoking and alcohol drinking involve spending money on purchasing unhealthy products. The figure showed that 32.2% (n=48) of surveyed households having people smoking, and 31.5% (n=47) households having people drinking alcohol. Moreover, the FGDs participants revealed that alcohol and cigarette addiction were becoming prevalent social issues in the community. In terms of an imbalanced diet, it was a challenge for surveyed respondents because most of them were not sure whether they had a balanced diet.



Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.57 Common Unhealthy Behaviours of the Surveyed Population

Surveyed households reported that facing critical health problems could significantly influence their livelihood. Critical health problems in this context are not a medical term but a self-rated of interviewees. Hence, they are classified as a critical health problem if their family members need to undergo long-term treatment and their diseases impact significantly their living life or family's finance. There were 25.2% (n=30) of surveyed households acknowledged that they had faced critical health problems, including five AHs and 25 not directly AHs.



Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.58 Number of the Surveyed Households Having Critical Health Problems

9.11 Natural Capital

9.11.1 Landownership

The table demonstrated that 98.7% of the surveyed households (n=147) possess residential land with an average area of 869.8m^2. However, there was a significant difference in a residential area among households. The smallest residential area was 20m, while the largest residential area was 44,000m^2. The median size of a residential land area was 240m^2 (median is a central value of the dataset).

Table 9.28 Residential Land Area of the Surveyed Households

Categories	Residential land				
	#	Average (m^2)	Median (m^2)	Min (m^2)	Max (m^2)
Surveyed households	147	869.8	240	20	44,000
AHs	33	868.8	210	90	44,000
Not Directly AHs	114	402.2	240	20	4,000

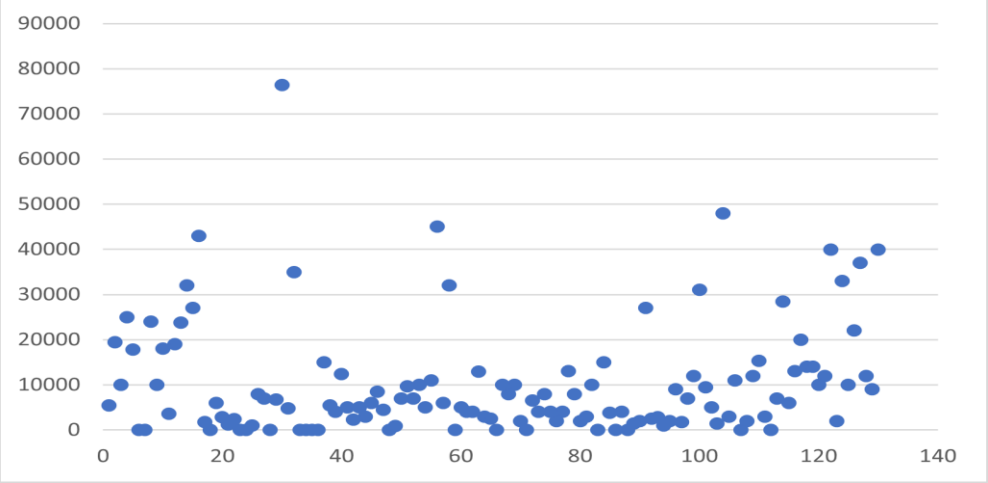
Source: Socio-economic baseline conducted by ERM, 2020

The survey showed that 127 households had cultivated land, accounting for 85.2% of surveyed households. On average, each household possessed an area of 12,420 m^2 or around 1.24 ha. This figure was slightly lower than the national average in 2017 (1.5 ha) (GSO 2017)[45]. Furthermore, the cultivated area size was significantly different among surveyed households. While the smallest cultivated size was only 900 m^2, the largest one was 76,450 m^2. (See Table 9.29).

Table 9.29 Cultivated Land Area of the Surveyed Households

Categories	Cultivated land			
	#	Average (m2)	Min (m2)	Max (m2)
Surveyed households	127	12,420.10	900	76,450
AHs	31	18,216.10	2,000	40,000
Not Directly AHs	96	10,548.50	900	76,450

Source: Socio-economic baseline conducted by ERM, 2020



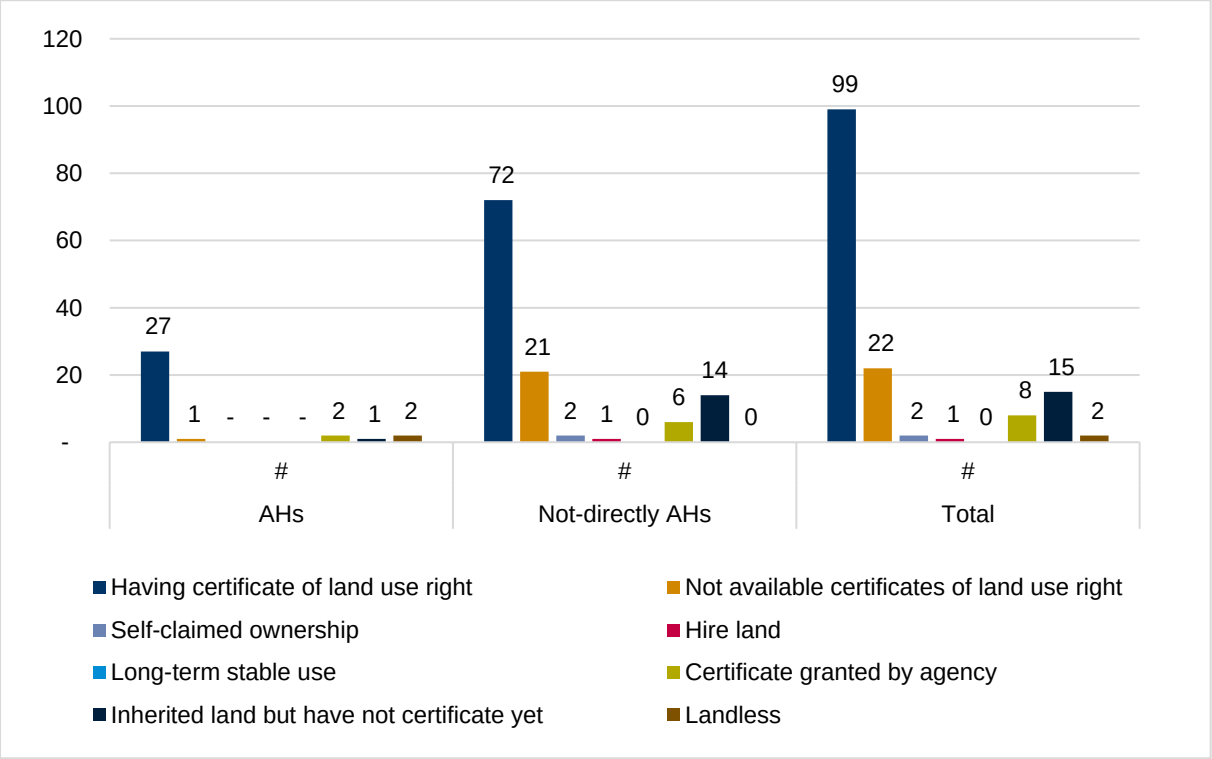
Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.59 Distribution of Cultivated Land Area (m2)

[45]GSO 2017, Vietnam Yearbook of Statistics 2017, Hanoi: Statistical Publishing House

Figure 9.59 illustrated that most HHs had cultivated land less than 10,000m^2 or 1ha, accounting for 64.6% (n= 84) of HHs having cultivated land. Moreover, 77.2% of HHs with cultivated land had an area smaller than the average cultivated area of Vietnam (1.5ha). However, the surveyed households' average cultivated land is much higher than the average cultivated land allocated to each HH in Phu Lac (3 ha per household).

Land ownership paper, cultivated lands, is a source of earning for many households and a valuable asset, so the certificate of land use rights and land ownership is a legal basis to prove the legality of citizens for land use. Especially for AHs, it shall be an important legal basis to apply for the compensation price as well as compensation allowance for households. According to the survey results, there were 66.4% (n=99) of survey households having a certificate of agricultural land use right, 5.4% (n=8) have a certificate of agricultural land granted by state agencies, 10.1% (n=15) of households not having a certificate of inherited land yet.



Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.60 Types of Agricultural Land Ownership

9.12 Financial Capital

9.12.1 Income

The income discussed in this section is defined as income from livelihoods, social welfare and regular financial support from surveyed respondents' relatives. Loans are not summed into the income and are discussed separately in the following section.

The average household monthly income of 149 surveyed households was approximately 14.7 million VND, and a monthly per capita income was approximately 3.53 million VND (see Table 9.30). This figure is much higher than the poverty threshold of MOLISA[46] standard, which is 700,000 VND for rural

[46] According to Decision No.59/2015/QD-TTg, dated 19/11/2015, promulgating multidimensional poverty levels application during 2016 – 2020.

or 900,000 VND for urban inhabitants[47], and it is also nearly equal to the average income per capita of Binh Thuan province (3.58 million VND) and of Tuy Phong district (3.72 million VND). It is interesting to note that PAPs' monthly per capita income was 6,259 VND and significantly greater than that of non-directly affected persons, 2.753 million VND. Conversely, it is reported that there is a drastically higher in household income of AHs in comparison with that of Not Directly AHs in the survey as the figure is 24,138 thousand VND and 11,993 thousand VND, respectively.

By gender, there was no difference in the average income of female-headed HHs and male-headed HHs (14,702 thousand VND and 14,654 thousand VND).

Table 9.30 Description of Income of the Surveyed Households

	Monthly Average Income per household	Monthly Maximum Income per household	Monthly Minimum Income per household	Monthly Average Income per capita	Average family size
Unit	('000VND/ household)	('000VND/ household)	('000VND/ household)	('000 VND/ capita)	#
All surveyed HHs	14,692.6	128,333.3	1,500	3,529.8	4.7
AHs	11,992.6	116,666.7	1,916.7	6,259.0	5.1
Not directly AHs	24,183.4	128,333.3	1,500	2,753.3	4.5

Source: Socio-economic baseline conducted by ERM, 2020

Table 9.31 Average Income of Household's Head by Gender

	Monthly Average Income per household	Monthly Maximum Income per household	Monthly Minimum Income per household	Monthly Average Income per capita
Unit	('000VND/ household)	('000VND/ household)	('000VND/ household)	('000 VND/ capita)
All surveyed HHs	14,692.6	128,333.3	1,500	3,529.8
Male headed HHs	14,702.2	128,333.3	1,500	3,496.5
Female headed HHs	14,654.6	120,000.0	1,583	3,661.8

Source: Socio-economic baseline conducted by ERM, 2020

9.12.2 Expense

The spending of the surveyed community is categorized into (1) 'daily expenses' for basic spending such as electricity, water, energy, food, transportation, and communications; (2) 'monthly expenses' for clothes, social activities, and entertainment; and finally (3) 'unplanned/irregular expenditure' such as significant health care, house renovation and family events.

As the figure indicated, regular expense accounts for the prevalent proportion, 43.5% (or 89,348 thousand VND/household/year) of household expenditure. Followed up by the unexpected expense, made up 41.6% of total HH's expense. Irregular expense accounts for the smallest share of the total expense, 14.8%.

[47] MOLISA, 2020, retrieved on 3rd November 2015, at http://www.molisa.gov.vn/Pages/tintuc/chitiet.aspx?tintucID=24215

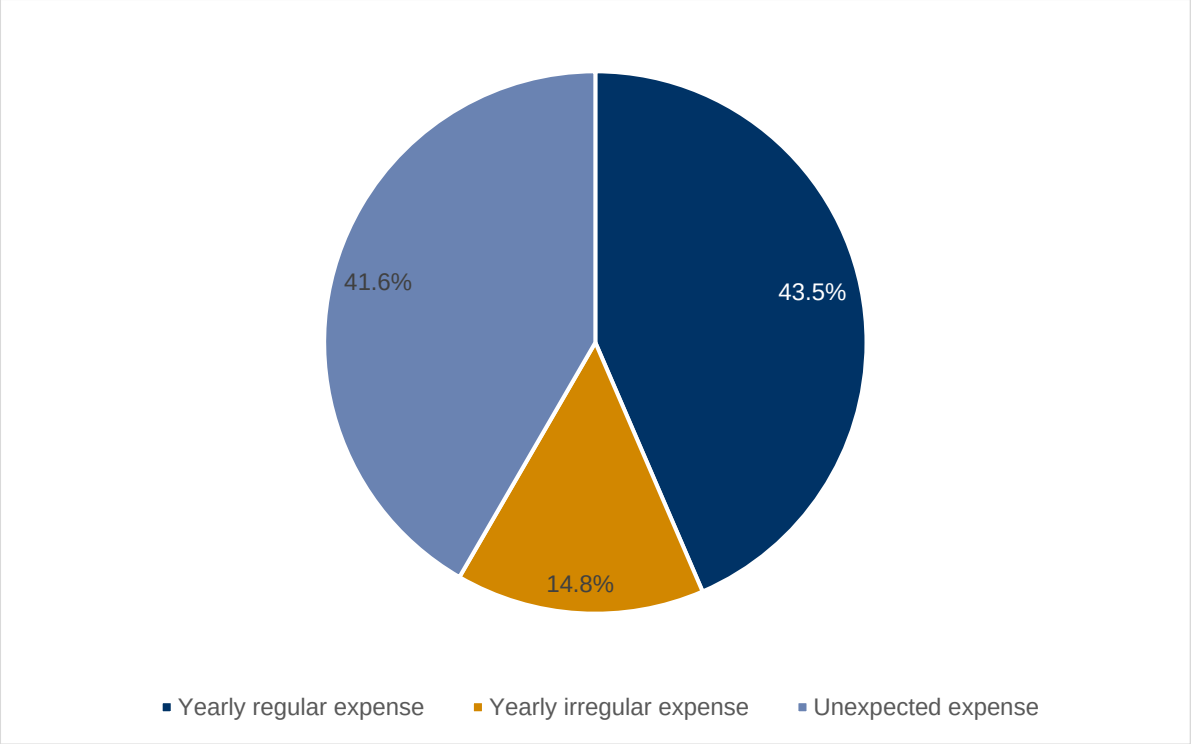
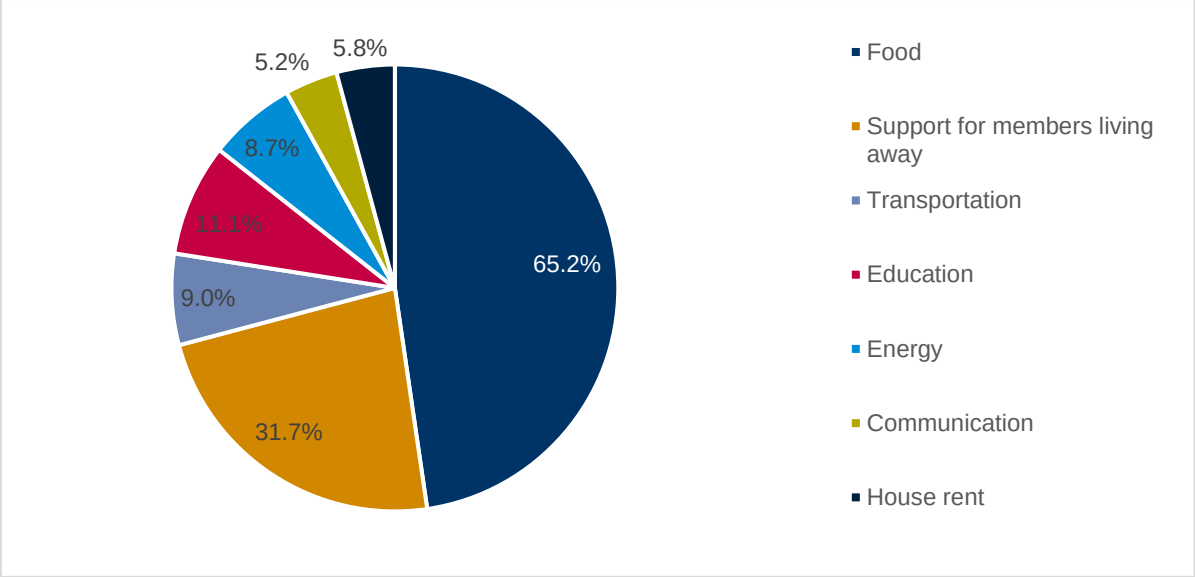


Figure 9.61 Yearly Expense of the Surveyed Households

In this survey, regular expenditure includes foods, supporting family members living away, transportation, education, energy, communication, and house rent. So, the total yearly regular expenditure per household averagely is 89,347 thousand VND. Of which, food constitutes the largest proportion, at 65.2% (or 58,246 thousand VND). This finding is consistent with the information from FGDs that the food typically accounts for a significant proportion of their limited income, and relatively higher than that of the country in 2018, at 47.3%. Moreover, according to GSO[48], the share of total daily life expenditures spent on food and drink is a useful indicator for assessing each household's living standards. The higher this share, the lower the living standard is and vice versa. Viet Nam is a low middle-income country, and this proportion is still high, yet a downward trend has appeared in recent years. The second-largest proportion is supporting for members living away, 31.7%. The surveyed household spent averagely 11.1% of the regular expense for education, much less than the average expenditure of Vietnamese household, 6.6 million VND. Next are the necessary daily expenses, including transportation (8,067 thousand VND or 9.0%) and energy (8.7 % or 7,754 thousand VND).

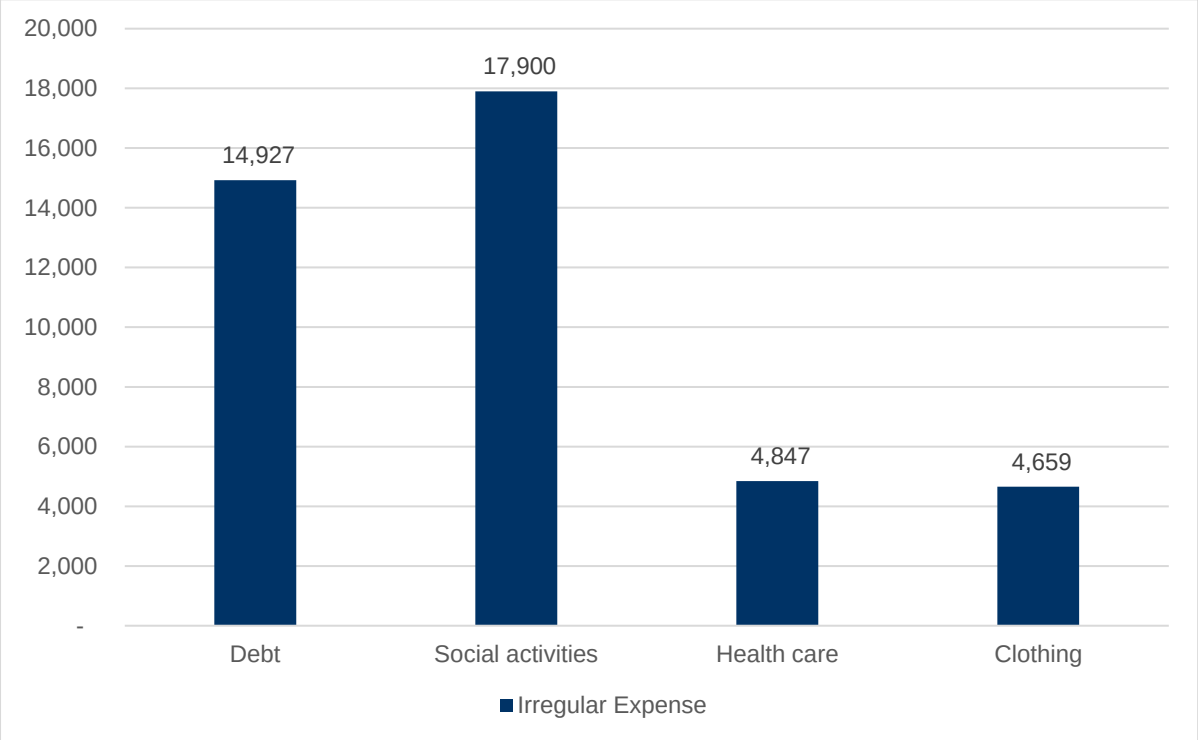
[48] GSO 2018, retrieved on 30 December 2020, at https://www.gso.gov.vn/wp-content/uploads/2020/05/VHLSS2018.pdf



Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.62 Annually Regular Expense of the Surveyed Households

Irregular expenditure relates to paying debt, social activities, health care, and clothing. Although irregular expense made up the smallest of the average household expense, it was still an indispensable expense of every household. It can be seen that in irregular expenses, social activities account for the largest proportion, up to 58.4%.



Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.63. Annually Irregular Expense of the Surveyed Households

In terms of an unexpected expense, 30 HHs reported that they spent on emergency healthcare within 12 months, and 28 HHs spent money on house repairing.

Health expenditure is higher and higher as the improvement of living standard, however, there is another reason that it is caused by the increase of health services prices. In 2018, the average health expenditure per Vietnam person having treatment in one year was nearly 3.16 million VND. Health expenditure for inpatient treatment per person is 5.6 times higher than outpatient treatment (8.47 million dongs vs 1.52 million dongs). Health expenditure increases gradually by age and it reaches a peak at aged 60 years with 5 million VND per year, especially health expenditure for inpatient treatment of old people reaches 12 million VND. Indeed, health expenditure is such a burden for some households with severe diseases. Similarly, for HHs with severe patients, this survey reported that they spent an average of 21,983 thousand VND per household for health treatment.

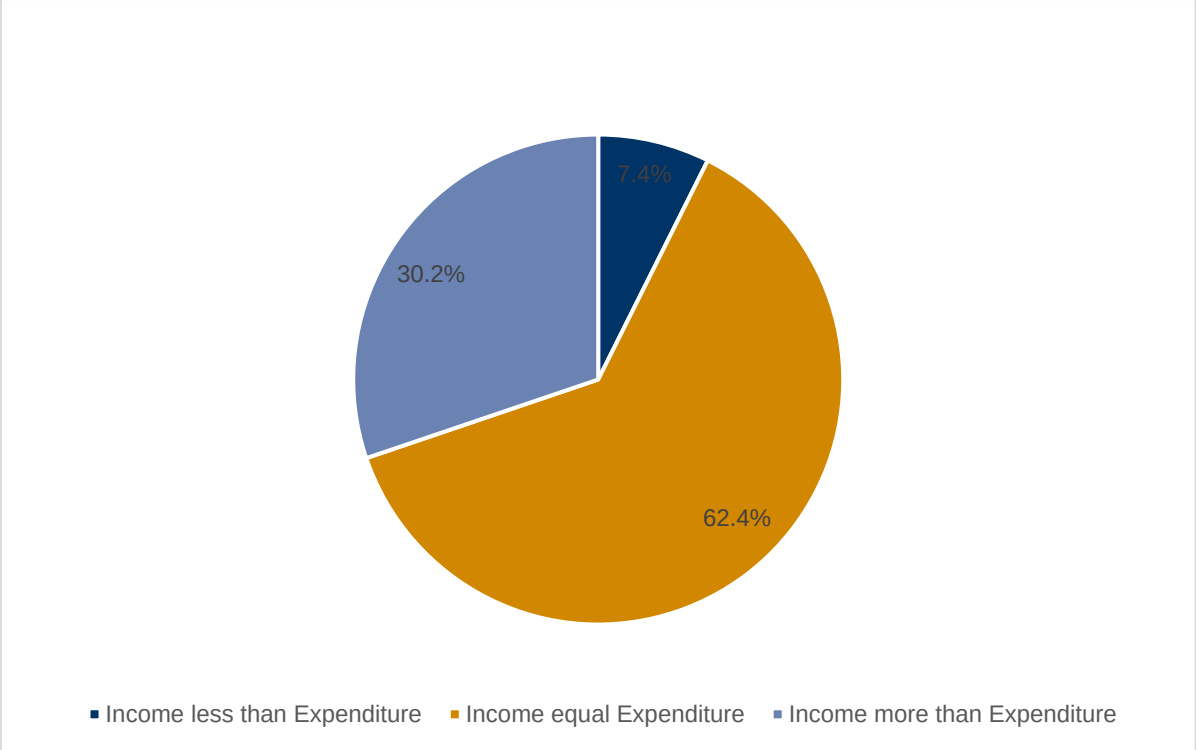
Table 9.32 Monthly Expense of AHs and Not Directly AHs

	Monthly Average Expenditure per household	Monthly Max Expenditure per household	Monthly Minimum Expenditure per household	Monthly Average Expenditure per capita
	('000VND/household)	('000VND/household)	('000VND/household)	('000 VND/capita)
All surveyed HHs	12,469	115,017	1,695	2,877
AHs	12,519	24,533	1,695	2,812
Not directly AHs	12,454	115,017	1,727	2,896

As indicated in Table 9.32, the monthly average expenses of both AHs and Not directly AHs per household and per capita are relatively the same. However, in the Not directly AHs there is a family spent up to 115,017 thousand VND per month and considered as the maximum expenditure of this group. While, the monthly maximum expenditure of AHs group is around 24,533 thousand VND. In overall, the surveyed households spent approximately 3 million for each person and 12.5 million for the whole family.

9.12.3 Balance

Of the 149 surveyed households, households having an equal amount in their income and expenditure made up the largest proportion of the surveyed households, accounting for 62.4% (n=93), followed by households earning more than spending with30.2% (n=45) and 11 (7.4%) households having income less than their expenditure. (See Figure 9.64).



Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.64 Income/Expense Comparison

9.12.4 Debt

Averagely, 76.5 % (n=114) of the surveyed households had debts, which comprise of 18 AHs and 96 not directly AHs (See Table 9.33). Each household averagely needs to pay a 14,926 thousand VND per year for partly principal and interest.

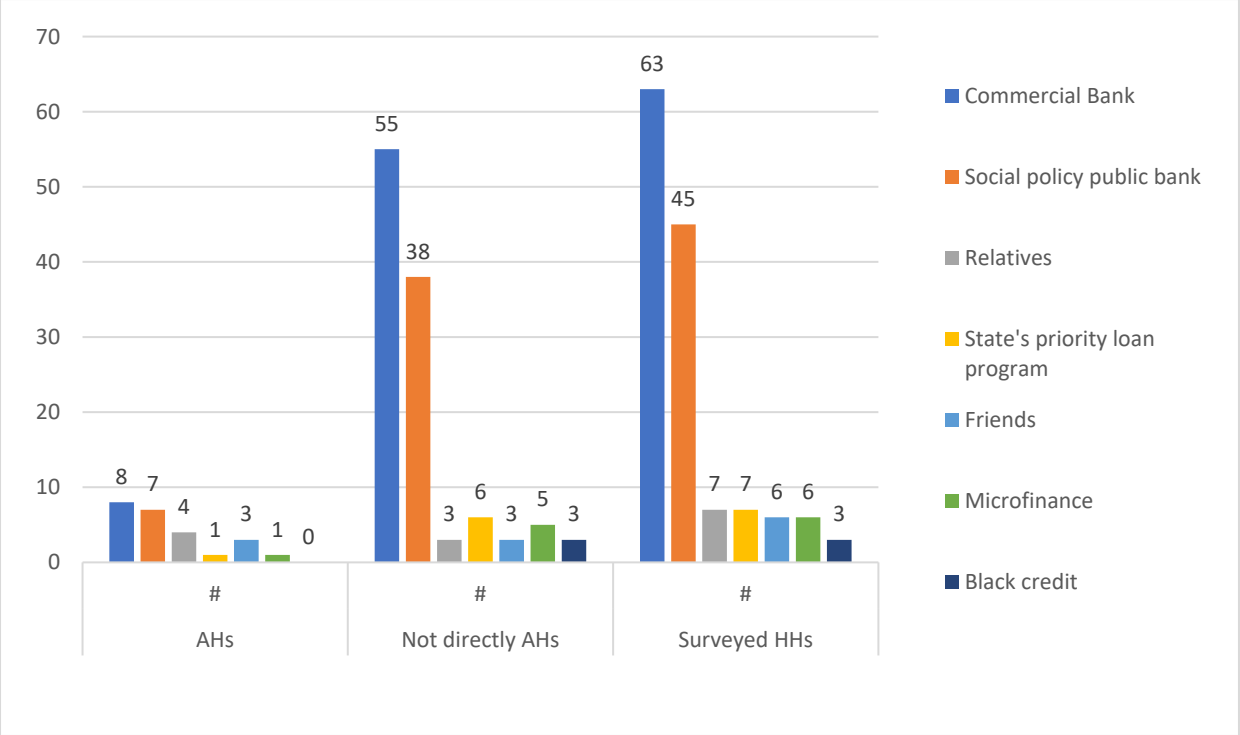
Table 9.33 Number of HHs Having Debt

	Have debt	No debt	Total	% having debt
All surveyed HHs	114	35	149	76.5%
AHs	18	15	33	12.1%
Not Directly AHs	96	20	116	64.4%

Source: Socio-economic baseline conducted by ERM, 2020

The commercial bank was the most common source of financial borrowing, accounting for 55.3% (n=63) of surveyed households having debt. The following loan was from the Vietnam Bank for Social Policies (VBSP), accounting for 39.5% or 45 households. The other sources such as state's priority loan program, microfinance, friends or relatives account for 5-7%. It is important to note that 23 households receiving more than one financial support source and there were three households borrowing from black credit.

Moreover, commercial bank and social policy public bank are the preferred sources of financial loaning for both AH and not directly AHs groups. The next option could be from their relatives or friends/ neighbours or State's priority loan program. There was no difference in financial borrowing preference between AHs and not directly AHs group. Detailed information could be found in Figure 9.65.



Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.65 Source of Financial Borrowing

9.13 Physical Capital

9.13.1 Housing

Most of all households surveyed (98.7%) owned their house privately. There were two households reported that they were living in their relatives' houses.

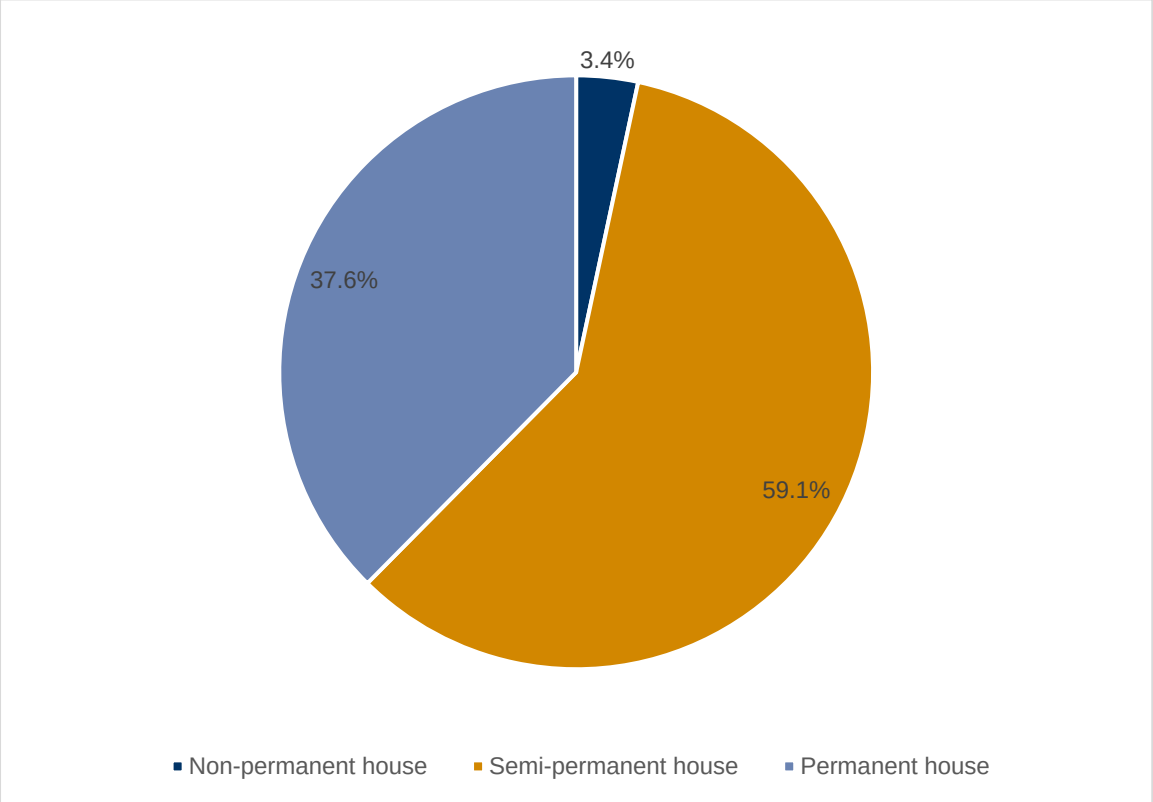
Table 9.34 House Ownership Type by Groups

House Ownership Type	AHs		Not directly Ahs		Total	
	#	%	#	%	#	%
Privately owned	33	100%	114	98.3%	147	98.7%
Borrowed from relatives	0	0%	2	1.7%	2	1.3%
Total	33	100%	116	100.0%	149	100.0%

Source: Socio-economic baseline conducted by ERM, 2020

The survey calculated and separated people's housing into three types: permanent house, semi-permanent house, and non-permanent house (or temporary house). By housing type, semi-permanent houses were found to be the most popular type (59.1%), followed up by permanent houses (37.6%) and non-permanent houses (3.4%). The non-permanent house proportion was slightly more than that of the whole country, 1.7% in 2018. This is an impressive figure because, in the past years, the Party and the State have had many policies to support people in difficult circumstances to build new houses, eliminate temporary houses, and improve current houses for people in rural, remote, coastal, and island areas. Every year, many Vietnamese suffers from different kinds of natural disasters (storms, tornadoes, flash floods), hence the removal of temporary houses, which are unstable accommodation

when facing with these catastrophes, is one of the urgent requirements to help stabilize and ensure safety for people.



Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.66 House Types of the Surveyed Households

Non-permanent house in surveyed area (Lac Tri-Phu Lac)

Non-permanent house in surveyed area (Phu Dien-Phu Lac)

Semi-permanent house in the surveyed area (Lien Huong)

Permanent house in the surveyed area (Lac Tri-Phu Lac)

Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.67 Photos of House Types of the Surveyed Households

Regarding land for house building, most surveyed households (89.9%) built their house on residential land (or non-agricultural land) as presented in Table 9.35. Many HHs have a land certificate for both AHs and not directly AHs group, accounting for 81.8% and 92.2%, respectively. There were only 6 AHs who reported that they did not have a land certificate.

Table 9.35 Residential Land Ownership

Residential Land Ownership Type	AHs		Not directly AHs		Total	
	#	%	#	%	#	%
Certificate	27	81.8%	107	92.2%	134	89.9%
No certificate	6	18.2%	9	7.8%	15	10.1%
Total	33	100%	116	100.0%	149	100.0%

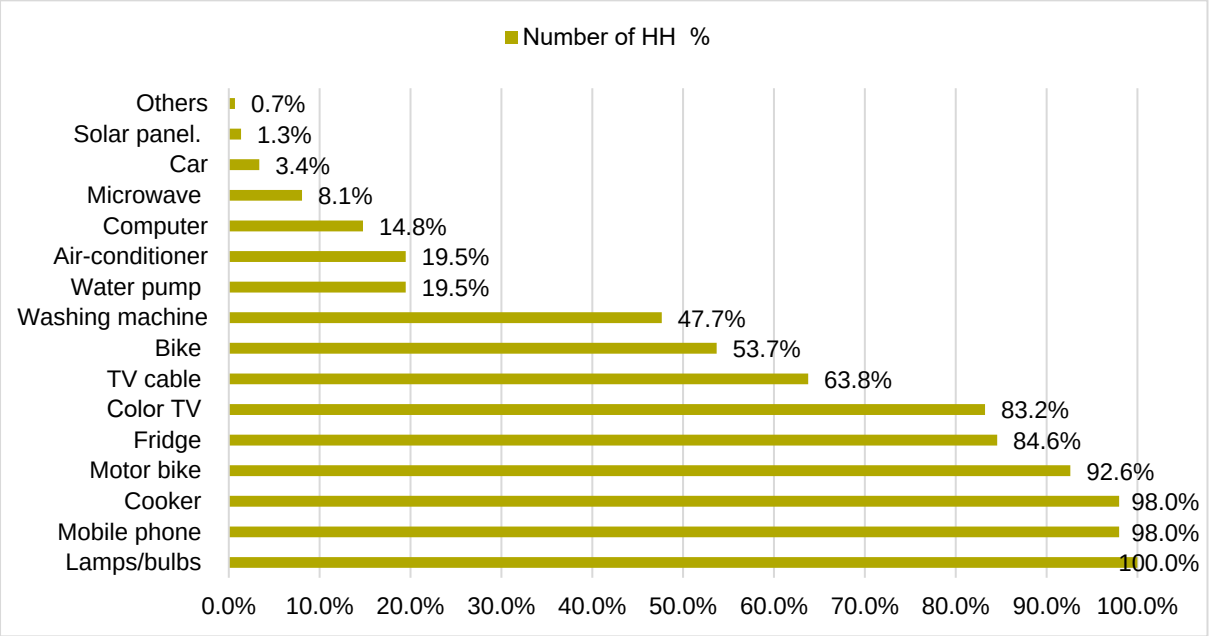
Source: Socio-economic baseline conducted by ERM, 2020

On average, a surveyed family live in their house for 25 years. The longest duration was recorded as 67 years for a family in Lien Huong town. While the newest house owner was reported in two families in Phu Lac who have lived in their houses for one year.

9.13.2 Housing Facilities

Most of the surveyed households owned primary assets such as lamp/bulb, mobile phone, cooker, and motorbike. In the past, if any households had had a mobile phone or a motorbike, they would have been considered as prosperous. However, as these items have diverse versions with various designs and reasonable prices, they have been becoming popular means of transportation and communication. Besides, other valuable items, such as fridges, colour TVs and washing machines, were quite common in the community, accounting for 84.6%, 83.2% and 47.7%. Televisions are widely used in most households in the communes with the main purposes of entertainment and information.

There were from 10% to 20% of households having other assets, being considered more expensive or just being bought with higher consumption demand, including air conditioners, computers and microwaves. There was 3.4% of surveyed households having a car, which was a luxurious asset for most Vietnamese in the rural area.



Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.68 Different Household Asset Items Owned by the Surveyed Households

The percentage of families owns household assets was similar in both AHs and not directly AHs group.

There were two out of 10 households having air conditions to mitigate heat throughout the dry season. Only 14.8% of households owned personal computers, while only 3.4% owned a car.

Table 9.36 Households' Facility

Type of facilities	AHs		Not directly Ahs		Number of HH	
	#	%	#	%	#	%
Lamps/bulbs	33	2.8%	116	9.9%	149	100.0%
Mobile phone	32	2.7%	114	9.7%	146	98.0%
Cooker	33	2.8%	113	9.6%	146	98.0%
Motor bike	32	2.7%	106	9.0%	138	92.6%
Fridge	31	2.6%	95	8.1%	126	84.6%
Color TV	29	2.5%	95	8.1%	124	83.2%

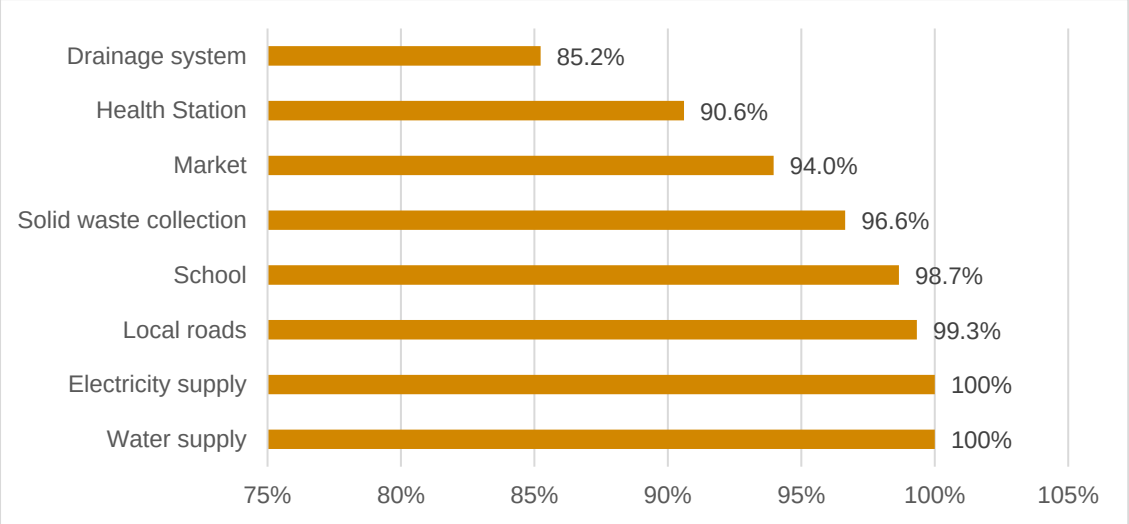
Type of facilities	AHs		Not directly Ahs		Number of HH	
	#	%	#	%	#	%
TV cable	23	2.0%	72	6.1%	95	63.8%
Bike	21	1.8%	59	5.0%	80	53.7%
Washing machine	20	1.7%	51	4.3%	71	47.7%
Water pump	12	1.0%	17	1.4%	29	19.5%
Air-conditioner	12	1.0%	17	1.4%	29	19.5%
Computer	9	0.8%	13	1.1%	22	14.8%
Microwave	6	0.5%	6	0.5%	12	8.1%
Car	3	0.3%	2	0.2%	5	3.4%
Solar panel.	0	0.0%	2	0.2%	2	1.3%
Others	0	0.0%	1	0.1%	1	0.7%

Source: Socio-economic baseline conducted by ERM, 2020

9.13.3 Access to Public Services

Access to public services and facilities is crucial. It was reported that electricity supply and water supply were the two main public facilities, with 100% of households reported having access. More than 90% of households accessed to local road, school, solid waste collection, market, and health station.

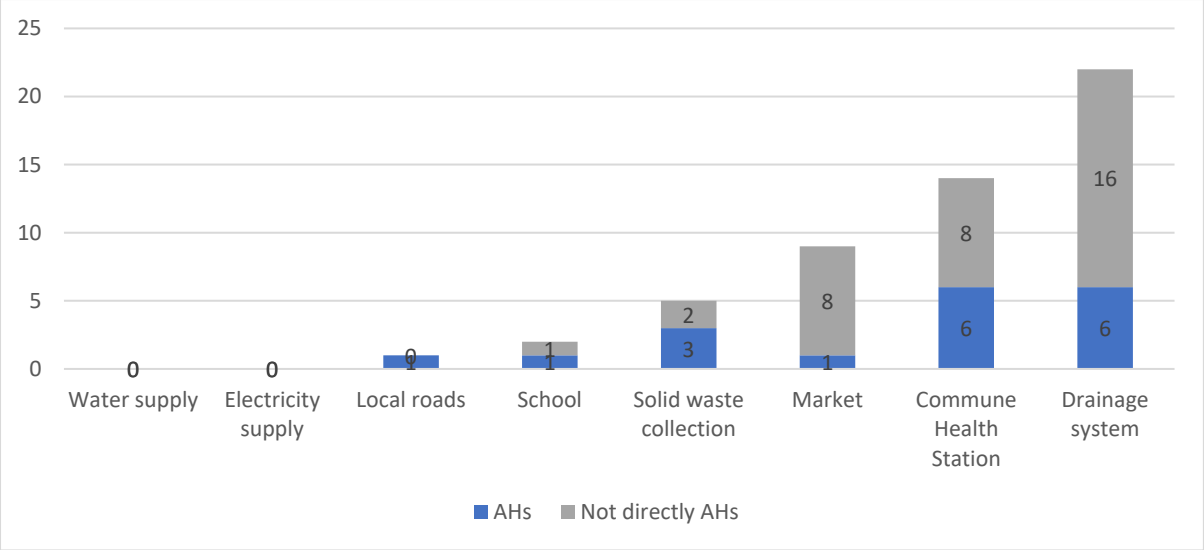
The percentage of households reported connect to drainage system was just 85.2%% on average.



Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.69 Accessibility to Public Services of the Surveyed Households

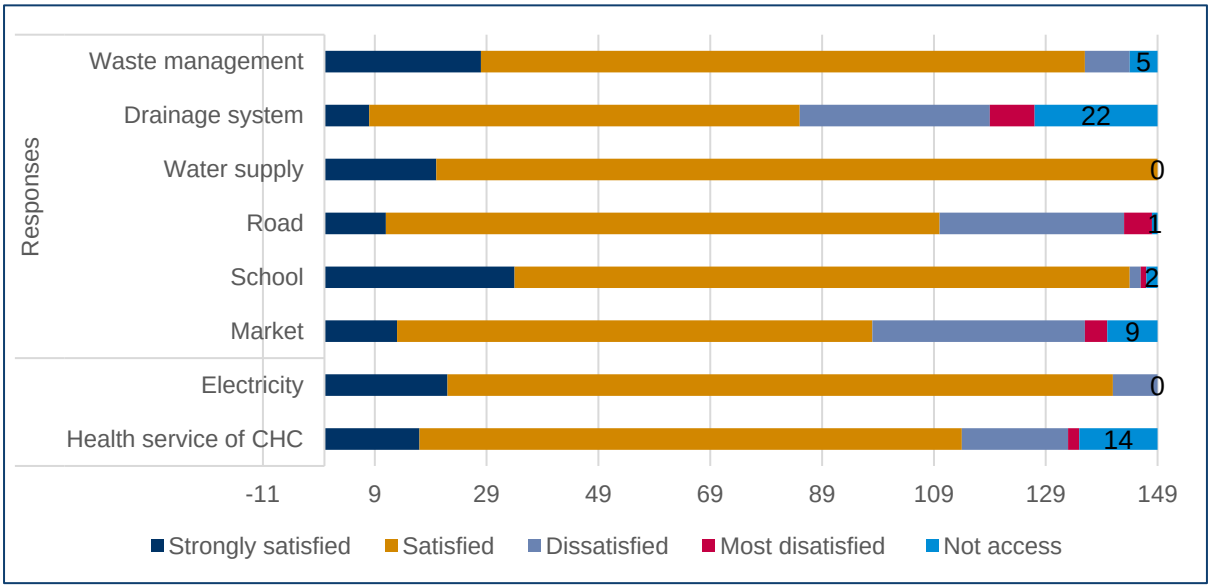
The drainage system and commune health station were the two least accessible public services for both AHs and not directly AHs group. 22 HHs reported that they could not access the drainage system, including 6 AHs and 16 not directly AHs. Moreover, 6 AHs and eight not directly AHs claimed that they did access commune health commune but prefer other healthcare services such as district health center or private clinic. Other public services were well-accessed by local people. (See Figure 9.70).



Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.70 Number of Households that Could Not Access Public Services

Public services' level of satisfaction reflects how happy people feel when using these services. It was noted that the market was the most satisfying public facilities with 95.6% assessed 'strongly satisfied' and 'satisfied', followed up by electricity supply (93.4%), water supply (89.8%), local roads (77.4%), drainage system (70.8%), school system (70.8%), health care station (59.9%). The solid waste collection received the lowest proportion of 'strongly satisfied' and 'satisfied' but that was because respondents did not know about this service (83.9%). Only 1.5% of households rated this service 'most dissatisfied'.



Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.71 Level of Satisfaction about Public Services of the Surveyed Respondents

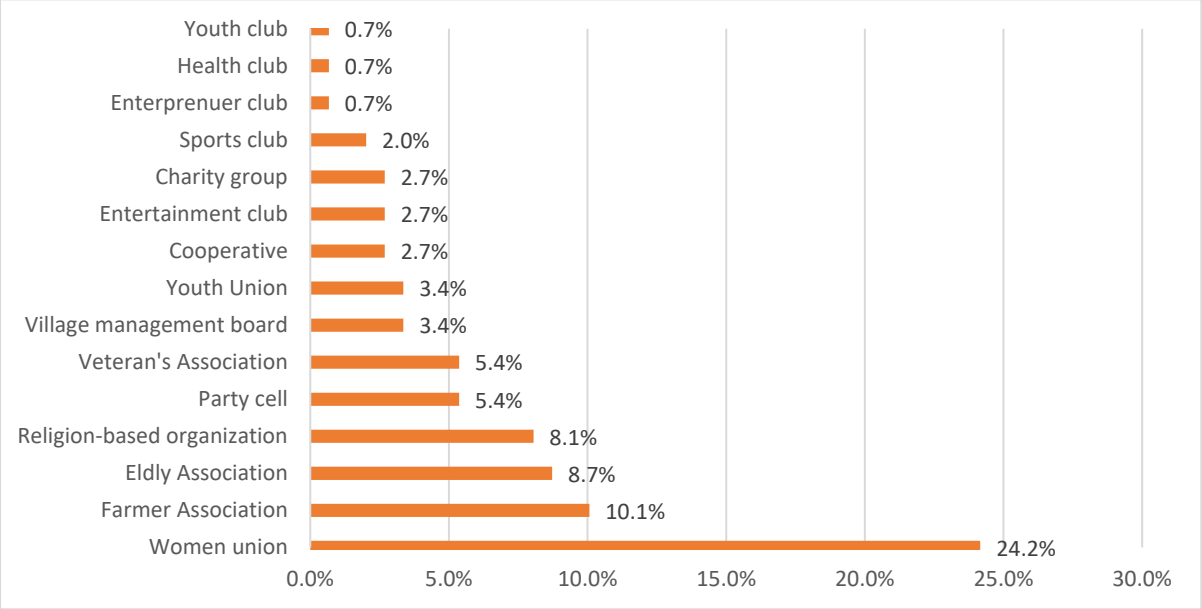
9.14 Social Capital

A strengthened social capital is considered an essential contribution to fostering communities' potential to build sustainable locality and enhance possibilities to deal with collective actions and societal challenges. If people trust each other, they are more likely to sustain mutually productive social exchanges, even if these come at a cost for participants taken individually. According to the World Bank,

social capital is related to the institutions, relationships, standards for forming the quantity and quality of social interaction in a society. More and more evidence shows that social cohesion is crucial for sustainable socio-economic growth and development. It is not only a simple summary of institutions for forming a society but also the gluing substance for binding them together. Social capital is the effective functioning of social groups through interpersonal relationships, a shared sense of identity, a shared understanding, shared norms, shared values, trust, and cooperation. In the framework of this report, some aspects of local household's capital will be examined.

9.14.1 Civil Society Organizations (CSOs)

Many Vietnamese CSOs are emerging, responding to the local's needs through various approaches, from policy advocacy to charity work. With the State's leading and support, mass organizations are regularly meeting and organizing various activities such as Women union, Farmer Association, Veterans, Youth union. However, the level of engagement of the community is different among groups. The survey indicated that women union is the most enticing group, 24.2% of surveyed households claimed that their family members are a member of the Women Union. Followed by Farmer Association (10.1%), the elderly group (8.7%) and region-based organization (8.1%).



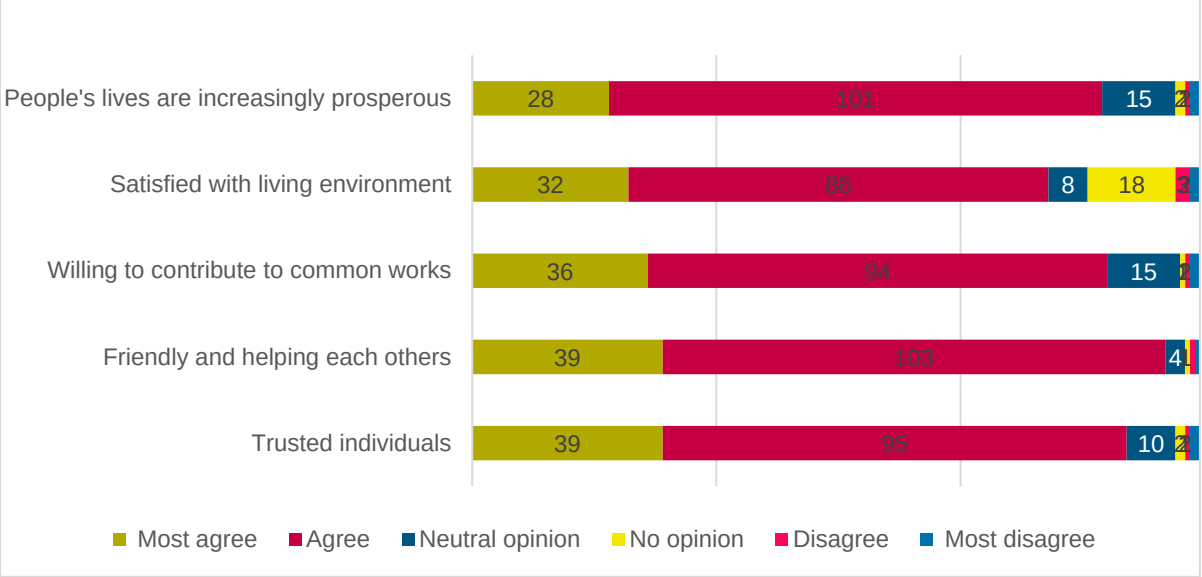
Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.72 Level of Participant of the Surveyed Households in CSOs

9.14.2 Community Relationship

The vast majority of the respondents (more than 80%) felt able to be themselves with key trusted individuals, felt appreciated by others, and felt that they had people to share and help when being in need. Most commonly, family, friends and/or neighbours were included in the bonding social capital.

A high level of social trust emerged from the respondent's accounts on their relationships with neighbours, as did the prevalence of favours exchanged with neighbours, which were wide-ranging and encompassed both long-standing, on-going arrangements and more urgent, one-off favours.
The most common value-added by social trust and neighbourliness was willing to lend money or share good seeds. The survey figured out that 25% of financial borrowing was from friends or neighbours. For some of the respondents, social trust was seen to be a basic human need. According to FGDs, many participants claimed that their neighbours were often their close friends.



Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.73 Level of Satisfaction of the Surveyed Households

When being asked about the reliability of people in general, the distribution of response was as follows: “Most agree” (39), “Agree” (95), only 1 respondent disagreed. The distribution was similar to other questions “people are friendly and helping each others”, “willing to contribute to common works”, “satisfied with the living environment” and “people’s lives are increasingly prosperous” (See Figure 9.73)

Although the surveyed respondents have positive opinions toward the personal relationship, borrowing money from acquaintances was not expected. Only 13 out of 149 people said that they lent money from neighbours or families. However, in Vietnamese society, people depend on social capital to participate in social or personal events; almost everyone participating in the same wedding ceremonies and funerals is in intimate relationships, such as family members, relatives, friends, acquaintances and neighbours. It can be understood from the results that they show great courtesy to those in the intimacy group at the time of wedding ceremonies and funerals. According to the survey results, households also paid a medium amount of money for community activities, which helped attach themselves to the local community life and enhance local bonds. Each household paid around 17.9 million VND a year for this important activity (accounting for 8.7% of total household annual expenses and 58.8% of total household annual irregular). It was also confirmed that friends, acquaintances and neighbours are part of the intimate relationships, like family members and relatives “The social network becomes the useful capital source of many people. With the available relationships, individuals can advantageously assess the information that helps to improve their livelihoods. It could be said that access to information plays a key role in the development of individuals, groups, communities and society. With the available information about the aspects of life, people will select more appropriate actions in life. The variety of social networks has provided useful information about seeking jobs, opportunities for selling/buying, public services, technical and health instruction, thereby helping people improve their livelihoods. In general, the unofficial networks retain an important role in helping people access employment opportunities, opportunities for studying/training, and technical instruction.

9.15 Vulnerability

Vulnerable households include ones that comply with least one of the following criteria:

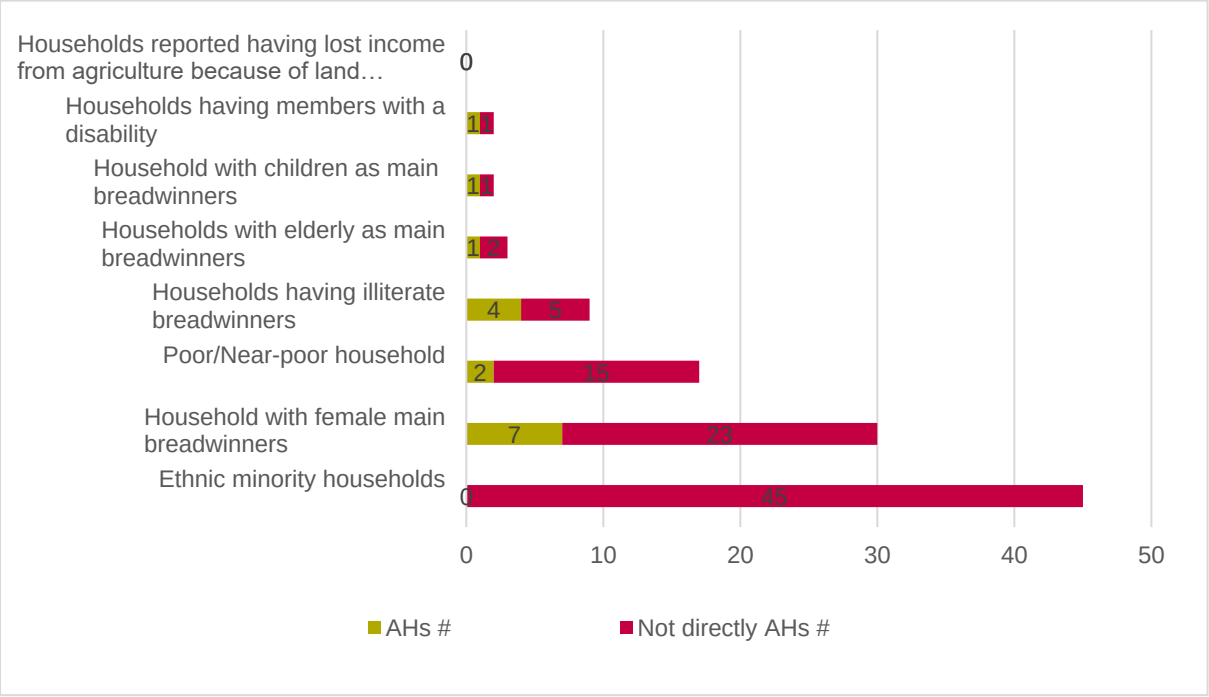
- Poor/near poor with certification (as certificated by the Government)
- Households having physical disability or mental disability
- Households with orphan children

- Households with main labour being the elderly (55 for female and 60 for male)
- Headed households are illiterate
- Elder people who is above age 60 living alone
- Single mom, women led/headed households.
- Ethnic minority households.

Households have mentioned characteristics that, in general, affect their ability to adapt to change. High dependence on natural resources generally indicates greater exposure to the impacts of land acquisition. Therefore, the way the Project interacts with people through collaborative planning, partnerships, and share information builds social capital and adaptive capacity in the community.

In all 149 surveyed households, there was only 12.8% (n=19) of households declared themselves as 'poor or near-poor households' with a certificate from the government. Thirty female-headed households account for 20.1% of surveyed households. There were 45 households (30.2%) who were the Cham people. Nine households (6.0%) have illiterate breadwinners and two households (1.3%) have children as main labours. No households reported a loss of income in agriculture due to land acquisition as they have not been informed about the proposed project yet.

Within 33 AHs, there are 12 cases of vulnerability reported from seven AHs. Their vulnerable status is presented in Figure 9.74.



Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.74 Household Vulnerability's Profile

9.16 Gender Profile

As reported in the FGD with women group, women in surveyed communes engage in farming (growing rice, onions, chili) or day labour (depending on the cropping season, in onion and bean season they will be hired for weeding activities for a whole week. The wage is from 100,000VND to 150,000VND/day. Such season happens before Tet, and thus after Tet (around February and March), they have less work, and only employed as day labour once a month.

After the discussion between the husband and wife for important family jobs such as buying land, building a house, and children's education, the husband is the final decision-maker. According to the women participating in the FGD, the husband is the main earner in the family, and the wife is the money keeper. At the same time, letting their husband make decisions is also confirmed as a form of respect for their husbands. The husband was also reported as the household representative for important legal papers such as land use right certificate and household registration book.

In recent years, the role of women has changed a lot, women participate in social activities such as participating in mobilizing children who dropped out of school to return to school, joining the mass organisations such as village fatherland fronts, women's unions, village representative boards, mediation boards. Community activities such as meetings, training on production, both men and women attend, depending on their availability. However, participants stated that more women participate in meetings (village meetings, commune meetings, parent meetings) than men, and then re-disseminate with their husbands because the husbands work hardly in the fields and have no time to go to meetings. In this area, there was no case reported as solely doing housework. Women still do generate income in some ways, such as doing a part-time job or involving in farming.

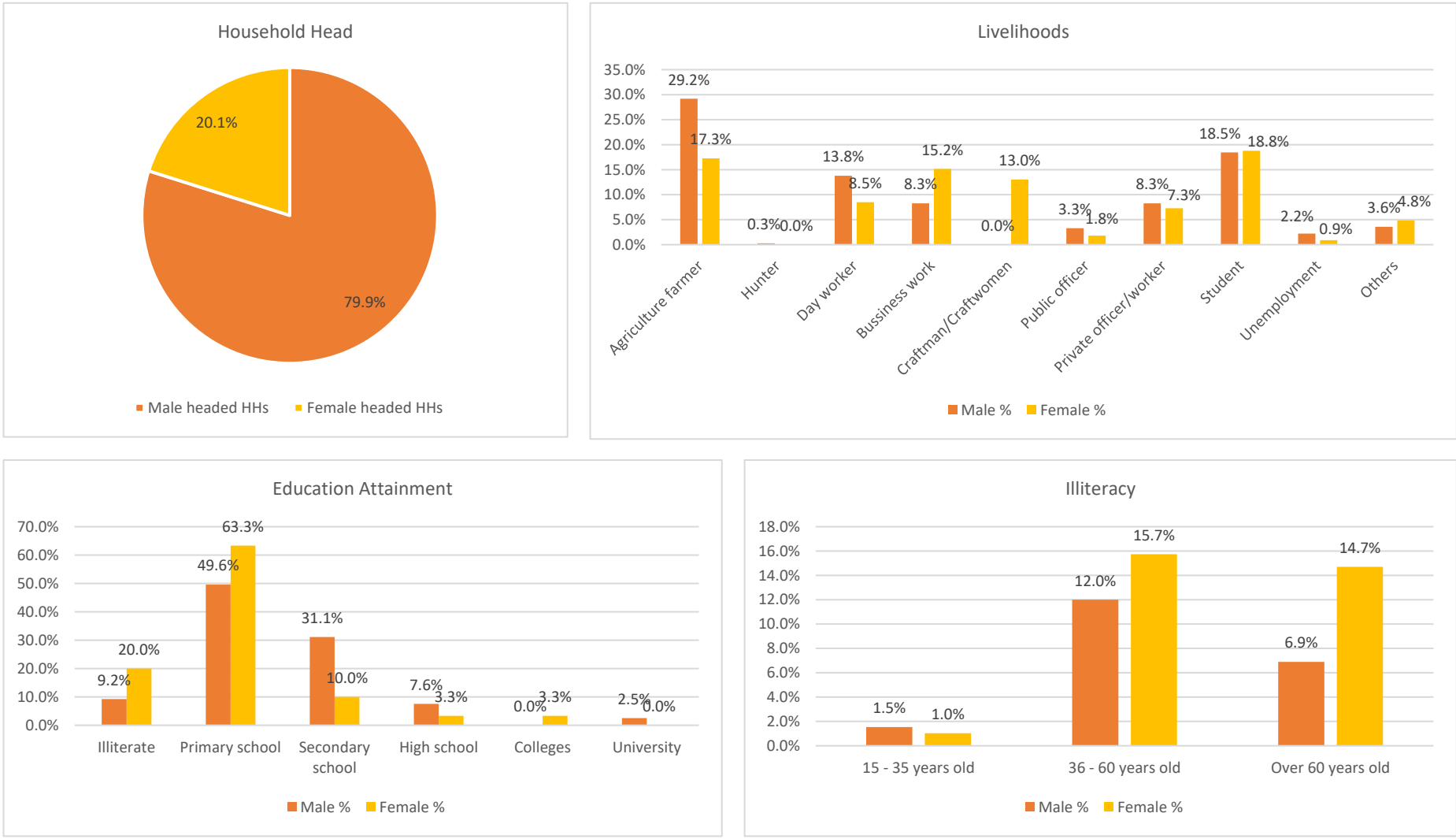
Moreover, through FGDs, participants shared that gender issues in Phu Lac village have been improved recently, especially since the Law on Gender Equality[49]. There was no gender discrimination in recruitment, education and health service accessibility. However, the male was likely dominant in social or political agencies. All village chiefs of Phu Lac commune are males.

Domestic violence does happen, but less often than before. The sexual harassment was not reported in the locality, if any, it will be denounced immediately.

Figure 9.75 FGD with Women Group in Phu Lac Commune

An overview of key socio-economic indicators of the surveyed population by gender is summarised as in Figure 9.76.

[49] https://evaw-global-database.unwomen.org/-/media/files/un%20women/vaw/full%20text/asia/law%20on%20gender%20equality%20-%202007/law%20on%20gender%20equality%20-%202007.pdf?vs=2102



Source: Socio-economic baseline conducted by ERM, 2020

Figure 9.76 Overview of Key Socio-Economic Indicators of the Surveyed Population by Gender

9.17 Local Perception about the Project

9.17.1 Project Acknowledgment

ERM representatives undertook social perception surveys and consultations during the site visit to appraise the socio-economic status of the resident population within the study area, the concerns/issues of the local population and benefits/ expectations from the project.

The structured questionnaire for the household survey was designed to assess local people's awareness about the Project. The perception of local people was also collected via the 05 FGDs and 04 KIIs with local representatives. According to the household survey, 45 interviewees reported that they knew about the Project, accounting for 30.2% and the remaining did not know about the Project. The survey also reveals that verbally exchange among the community and the local authority are the two mains lines of communication for project information, approximately 59.7% (n=89) and 18.1% (n=27).

Most of the feedback from the surveyed people is related to their concerns about the Project's impacts, particularly to livelihood and income impacts and reduction of agricultural land due to the establishment of the Project. Some landowners in Lien Huong town, who have agricultural lands near the national highway, showed a strong response to an unexpected land acquisition and required a transparent and appropriate negotiation process. As to the time of the survey, the land acquisition had not been started.

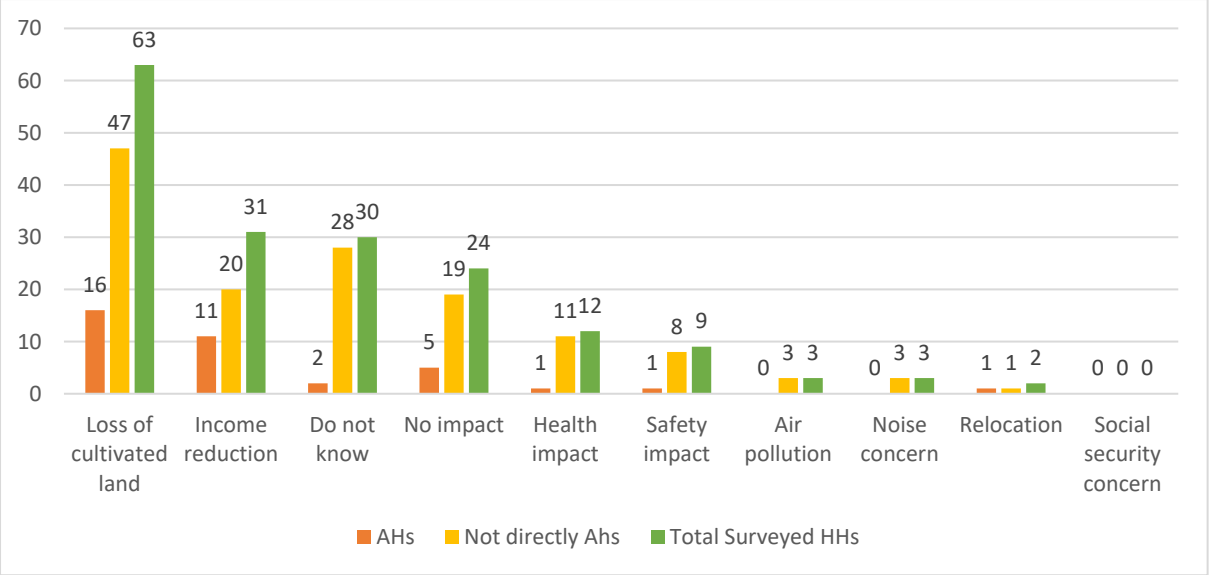
A total number of 33 families (168 people in total) are likely to be affected directly by the project, of which 15 families in Lien Huong town, 16 families in Phu Lac commune, and 2 families in Phong Phu commune. None of the affected families will lose their houses. In the areas where turbines are to be located, all the affected areas are agricultural or governmental land.

9.17.2 Local Concerns about Project Development

The potential environmental and social impacts due to the proposed Project have been identified throughout project stages. According to all FGDs participants, most of these impacts are related to construction activities, which are inevitable but manageable through certain social and environmentally friendly practices.

Among 33 AHs, most interviewed households were afraid of cultivated land loss and income reduction after the land acquisition. The remaining paid attention more on the health and safety and relocation impacts (see Figure 9.77). Seven AHs reported that they do not know what impacts will be (2 AHs) and others thought that no impact will be generated by the Project development (5AHs).

Identical trend was found from the Not directly AHs when the land and income loss also are the popular responses. A large number of Not directly AHs did not know about the Project impacts or believed the Project will not cause any impact. Approximately 16% of Not directly AHs expressed their concern on health and safety impacts (19 households) and the remaining concerned more on air, noise and relocation.



Source: Socio-economic survey conducted by ERM, 2020

Figure 9.77 Number of Surveyed Households Sharing Concerns about the Project

Compared to the environmental impacts of conventional energy sources, wind power's environmental impact on land-based activities is relatively minor. Sixteen respondents showed their concerns about losing agricultural land. It would result in income reduction (11 respondents).

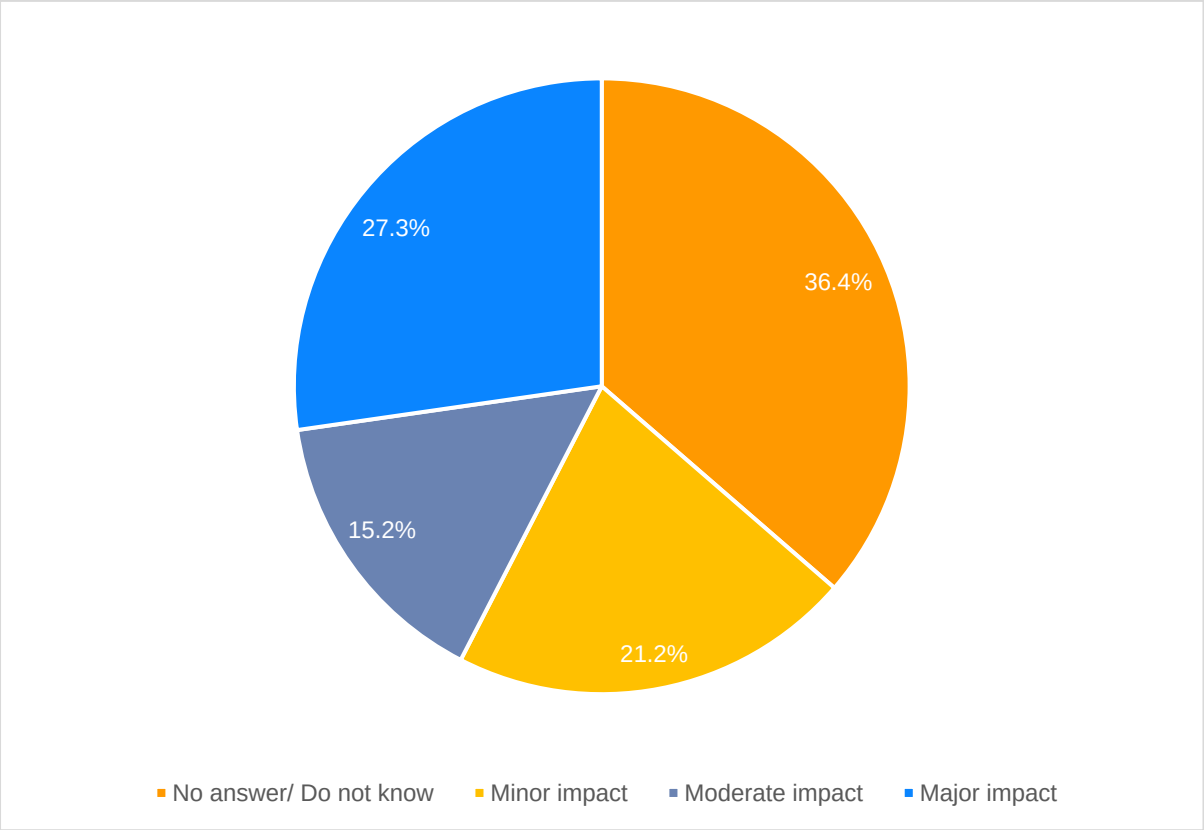
Reported in all the FGDs, most Phu Lac residents do not really experience nuisance due to the existing wind turbine noise from Phase 1 as these turbines are quite far from their houses.

It is necessary to undertake consultation with potentially affected people and other community members to understand their views, get their input regarding environmental and social issues, and take these into account during the preparation of the management framework and plans. Regarding social components, the baseline has preliminary identified the affected families. Indigenous/ marginalized communities within the proposed site and its immediate vicinity were also considered in the baseline.

Through FGDs, consultations with women and vulnerable households should be organized to obtain the actual inputs as stakeholders regarding how to avoid or minimize unexpected impacts, as well as to identify their needs and preferences. The project should have recognition on the strategic importance of communication with stakeholders and disclosure of information, particularly regarding significant impacts to local communities, including land acquisition and resettlement since many households have ancestral graves on their agricultural land. Acquisition of agricultural land with the ancestral graves could be an emotional issue and must be addressed sensitively and openly through adequate and timely information. Hence, proactive communication will help build collaborative and constructive trustworthy relationships and can avoid the possible rapid spread of rumors and misunderstandings. It helps to strengthen the project's image among affected stakeholders.

When the project conducts land acquisition, it leads to changes in people's livelihoods, especially 46 farmers. (30.9% of surveyed households), who depend on agricultural activities. If the acquisition of agricultural land accounting for over 50% of total land, it could lead to a shortage of productive land, labor, surplus, unstable income and other changes to people's lives.

9.17.3 The Perceived Impact of Land Acquisition



Source: Socio-economic survey conducted by ERM, 2020

Figure 9.78 Levels of Perceived Impact of Phu Lac Project to Surveyed Affected Households

When asking about the project's level of impact, there were five levels of impact, including major impact, moderate impact, minor impact, no impact, and no answer/ do not know. Major impact means AHs almost impossible to do current livelihood or their income will significantly decrease due to land acquisition. Moderate impact means AHs might keep doing their current livelihoods but need some assistance. Minor impact means their livelihoods nearly unchanged

Figure 9.78 provides information about Phu Lac project's impact levels to 33 affected households (AHs). More than one-third of AHs (36.4%) had no answer about the Project's impact since they did not know how the impact will be. 27.3% of AHs estimated they would have a profound impact, compared with approximately 15.2% of HHs who suppose that they will experience a moderate impact by the project. There was 21.2% of AHs rate for minor impact.

FGDs conducted with affected communities uncovered some significant concerns about the development of the Project. Each type of livelihood led to different concerns. Overall, the 5 FGDs indicated that participants would want further information about the Project and a proper compensation for the land acquisition.

9.18 Needs Assessment for Livelihood Restoration

9.18.1 Use of Compensation

In general, the use of compensation seems not clear because 17 out of 33 AHs did not know about the Project. Sixteen AHs even though they knew about the Project, they were not really aware how much they can expect for compensation linked to land acquisition, so they have not had a detailed plan yet. This understanding may help explain why 10 out of 33 AHs answered that they do not have any detailed

plan, although interviewers tried to put them in a scenario of having compensation, accounting for 30.3% of AHs. However, 23 AHs knew what they intended to use the compensation for in various ways. Each surveyed respondent could select options that were provided to them.

Out of the 23 AHs, 22 HHs will invest their compensation on the following:

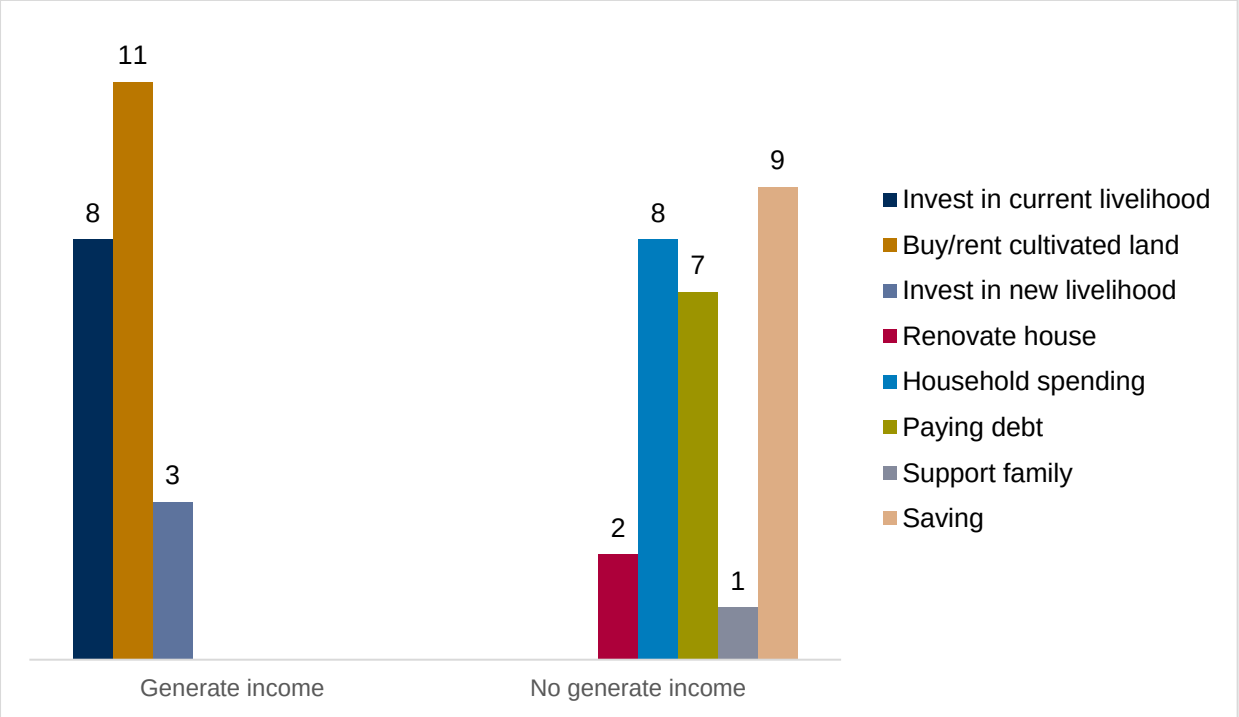
- investing current livelihood (8),
- buying/renting cultivated land (11) and
- investing in new livelihood (3).

With compensation, households plan to develop their farming or businesses to create a stable income and ensure livelihoods once they lose much of their agricultural land. Indeed, this sub-group was less preferred than the group of “not generate income”.

AHs reported that if they received compensation, they would use for:

- household spending (9),
- paying debt (7) or
- supporting family member (1).

Nine AHs claimed that they would save the money in a bank account. It is worth notice that no case intended to invest this in human capital, as investing in education or training.



Source: Socio-economic survey conducted by ERM, 2020

Figure 9.79 Compensation Usage of the Affected Households

9.18.2 Demand for Livelihood Restoration

Livelihood restoration plans are essential in recovering income loss or livelihood resources that will be impacted by the project of interest. However, designing this plan is dependent on if studied households recognized how their livelihood or income will be affected by the Project and whether they are proactively finding the approach to improve or restore their loss. Based on the project's perceived impacts, affected households conveyed various demands for project’s owner. The project will integrate

the suggestions from governments and affected people during Livelihood Restoration Plan design process.

Livelihood's sub-program intervention areas:

Although nearly half of surveyed households reportedly had some proposed ideas of livelihood restoration, the FGDs showed that they were not really aware of a restoration plan, they were not really aware of how much money they will receive for land compensation, and total area of their land that will actually be acquired for the project development. However, it can be seen that households aim to diversify their livelihood by putting the investment in cultivation, husbandry, wage job, and expanding economic activities, but with the majority focus on agriculture activities. Below please find some suggestions placed by FGD participants and surveyed respondents linked to investment actions:

- Microfinance has attracted attention from the surveyed households and FGD's participants because it is considered powerful poverty alleviation support. Local people suggested that only semi-formal or formal service providers could deliver a microfinance program. However, they wish the credit suppliers should simplify the loan procedure and be interest-free. Microfinance was the most preferred action for livelihood restoration as many studies and projects proved that the interrelation between financial system development with agricultural investment.
- Animal husbandry can also be an alternative livelihood for households whose land will be acquired. Some households suggested being subsidized with raising cows, pigs and goats. The support should be given through a microcredit, animal breeds, technical assistance, and animal disease prevention. They suggested to considered gathering a group of people with husbandry experience, technical skills along with a group of people lacking husbandry skills, to integrate a group for mutual support. Most of the FGD participants, especially members from vulnerable groups, expected the Project to prioritize the support through husbandry models.
- For the households losing land due to the Project development, they expect that they are allowed to continue their farming or plantation activities on their land. They express their wish to be well-informed during the process of land acquisition to have a good preparation for any livelihoods change if needed.
- For families with young members, they suggested these young members to receiving vocational training and be connected to nearby factories.
- Provide vocational training programs for youth who at least finished lower or upper education levels, focusing on professional skills in cooperation with local businesses. Provide job training, vocational orientation, job introduction, provision of labour market information. Establish commune-based centers for job introduction, vocational guidance in the province-level projects. FGDs with vulnerable people and the interview with key informants in the commune showed consensus with this suggested action. This activity aims to provide sustainable employment opportunities for vulnerable households members, especially for youth groups who dropped out from school.

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APPENDIX A LIST OF INVASIVE SPECIES OF VIETNAM

No.	Class	Scientific Name	Habitat
1	Dicot	*Abrus precatorius*	Terrestrial
2	Dicot	*Acacia farnesiana*	Terrestrial
3	Dicot	*Acacia mangium*	Terrestrial
4	Gastropods	*Achatina fulica*	Terrestrial
5	Bird	*Acridotheres tristis*	Terrestrial
6	Dicot	*Adenanthera pavonina*	Terrestrial
7	Dicot	*Ageratum conyzoides*	Terrestrial
8	Monocot	*Alpinia zerumbet*	Terrestrial
9	Dicot	*Alternanthera sessilis*	Terrestrial
10	Bird	*Anas platyrhynchos*	Freshwater and Terrestrial
11	Dicot	*Annona glabra*	Terrestrial
12	Bird	*Anser anser*	Freshwater and Terrestrial
13	Dicot	*Ardisia crenata*	Terrestrial
14	Fern	*Azolla pinnata*	Terrestrial
15	Dicot	*Bacopa monnieri*	Terrestrial
16	Dicot	*Bidens pilosa*	Terrestrial
17	Monocot	*Bothriochloa pertusa*	Terrestrial
18	Dicot	*Caesalpinia decapetala*	Terrestrial
19	Dicot	*Cardamine flexuosa*	Terrestrial
20	Dicot	*Casuarina equisetifolia*	Terrestrial
21	Monocot	*Cenchrus echinatus*	Terrestrial
22	Dicot	*Ceratophyllum demersum*	Terrestrial
23	Mammal	*Cervus nippon*	Terrestrial
24	Dicot	*Chromolaena odorata*	Terrestrial
25	Dicot	*Cinnamomum camphora*	Terrestrial
26	Dicot	*Coccinia grandis*	Terrestrial
27	Dicot	*Colubrina asiatica*	Terrestrial
28	Bird	*Columba livia*	Terrestrial
29	Monocot	*Commelina benghalensis*	Terrestrial

No.	Class	Scientific Name	Habitat
30	Monocot	*Cynodon dactylon*	Terrestrial
31	Monocot	*Cyperus rotundus*	Terrestrial
32	Monocot	*Dioscorea bulbifera*	Terrestrial
33	Monocot	*Eichhornia crassipes*	Terrestrial
34	Monocot	*Epipremnum pinnatum*	Terrestrial
35	Dicot	*Ficus microcarpus*	Terrestrial
36	Bird	*Gallus gallus*	Terrestrial
37	Reptile	*Hemidactylus frenatus*	Terrestrial
38	Mammal	*Herpestes javanicus*	Terrestrial
39	Dicot	*Hygrophila polysperma*	Terrestrial
40	Dicot	*Leucaena leucocephala*	Terrestrial
41	Dicot	*Ligustrum sinense*	Terrestrial
42	Dicot	*Limnophila sessiliflora*	Terrestrial
43	Fern	*Lygodium japonicum*	Terrestrial
44	Fern	*Lygodium microphyllum*	Terrestrial
45	Mammal	*Macaca mulatta*	Terrestrial
46	Dicot	*Melastoma candidum*	Terrestrial
47	Dicot	*Mimosa diplotricha*	Terrestrial
48	Dicot	*Mimosa pigra*	Terrestrial
49	Dicot	*Mimosa pudica*	Terrestrial
50	Monocot	*Neyraudia reynaudiana*	Terrestrial
51	Dicot	*Nypa fruticans*	Terrestrial
52	Dicot	*Oxalis corniculata*	Terrestrial
53	Dicot	*Paederia foetida*	Terrestrial
54	Monocot	*Panicum repens*	Terrestrial
55	Monocot	*Paspalum vaginatum*	Terrestrial
56	Dicot	*Passiflora foetida*	Terrestrial
57	Monocot	*Pistia stratiotes*	Terrestrial
58	Bird	*Porphyrio porphyrio*	Freshwater and Terrestrial

No.	Class	Scientific Name	Habitat
59	Dicot	*Prosopis*	Terrestrial
60	Dicot	*Prunus campanulata*	Terrestrial
61	Dicot	*Psidium guajava*	Terrestrial
62	Bird	*Psittacula krameri*	Terrestrial
63	Dicot	*Pueraria montana var. lobata*	Terrestrial
64	Bird	*Pycnonotus cafer*	Terrestrial
65	Bird	*Pycnonotus jocosus*	Terrestrial
66	Dicot	*Pyrus calleryana*	Terrestrial
67	Reptile	*Python bivittatus*	Terrestrial
68	Dicot	*Rhodomyrtus tomentosa*	Terrestrial
69	Monocot	*Rottboellia cochinchinensis*	Terrestrial
70	Dicot	*Rubus moluccanus*	Terrestrial
71	Dicot	*Rubus niveus*	Terrestrial
72	Mammal	*Rusa unicolor*	Terrestrial
73	Monocot	*Sagittaria sagittifolia*	Terrestrial
74	Dicot	*Striga asiatica*	Terrestrial
75	Dicot	*Syzygium cumini*	Terrestrial
76	Dicot	*Terminalia catappa*	Terrestrial
77	Reptile	*Trachemys scripta elegans*	Freshwater and Terrestrial
78	Dicot	*Trapa natans*	Terrestrial
79	Monocot	*Urochloa maxima*	Terrestrial
80	Monocot	*Urochloa mutica*	Terrestrial
81	Mammal	*Viverricula indica*	Terrestrial
82	Monocot	*Zizania latifolia*	Terrestrial
83	Monocot	*Zostera japonica*	Terrestrial
84	Bird	*Zosterops japonicus*	Terrestrial

Source: (GISD, n.d.)

APPENDIX B LIST OF BIRDS SPECIES AT PHU LAC 1

No.	Common Name	Scientific Name	IUCN	VNRB	Migratory/ Congregatory	Recorded in 2012 survey	Recorded in 2017 survey
1	Black Drongo	*Dicrurus macroercus*	LC	N/A	X	X	X
2	Black-collared starling	*Sturnus nigricollis*	LC	N/A		X	X
3	Burmese shrike	*Lanius collurioides*	LC	N/A	x	X	X
4	Collared scops owl	*Otus bakkamoena*	LC	N/A		X	
5	Common iora	*Aegithina tiphia*	LC	N/A		X	
6	Common tailorbird	*Orthotomus sutorius*	LC	N/A		X	
7	Common woodshrike	*Tephrodornis pondicerianus*	LC	N/A		X	
8	Eurasian tree sparrow	*Passer domesticus*	LC	N/A		X	X
9	Greater coucal	*Centropus sinensis*	LC	N/A		X	
10	Green bee-eater	*Merops orientalis*	LC	N/A		X	X
11	Common Hoopoe	*Upupa epops*	LC	N/A	X	X	X
12	Indochinese bushlark	*Mirafra marionae*	LC	N/A		X	X
13	Olive-backed sunbird	*Nectarinia jugularis*	LC	N/A		X	
14	Paddyfield pipit	*Anthus rufulus*	LC	N/A		X	
15	Pied bushchat	*Saxicola caprata*	LC	N/A	X	X	X
16	Racket-tailed treepie	*Crypsirina temia*	LC	N/A		X	X
17	Red-collared dove	*Streptopelia tranquebaria*	LC	N/A	X	X	X
18	Red-wattled lapwing	*Vanellus indicus*	LC	N/A	X	X	X
19	Savanna nightjar	*Caprimulgus affinis*	LC	N/A		X	

No.	Common Name	Scientific Name	IUCN	VNRB	Migratory/ Congregatory	Recorded in 2012 survey	Recorded in 2017 survey
20	Streak-eared bulbul	*Pycnonotus blanfordi*	LC	N/A		X	X
21	Vinous-breasted starling	*Acridotheres burmannicus*	LC	N/A		X	X
22	White-throated kingfisher	*Halcyon smyrnensis*	LC	N/A		X	X
23	Barred Buttonquail	*Turnix suscitator*	LC	N/A			X
24	Oriental Pratincole	*Glareola maldivarum*	LC	N/A	X		X
25	Spotted Dove	*Streptopelia chinensis*	LC	N/A			X
26	Zebra Dove	*Geopelia striata*	LC	N/A			X
27	Blossom-headed Parakeet	*Psittacula roseata*	NT	N/A			X
28	Plaintive Cuckoo	*Cacomantis merulinus*	LC	N/A	X		X
29	Greater Coucal	*Centropus sinensis*	LC	N/A			X
30	German's Swiftlet	*Aerodramus germani*	NL	N/A			X
31	Lineated Barbet	*Megalaima lineata*	LC	N/A			X
32	Oriental Skylark	*Alauda gulgula*	LC	N/A	X		X
33	Barn Swallow	*Hirundo rustica*	LC	N/A	X		X
34	Zitting Cisticola	*Cisticola juncidis*	LC	N/A			X
35	White-shouldered Starling	*Sturnia sinensis*	LC	N/A	X		X
36	Paddyfield Pipit	*Anthus rufulus*	LC	N/A			X
37	Plain-backed Sparrow	*Passer flaveolus*	LC	N/A			X
38	Nutmeg Mannikin	*Lonchura punctulata*	LC	N/A			X
39	Blue-tailed Bee-eater	*Merops philippinus*	LC	N/A			X
40	Cook’s Swift	*Apus cooki*	N/A	N/A			X

APPENDIX C LIST OF BAT SPECIES AT PHU LAC 1

No.	English Name	Scientific Name	IUCN	VNRB	Number of carcasses	Foraging strategy
1	Greater Asian yellow house bat	*Scotophilus heathi*	LC	N/A	12	III
2	Lesser Asian yellow house bat	*Scotophilus kuhlii*	LC	N/A	7	III
3	Javan Pipistrelle	*Pipistrellus javanicus*	LC	N/A	33	III
4	Wrinkle-lipped Free-tailed Bat	*Chaerephon plicatus*	LC	N/A	8	III
5	Black-bearded tomb bat	*Taphozous melanopogon*	LC	N/A	10	III
6	Unidentified fruit bat	*Rousettus sp.*	N/A	N/A	1	V

APPENDIX D LIST OF CANDIDATE SPECIES WITHIN 50 KM RADIUS OF PHU LAC 2

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
REPTILIA	*Crocodylus siamensis*	Siamese Crocodile	CR	CR	This species is is a medium-sized freshwater crocodile native in Thailand, Indonesia, Vietnam. The global population is considered estimated at 500 - 1,000 mature individuals. The EOO is unknown. In Viet Nam, wild populations are possibly extirpated. Surveys over the past two decades have failed to detect crocodiles in sites they were reported to occur except one site, Ha Lam Lake (Phu Yen Province), where at least two individuals were present in 2005. A single reintroduced population is at Cat Tien National Park, where breeding occurs.	This is an aquatic species. The project is unlikely to impact aquatic species.
REPTILIA	*Eretmochelys imbricata*	Hawksbill Turtle	CR	EN	This widespread species is distributed throughout most of Europe, parts of north and eastern Africa, the Middle East, very large areas of central northern Asia, southern Asia, Southeast Asia and eastern Asia. Its EOO is 60,700,000km2. The number of mature individuals is estimated at 5,000,000 – 19,999,999	This is a marine species that only come to shore for breeding. The EAAAs does not support land for breeding of this species and only considers marine habitat for Aves class. This species has a large EOO that it is unlikley to meet the thresholds of criteria 1 and 3.
REPTILIA	*Indotestudo elongata*	Elongated Tortoise	CR	EN	*Indotestudo elongata* is widely distributed across South and Southeast Asia, scattered occurrences in Viet Nam. Severe population declines has occurred recently due to human activities. Subpopulations in Viet Nam have since been severely depleted and possibly locally extirpated (R. Timmins pers comm. 2018). Some record of this species were found in Binh Dinh province between 2011-2014. Elongated Tortoises inhabit primarily deciduous forest types (Sal, Dry Dipterocarp, Mixed Deciduous forests) with open, broken canopy allowing sufficient light for a moderate to very dense undergrowth of grasses and herbs; during the dry, leafless season animals may retreat to evergreen stream gallery forest.	The species' distribution overlaps with the EAAA2. However, the species mainly live in forests that the EAAA2 does not suppor. Additionally, it has a large EOO compared to the EAAA2 that make it unlikely to meet the threshold for criterion 1.
MAMMALIA	*Pygathrix nigripes*	Black-shanked Douc Langur	CR	N/A	These animals are predominantly arboreal but may occasionally come to the ground. They are found in evergreen, semi-evergreen and semi-evergreen-mixed deciduous forest	The species distribution overlaps with the EAAA2. The species mainly live in forests and are very timid. The EAAA2 is unlikely to

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					mosaics, as well as in coastal dry forest. It seems that species of this genus can adapt to relatively heavily disturbed forest. The largest known population globally exists in Seima Biodiversity Conservation Area, Cambodia and was estimated at approximately 42,000 individuals. In Vietnam, the largest known population may be in Bu Gia Map NP (Binh Phuoc Province) which is estimated at 1,789 individuals. Other stronghold for the species are recorded in Nui Chua National Park (Ninh Thuan Province), which is estimated at 500-700 individuals, Phuoc Binh NP at least 164 individuals, Chu Prong (Gia Lai Province) at about 200 to 250 individuals.	contain critical habitat for this species, sustaining ≥ 0.5% of the global population and ≥ 5 reproductive units.
MAMMALIA	*Muntiacus vuquangensis*	Large-antlered Muntjac	CR	VU	The large-antlered Muntjac is chiefly located in Vietnam but also found in Cambodia and Laos. There are no accurate global estimates. There have been very few records of this species in Vietnam since the 1990's despite targeted camera trapping. The species is restricted to subtropical/tropical moist lowland and montane forest.	The species is possible extinct in Vietnam. It is unlikely to occur within the EAAAs given the fragmentary and degraded nature of the forest..
AVES	*Calidris pygmaea*	Spoon-billed Sandpiper	CR	N/A	This migratory species is native to Bangladesh, Myannmar, Thailand, China and South and North of Vietnam. This species possibly extinct in central of Vietnam. The global population is considered estimated at 240 - 456 mature individuals. Its Estimated Extent of Occurrence (EOO) is estimated at 355,000 km2. Declines were observed at wintering grounds and breeding grounds. For example, no birds were sighted wintering in Viet Nam in 2009 at a site that supported at least 27 birds in the mid 1990s. Over 80% of the entire population are considered to winter in Myanmar and Bangladesh. In Vietnam, the species was recorded in the Xuan Thuy Nature Reserve, Mekong Deltare including Can Gio (1 individual	The species' distribution overlaps with the EAAA for birds. The species comes to Vietnam for wintering. However, the EAAA does not support habitats for breeding and foraging of this species during wintering. Thus, it is unlikely that the species will occur within the EAAA.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					2010), Tan Thanh shore in Go Cong (3 to 5 indivudals in 2013), Tien Giang (1 indiviual), Ba Tri (5 indivual 2000) and Cua Day Estuary (7 birds in 1998).	
AVES	*Gyps bengalensis*	White-rumped Vulture	CR	CR	This species is native to India, Banladesh, Myanmar, Thailand, Cambodia. This species possibly extict in Vietnam. The global population is considered estimated at 2500 - 9999 mature individuals. Its Estimated Extent of Occurrence (EOO) is estimated at 7,370,000 km2.	The species is possible extinct in Vietnam. It is unlikely to occur within the EAAAs.
AVES	*Sarcogyps calvus*	Red-headed Vulture	CR	N/A	This species is native to India, Myanmar, Cambodia. This species possibly extict in Vietnam. The global population is considered estimated at 2500 - 9999 mature individuals. Its Estimated Extent of Occurrence (EOO) is estimated at 5,230,000 km2. The population close to the Project EAA is in Cambodia and is restricted to the northern and eastern plains; with a minimum of only 47 individuals in 2010. Vagrants may sometimes stray into Vietnam. Dry tropical/subtropical forests. The global population is estimated at 2,500 – 9,999 mature individuals. The EOO for this species is 5,230,000km2.	The species is possible extinct in Vietnam. It is unlikely to occur within the EAAAs.
AVES	*Emberiza aureola*	Yellow-breasted Bunting	CR	N/A	This species once bred across the northern Palaearctic from Finland, Belarus and Ukraine in the west, through Kazakhstan, China and Mongolia, to far eastern Russia, Korea and northern Japan. However,it is now thought to have potentially completely disappeared from Finland, Belarus, Ukraine and large parts of Russia. It winters in a relatively small region in South and South-East Asia, including Vietnam. It winters in large flocks in cultivated areas, rice fields and grasslands, preferring scrubby dry-water rice fields for foraging and reedbeds for roosting. A study found it appeared in Van Long	The species' distribution overlaps with the EAAA for birds. However, It prefers dry-water rice fields and reedbeds which are not common in the EAAA1. No individuals have been seen in Binh Thuan province according to eBird. Additionally, the EAAA is relatively small compared to the EOO that it is unlikely to sustain more or equal to 0.5% of the species population. It is unlikely for this species to trigger criterion 1.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					Wetland Nature Reserve in Ninh Binh. The decline is likely to be driven by excessive trapping at migration and, in particular, wintering sites.	
MAMMALIA	*Panthera pardus ssp. delacouri*	Indochinese Leopard	CR	N/A	This species is continuously found throughout northern, central and eastern Asia and parts of southern Asia. This species is extant to Vietnam. The EOO is 15,600,000km2. The global population has not yet been quantified, however, the population is considered stable	The species is extinct in Vietnam. It is unlikely to occur within the EAAAs.
MAMMALIA	*Bos javanicus*	Banteng	EN	EN	This species is in Thailand, Cambodia, Viet Nam, and Lao PDR, Banteng occurs (or occurred) in open mainly deciduous forest with glades, parklands, and dense forest patches; and 'it is claimed by some that they prefer rocky, slightly hilly country, but they are certainly at home wherever the Kouprey [Bos sauveli] is found.	The species' distribution does not overlaps with the EAAAs.
REPTILIA	*Chelonia mydas*	Green Turtle	EN	EN	The Green Turtle has a circumglobal distribution, occurring throughout tropical and, to a lesser extent, subtropical waters (Atlantic Ocean – eastern central, northeast, northwest, southeast, southwest, western central; Indian Ocean – eastern, western; Mediterranean Sea; Pacific Ocean – eastern central, northwest, southwest, western central). Green turtles are highly migratory and they undertake complex movements and migrations through geographically disparate habitats. Nesting occurs in more than 80 countries worldwide. During non-breeding periods adults reside at coastal neritic feeding areas that sometimes coincide with juvenile developmental habitats. In Vietnam, Green turtle mostly breeds at Con Dao island (about 230-300 inviduals per year). Minority was recorded in Ninh Thuan province (10 individuals/ year), Binh Dinh province	This is a marine species that only come to shore for breeding. The EAAA2 does not support land for breeding of this species and only considers marine habitat for Aves class.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					(4-5 indv/year), Bai Tu Long bay and Co To island (<10 indv/year).	
MAMMALIA	*Chrotogale owstoni*	Owston's Civet	EN	N/A	This cryptic mammal is found in parts of southern China, Laos and Vietnam. An EOO has not been calculated for this species. Moist lowland and montane tropical/subtropical forest are considered important for this species, however, it can to a degree utilise shrub land and heavily degraded former forest habitat too. The species is scarcely observed due to its cryptic nature, therefore, there are no accurate global population estimates	The species' distribution does not overlaps with the EAAA2.
MAMMALIA	*Nycticebus pygmaeus*	Pygmy Slow Loris	EN	EN	In Viet Nam, researchers have concluded that wild populations are in major decline. In 2002 in Phong Nha-Ke Bang National Park only seven sightings of this species; in Ben En National Park, only eight animals were encountered. 2013-14 surveys in North Vietnam recorded 0.19 individuals/km and 0.4 individuals/km respectively. In South Vietnam in 2013, 0.48 individuals/km were recorded and 0.41-0.44 individuals/km in 2014. Surveys carried out in Central Viet Nam in 2015 found low densities of N. pygmaeus, with no animals observed in 20 km at Bach Ma National Park, and 0.19 ind./km at Son Tra Nature Reserve. The species has also been observed in Cat Tien National Park and Vinh Cuu Biosphere Reserve, which are both part of the Dong Nai Biosphere Reserve. No estimations about its EOO or global population size. This species has been sighted in a wide variety of habitats, including primary evergreen and semi-evergreen forest, forest on limestone, secondary and highly degraded habitats, and bamboo thickets	The species' distribution overlaps with the EAAA2. It can inhabit the kind of habitat that the EAAA2 mostly covers. However, the natural population is decline in Vietnam and the remaining populations are mostly found within protected areas. The EAAA2 is unlikely to support 0.5% of the global population . Within the project area there is no suitable habitat.
MAGNOLIOPSIDA	*Hopea ferrea*	N/A	EN	EN	This species is native to Indochina where it is found in Cambodia, Lao PDR, Viet Nam, Thailand, Peninsular Malaysia.	The distribution range does not overlap with the EAAA2, The EAAA2 does not provide

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					It is cultivated within Singapore. This species has a wide distribution but population is scattered and the species is considered uncommon. The estimated EOO is 1081317 km2. The estimated population is unknow. The species is found in seasonally dry tropical rain forests on rocky soils. The species is not well represent in ex situ collection but is found in some protected areas. Further ex situ collections of this species should be made and the species habitat protected.. Recorded in Binh Chau Phuoc Buu Reserve, Ta Dung Nature Reseve, Ca Na (Ninh Thuan).	suitable habitat for this species. Moreover, it only has a large EOO that is unlikley to meet the threshold for criterion 1.
MAGNOLIOPSIDA	*Dipterocarpus intricatus*	N/A	EN	N/A	This is a relatively widespread and common species. It is mostly restricted to dry deciduous forest, lowland to sandstone slope. However there has been between a 30 and 50% population reduction in the last three generations (300 years) due to the expansion of agricultural areas and exploitation for timber. The species is continuing to decline but at a lower rate, threatened by habitat loss. It is found at elevation <700m.	The distribution range does not overlap with the EAAA2. The EAAA2 does not provide suitable habitat for this species. Moreover, it only has a large EOO that is unlikley to mee the threshold for criterion 1.
MAMMALIA	*Trachypithecus germaini*	Indochinese Silvered Langur	EN	N/A	This species is found throughout Cambodia, Laos, Myanmar, Thailand and Vietnam. This is primarily a lowland species, with a preference for evergreen and semi-evergreen, mixed deciduous, riverine and gallery forest. Records in hilly areas or at higher elevations are few. The EOO is unknown for this species. The number of mature individuals is unknown, however, considered to be decreasing. It has been recorded from Phu Quoc National Park (Viet Nam), and probably still occurs in Cat Tien National Park (Viet Nam), and it occurs in several protected areas in Thailand.	The species mainly live in forest, which the EAAA2 for mammals does not support suitable habitat for it. It is unlikely that the EAAA2 contains more or equal 0.5% of this species global population.
MAMMALIA	*Viverra megaspila*	Large-spotted Civet	EN	VU	The Large-spotted Civet is found throughout Cambodia, Laos, Malaysia, Myanmar, Thailand, Vietnam and likely extinct in southern Vietnam and China. This speices is found in Ke Go-	The species is possible extinct in Vietnam. It is unlikely to occur within the EAAAs.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					Khe Net Lowlands and Cat Tien National Park. Large-spotted Civet is now evidently very rare in Viet Nam and is probably very close to national extinction if not gone already. Dry and moist lowland forests are considered important to Within suitable altitude and terrain, the species has been recorded in a number of different habitats: natural habitats assigned directly by observers include evergreen forest, semi-evergreen forest, mixed deciduous forest, deciduous dipterocarp forest, Melaleuca-dominated swamp-forest, shrubland, wetlands and grassland.	
AVES	*Pavo muticus*	Green Peafowl	EN	N/A	This species is native to Myanmar, Vietnam. The global population is considered estimated at 10,000-19,999 mature individuals. The Green Peafowl is found throughout Southeast Asia. The species has an EOO of 4,590,000km2. The species uses a range of forest, savannah, shrub land, grassland and pastureland habitats. The species favours areas with water access and minimal human interference. In Viet NAm, the main population is now thought to lie in the southcentral region, with the Yok Don and Cat Tien National Parks thought to contain the most important populations.	The species' distribution does not overlaps with the EAAA for birds. The main populations in Viet Nam are in Cat Tien National Park, which is more than 70 km off the EAAA1.
AVES	*Sterna acuticauda*	Black-bellied Tern	EN	N/A	This species is native to India and posibly extinct in Vietnam. The global population is considered estimated at 6700 - 17000 mature individuals. Its Estimated Extent of Occurrence (EOO) is estimated at 4,490,000 km2. It is found on large rivers (usually breeding on sandpits and islands) and marshes, occasionally on smaller pools and ditches, in lowlands (but not on the coast), up to 730 m. There is lack of information relate to distribution range. Threats include the destruction of breeding habitat (islands and sandspits in larger rivers are increasingly cultivated)	The species is possible extinct in Vietnam. It is unlikely to occur within the EAAAs.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
AVES	*Lonchura oryzivora*	Java Sparrow	EN	N/A	This species is a native endemic of the islands of Java, Bali and was introduced in coastal area of Southeast Asisa, including is Vietnam. The global population is considered estimated at 1000 - 2499 mature individuals. Its Estimated Extent of Occurrence (EOO) is estimated at 148,000 km2.	The species is an invasive species in Vietnam, and therefore, not applicable in this assessment
MAGNOLIOPSIDA	*Camellia dilinhensis*	N/A	EN	N/A	Camellia dilinhensis is a recently described species, endemic to the Di Linh district of southern Vietnam (Lam Dong Province). The area of occupancy is less than 500 km². The species is found in evergreen forest at altitudes of 850-900 m.	The species lives in forest, the type of habitat that the EAAA2 does not cover.
MAGNOLIOPSIDA	*Magnolia bidoupensis*	N/A	EN	N/A	Magnolia bidoupensis is endemic to the Bidoup-Nui Ba National Park in south Viet Nam. This species has an estimated extent of occurrence (EOO) of 700 km2, occuring in less than five locations. Continuing decline in the area and quality of habitat has been reported due to encroachment, fire and illegal logging. Magnolia bidoupensis grows as a evergreen tree up to 8 m tall in montane, broad-leaved forests, associated with species such as Calophyllum balansae, Gordonia sp. and some Ericaceae, usually co-dominant in the first forest stratum.	The species mainly lives in forest which is not covered in the EAAA2. Therefore, the species is unlikely to occur in the EAAA2 with equal or more than 10% of the global population and 10 reproduction units.
MAMMALIA	*Nomascus gabriellae*	Red-cheeked Gibbon	EN	EN	In Viet Nam, the species occurs in Gia Lai (Sre Pok River), Phu Yen (Ba River), Dak Nong (Quang Truc commune), Ninh Thuan (Ninh Son State Forest Enterprise) and Khanh Hoa province (Son Thai - Giang Ly Communes) to the south. Within protected areas, the species has been recorded in Cat Tien NP, Bi Doup- Nui Ba Mountain, Bu Gia Map NP, Phuoc Binh NP, Hon Ba NR, Chu Yang Sin NP. This species is found in tall evergreen and semi-evergreen forest, and occasionally in other forest types such as mixed bamboo and woodland forest. Though dry deciduous dipterocarp forests are present in their range, these gibbons do	The species mainly live in forest, which the EAAA for mammals does not contain.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					not appear to utilize these forests where associated semi-evergreen or evergreen forest is absent.	
ACTINOPTERYGII	*Scleropages formosus*	N/A	EN	EN	This species occurs in the Mekong basin in Viet Nam. Scleropages formosus occurs in lakes, deep parts of swamps, flooded forests and stretches of deep rivers with slow currents and dense, overhanging vegetation, as well as reservoirs and waterways. The estimated population and EOO size is unknown.	This is an aquatic species. The project is unlikely to impact aquatic species.
MAMMALIA	*Bos gaurus*	Gaur	VU	EN	This species is found Ninh Thuan, Dong Nai, Binh Duong, Tay Ninh, Dak Lak, Gia Lai, Kon Tum provinces. The EOO is quite large. The global population is estimated approximately 6,000-21,000 mature individuals. This species was found in Phuoc Binh Nature Reserve an in Ma Noi forest in Ninh Thuan province. Low-lying areas seem to comprise optimal habitat for this species and in Vietnam, gaur occurs in many forest types including truly evergreen and montane forest.	The species' distribution overlaps with the EAAA2. However, it manly lives in forest, the type of habitat that the EAAA2 does not cover. EAAA2 is relatively small compared to the EOO and thus, it is unlikely that the loss of any population of this species within the EAAA2 will lead to it become EN or CR.
REPTILIA	*Caretta caretta*	Loggerhead Turtle	VU	CR	The Loggerhead Turtle nests on insular and mainland sandy beaches throughout the temperate and subtropical regions worldwide. Hatchlings begin an oceanic phase in major current systems (gyres) that serve as open-ocean developmental grounds. During non-breeding periods, adults reside at coastal neritic feeding areas that sometimes coincide with juvenile developmental habitats. The estimated EOO is 4,940,000 km2. The estimated population is unknow	This is a marine species that only come to shore for breeding. The EAAAs does not support land for breeding of this species. This species has a large EOO that it is unlikley to meet the thresholds of criteria 1 and 3.
REPTILIA	*Dermochelys coriacea*	Leatherback	VU	CR	*D. coriacea* is an oceanic, deep-diving marine turtle inhabiting tropical, subtropical, and subpolar seas. Leatherbacks make extensive migrations between different feeding areas at different seasons, and to and from nesting areas.	This is a marine species that only come to shore for breeding. The EAAAs does not support land for breeding of this species and only considers marine habitat for Aves class.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					In Vietnam, only 1-2 individuals lay egg at the coastal line from Thanh Hoa to Binh Thuan province.	
MAMMALIA	*Helarctos malayanus*	Sun Bear	VU	N/A	Sun Bears are a forest-dependent species, favouring interior mature and/or heterogeneously structured primary forests (Augeri 2005). There are two ecologically distinct categories of tropical forest that comprise their natural range, distinguished by differences in climate, phenology, and floristic composition: seasonal evergreen and deciduous forest in the mainland (north of the Isthmus of Kra) and aseasonal evergreen rainforest in Malaysia, Sumatra and Borneo.	The species mainly live in forest, which the EAAA for mammals does not support.
REPTILIA	*Lepidochelys olivacea*	Olive Ridley	VU	EN	The Olive Ridley sea turtle has a circumtropical distribution, with nesting occurring throughout tropical waters (except the Gulf of Mexico) and migratory circuits in tropical and some subtropical areas (Atlantic Ocean – eastern central, northeast, northwest, southeast, southwest, western central; Indian Ocean – eastern, western; Pacific Ocean – eastern central, northwest, southwest, western central) (Pritchard 1969). Nesting occurs in nearly 60 countries worldwide. In Vietnam, about 10 individuals are seen per year, mostly at Bai Tu Long bay, Son Tra peninsula (Da Nang province) and Quang Binh province.	This is a marine species that only come to shore for breeding. The EAAAs does not support land for breeding of this species and thus, it is unlikely to occur within the EAAAs.
MAMMALIA	*Lutrogale perspicillata*	Smooth-coated Otter	VU	EN	Lives in lowland wetlands and rivers, including sluggish flowing canals and flooded fields; occurs in shallow, open water and is capable of lying buried in mud for lengthy periods if water evaporates during dry seasons. Dependent on swamps and swamp forest. Can move out of the water using its extended fins. It feeds on aquatic insects, young shrimps and small fishes.	This is an aquatic species. The project is unlikely to impact aquatic species.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
MAMMALIA	*Macaca arctoides*	Stump-tailed Macaque	VU	VU	This specie is found in Vietnam, Cambodia, Myanmar, Vietnam (Phuoc Binh National park). There are no available population estimates for this taxon in Vietnam. This species has a wide habitat range from tropical evergreen forest to semi-deciduous, deciduous forest and limestone forest, but it prefers dense evergreen forests. It occurs widely in the hill and mountain areas of VietNam.	The species mainly live in forest, which the EAAA2 for mammals does not support.
MAMMALIA	*Macaca fascicularis*	Nicobar Crab-eating Macaque	VU	LR	In Vietnam, Macaca fasicularis is found in the northern region and in Con Son Island, off the coast of southern Viet Nam. The species is extremely tolerant of a range of habitats, including mangrove and swamp forests, and can be found in agricultural areas near forest (secondary growth, secondary forest, and primary forest). Although this species is widely distributed and is known to be tolerant to habitat changes,, excessive hunting and persecution of this species is cause for concern. Population size and EOO have not yet been estimated.	The species' distribution overlaps with the EAAA2. It may be found in aritifical habitats but mostly prefers forested areas. There are no records of this species in Ninh Thuan. Although its EOO is unknown, based on its distribution map, it has a relatively large EOO compared to the EAAA2, thus it is unlikely that the loss of population, if any, within the EAAA2 will lead to this species becoming EN or CR.
MAMMALIA	*Neofelis nebulosa*	Clouded Leopard	VU	N/A	Found in Nepal to mainland Southeast Asia into China. In Viet Nam, they were directly camera trapped in Pu Ling Nature Reserve, Yen Bai province (Hang Toong Chung forest), Mu Cang Chai Species/Habitat Conservation Area.	The species' distribution does not overlap with the EAAA2.
MAMMALIA	*Panthera pardus*	Leopard	VU	CR	CR in Vietnam Redlist. This specie is found in Lai Chau, Bac Kan, Quang Tri, Thua Thien - Hue, Lam Dong. The leopard has the widest habitat tolerance of any Old World felid, ranging from rainforest to desert. In Africa, they are most successful in woodland, grassland savanna and forest but also occur widely in mountain habitats, coastal scrub, swampy areas, shrubland, semi-desert and desert. They range from sea level to as much as 4,600 m on Mt Kenya (Hunter et al. in press). In Southwest and Central Asia, leopards formerly occupied a range of habitats, but now are confined chiefly to the more remote	The species is possible extinct in Vietnam. It is unlikely to occur within the EAAAs.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					montane and rugged foothill areas. Through India and Southeast Asia, Leopard are found in all forest types, from tropical rainforest to the temperate deciduous and alpine coniferous (up to 5,200 m in the Himalaya), and also occur in dry scrub and grasslands (Nowell and Jackson 1996).	
MAMMALIA	*Ursus thibetanus*	Asiatic Black Bear	VU	EN	Asiatic Black Bears occupy a variety of forested habitats, both broad-leaved and coniferous, from near sea level to an elevation of 4,300 m. The distribution of the Asiatic Black Bear roughly coincides with forest distribution in southern and eastern Asia (FAO 2010),	The species mainly live in forest, which the EAAA for non-volant species does not contain. It is unlikely that the Project will impact a porportion of the species' population that result in this species become EN or CR
MAGNOLIOPSIDA	*Hopea odorata*	N/A	VU	N/A	This species is native to southern Asia and Indochina. It is found within Bangladesh, Myanmar, Thailand, Cambodia, Lao PDR, Viet Nam (including Phuoc Binh National park), Peninsular Malaysia and in India on the Andaman Islands. The EOO is 2793001 km2. No estimations about the population size but overall, it is currently in decline. It grows in lowland evergreen forest, dry forest, on hillsides, by streams in deciduous forest, open forest near the beach and peat swamp forest.	The species live in forest that is very limited in the EAAA2. Moreover, the species has a large EOO compared to the relatively small EAAA that is unlikely that the loss of population, if any, within the EAAA will lead to this species become EN or CR.
MAGNOLIOPSIDA	*Dipterocarpus alatus*	N/A	VU	N/A	Dipterocarpus alatus is a large tree species. It is native to India, BaIt is found within evergreen and semi-evergreen dipterocarp forests in low lying areas (foothills and valleys) (Singh et al. 2014). It is often found on ancient alluvial, granite and basalt rocks (Tam et al. 2014). The species requires well drained soil and humidity. The species is mostly found in protected areas in Vietnam that belonging to these provinces: Quang Ngai, Quang Nam, Gia Lai - Kontum, Dak Lak, Binh Phuoc, Dong Nai, Kien Giang.	The species has a large EOO and mostly been found in protected areas in Vietnam. This species is unlikely to occur witihin the EAAA2 and therefore, it is unlikely that the Project will impact a porportion of the species' population and result in this species become EN or CR.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
MAMMALIA	*Macaca leonina*	Northern Pig-tailed Macaque	VU	VU	This species occurs in eastern Bangladesh, Cambodia, southern China, northeastern India, Lao PDR, Myanmar, Thailand and central and southern Viet Nam. In Viet Nam, there are historical records from as far north as Nghe An province, but there is uncertainty whether the species was ever found north of this province. Found in dark evergreen and semi-evergreen forests, tropical, subtropical and deciduous forests in plains, foothills, hills.	The species mainly live in forest, which the EAAA2 for mammals does not support. It is unlikely that the population, if any, within the EAAA2 is impacted by the Project and result in this species become EN or CR.
MAMMALIA	*Arctictis binturong*	Binturong	VU	EN	This speicie is found in Nepan, Myanmar, China, Thailand, Laos, Cambodia and Vietnam. Binturong is primarily arboreal, but does descend to the ground; in fact the number of camera-trap photographs of this species across its range reveals a level of ground activity higher than had previously been unexpected for this species. Also, the species has been caught in baited live traps set on the ground (Grassman et al. 2005, Chutipong et al. 2014). The species is heavy and ponderous (adults can reach over 20 kg), and where more agile arboreal animal species could leap between trees, it must descend to the ground to go from one tree to another (Than Zaw et al. 2008).	The species is possibly extinct in Vietnam (except for the border regions with Cambodia) and it is unlikely that the species will occur within the EAAAs.
MAMMALIA	*Rusa unicolor*	Sambar	VU	N/A	No large Indian ungulate has adapted itself to a wider variety of forest types and environmental conditions than has Sambar. In the mountains of Viet Nam, Sambar seems often to be associated with degraded valley bottom areas. In Viet Nam, in most of the northern highlands, in particular, and all other areas of Viet Nam to an increasing extent, Sambar is very rare or has been hunted out from many areas of otherwise suitable habitat. Greater than 19,000 camera-trap nights from >100 locations in the Hue and Quang Nam Saola Nature Reserves detected the species from only one location. It is among the	The species' distribution overlaps with the EAAA2. The species mainly lives in forested area that the EAAA2 does not suport. Although its EOO is unknown, based on its distribution map on IUCN, it has a relatively large EOO compared to the EAAA2, thus is unlikely that the loss of any population of this species within the EAAA2 will lead to it become EN or CR.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					most sought-after wild meats which led to the major, ongoing, declines. No information about EOO and global population size.	
MAMMALIA	*Aonyx cinereus*	Asian Small-clawed Otter	VU	N/A	A riverine and lacustrine species, but perhaps passing from estuaries into the sea. Occurs in medium to large-sized rivers of the lower Mekong. Reported to undertake migrations in the Mekong mainstream. From the Khone Falls to the Mekong delta, it migrates upstream during the dry season from October to March and downstream at the onset of the monsoon season from May to July. These migrations are reported to be triggered by the receding or rising of the water levels. Feeds on crustaceans, insects and small fishes.	This is an aquatic species. The project is unlikely to impact aquatic species.
AMPHIBIA	*Microhyla annamensis*	Vietnam Rice Frog	VU	N/A	It is found in Cambodia, Laos, Thailand, and Vietnam. Its natural habitats are subtropical or tropical moist lowland forests, subtropical or tropical moist montane forests, swamps, and intermittent freshwater marshes.	The species favours tropical forest, moist areas which the EAAA2 does not support. The EAAA2 is therefore unlikely to be a critical habitat for this species which sustains equal or more than 10% of the global population and 10 reproduction units.
ACTINOPTERYGII	*Bagarius yarrelli*	N/A	VU	N/A	Inhabits slow moving streams and rivers, as well as lakes, ponds and swamps. A common species in forest streams. Often found in areas with plenty of aquatic vegetation, as well as submerged woody plants. Feeds on fishes, prawns, and crabs and slightly less on shrimps (Rainboth 1996). A nest builder like other channids, with both parents guarding developing eggs and larvae.	This is an aquatic species. The project is unlikely to impact aquatic species.
REPTILIA	*Naja siamensis*	Black And White	VU	N/A	This species is recorded from the Chao Phraya River and the Mekong basin (from Yunnan in southern China to Viet Nam).	The species distribution overlaps with the EAAA2. It can be found in cultivated areas, the

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
		Spitting Cobra			This species inhabits lowland and upland forest and cultivated areas, including rice paddies. It is found in deciduous, disturbed and open forest, and is absent from closed-canopy evergreen forest. There is no detailed population information available for this species, but snake hunters in the region of U Minh Thuong National Park, Viet Nam, report that the species has become much rarer (Like other cobras, this species is heavily harvested in Vietnam).	type of habitat that the EAAA2 mostly covers. However, it has a large EOO and is unlikely that the loss of any population of this species within the EAAA2 will lead to it become EN or CR.
REPTILIA	*Ophiophagus hannah*	King Cobra	VU	CR	The King Cobra is widely distributed in South and Southeast Asia. The EOO is unknown (quite large) for this species but is considered stable. This species is found in a variety of habitats, primarily in pristine forests, but it can also be found in degraded forest, mangrove swamps and even agricultural areas with remnants of woodland. The surviving population of this snake in Viet Nam may be very small. No EOO and population size are available. This species is threatened by destruction of habitat due to logging and agricultural expansion, as Southeast Asia is experiencing one of the highest rates of deforestation in the tropics and this species appears to be most abundant in forested habitats.	The species distribution overlaps with the EAAA2. The species are abundant in forested areas and it can be found in artificial habitats, the type of habitat that the EAAA2 mostly covers. This species' presence was recorded in Binh Thuan province. However, it is unlikely to meet the threshold for criterion 1 based on its relative large EOO.
REPTILIA	*Python bivittatus*	Burmese Python	VU	N/A	The Burmese Python is mostly found in forested areas, including mangrove forests and rainforests, but is also found in grasslands, marshes, streams and rivers. It is a widely distributed species found throughout Southeast Asia, especially India, but reported to be rare in Cambodia, Lao PDR and Viet Nam. EOO and population sizes are unavailable. This large constrictor is harvested for food, skin for use in the leather industry, medicinal purposes, and the pet trade.	The species distribution overlaps with the EAAA2. It is mostly found in forested areas that the EAAA2 does not cover. Although its EOO is unknown, based on its distribution map, it has a relatively large EOO compared to the EAAA2, thus it is unlikely that the loss of any population of this species within the EAAA will lead to it become EN or CR.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
AVES	*Mulleripicus pulverulentus*	Great Slaty Woodpecker	VU	N/A	A Mekong basin endemic, known from the lower basin in Viet Nam. The global population has been estimated to number 26,000-550,000 individuals. The Great Slaty Woodpecker occupies primary semi-open moist deciduous and tropical evergreen old growth, lower elevation forests, as well as adjacent secondary forest and clearings with scattered tall trees. It prefers dipterocarp and teak forests in certain areas, as well as swamp-forest and tall mangroves. It is threatened by habitat destruction, particularly the felling of old-growth forest, though it may persist in heavily logged forests at lower densities.	The species' distribution overlaps with the EAAA1. However, the species prefer old-growth forests and mostly been foundin the Mekong basin. It has never been recorded in Binh Thuan. It is unlikely that the species occurr in the EAAA1 and suffer a loss in population that will render it become EN or CR.
AVES	*Buceros bicornis*	Great Hornbill	VU	VU	This species can be found in Asia. In Vietnam, it is rare and declining resident. The most recent records are from Cat Tien National Park and Deo Nui San in the south, but also from Phong Nha-Ke Bang National Park. Global population is 13000 to 27000, EOO is not estimated. This species frequents wet evergreen and mixed deciduous forests, ranging out into open deciduous areas to visit fruit trees. Habitat-use seems to be negatively associated with human population and positively correlated with the density of large tree required for nesting, and it is therefore most common in unlogged forest. Known nest trees include *Tetrameles nudiflora, Dipterocarpus gracilis, Dipterocarpus turbinata, Cleistocalyx nervosum, Shorea faguetiana, Hopea odorata, Neobalanocarpys heimii, Palaquiuum ellipticum, Mangifera indica, Bombax ceiba, Mesua ferrea and Syzygium gardneri.*	The species' distribution overlaps with the EAAA for birds. It can be found in forest, the type of habitat that the EAAA for bird covers. However, the main populations are in Cat Tien National Park, which is 70km off the EAAA. It is unlikely that 65 individuals will occur within the EAAA and trigger critical habitat.
AVES	*Rhyticeros undulatus*	Wreathed Hornbill	VU	N/A	The species has a large natural distribution extending eastwards from Myanmar via Thailand, Lao PDR, Cambodia as far as Viet Nam and to the south through Peninsular Malaysia to Indonesia (Kalimantan and Sumatra). The species occurs in	The species' distribution overlaps with the EAAA for birds. It is confined to the primary rainforest that are not covered in the EAAA1. It is unlikely that the species will occur within the

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					extensive primary rainforest, mainly in the lowlands (Poonswad et al. 2013, Kemp and Boesman 2018). During the non-breeding season, it ranges higher uphill (A. Datta and R. Naniwadekar in litt. 2018), up to 2,560 m. It tolerates selective logging (Kemp and Boesman 2018), but generally avoids disturbed habitats and proximity to human population.	EAAA1 and suffer a loss in population that will render it become EN or CR.
AVES	*Carpococcyx renauldi*	Coral-billed Ground-cuckoo	VU	N/A	This species was described from a specimen collected from Pitsanulok, Thailand. It is recorded from the Mekong, Chao Phraya and Meklong basins.	The species' distribution overlaps with the EAAA for birds. However, the EAAA does not support habitats for breeding and foraging of this species during wintering. Thus, it is unlikely that the species will occur within the EAAA.
AVES	*Columba punicea*	Pale-capped Pigeon	VU	EN	This species is native to India, Nepal, Vietnam. The global population is considered estimated at 2500-9999 mature individuals. Its Estimated Extent of Occurrence (EOO) is estimated at 3,050,000 km2. In Vietnam it is very rare and local with small numbers recently reported from Mang Den/Kon Plong, Kontum Province in 2010 and from magrove forest at Ho Tram, approx 100 km south-east of Ho Chi Minh City, in 2011 (R. Craik in litt. 2012). However, large flocks were reported in the past from near Da Lat (C. Robson in litt. 2012) and it is regarded as uncommon but resident on some islands in Bai Tu Lam Bay.	The species' distribution overlaps with the EAAA1. The species is considered to be rare and none has been witnessed within Binh Thuan province. It is unlikely that the species will occur within the EAAA1 and suffer a loss in population that will render it become EN or CR.
AVES	*Clanga clanga*	Greater Spotted Eagle	VU	N/A	This species is found throughout western Asia, central Asia, parts of eastern and southern Asia, a few isolated parts of Europe and Africa.The global population is considered estimated at 3300-8800 mature individuals. Its Estimated Extent of Occurrence (EOO) is estimated at 18,100,000 km2. The preferred habitat types for this species is inland wetlands, marine intertidal, grassland and rocky areas. It occurs in	The species' distribution overlaps with the EAAA for birds. It prefers lowland forests near wetlands that are limited in EAAA1. It is unlikely that the species occured within the EAAA1 and/or suffer loss in populations that will render it become EN or CR.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					lowland forests near wetlands, nesting in different types of (generally tall) trees, depending on local conditions. It is a migratory species, with birds leaving their breeding grounds in October and November to winter in southern Europe, southern Asia and north-east Africa (del Hoyo et al. 1994). They tend to return in February and March. Birds migrate on a broad front, tending to pass in singles, twos and threes with the occasional larger group	
AVES	*Egretta eulophotes*	Chinese Egret	VU	VU	This species is native to coastal areas of Indonesia, Vietnam, China. It occurs in shallow tidal estuaries, mudflats and bays, occasionally visiting fishponds and paddy-fields. The global population is considered estimated at 2500-9999 mature individuals. Its Estimated Extent of Occurrence (EOO) is estimated at 1,240,000 km2 .	The EAAA1 lies in the area of its passage. However the species mostly occur near water bodies, which are very limited in EAAA1. It is unlikely that the species will occur within the EAAA1 and suffer a loss in population that will render it become EN or CR.
AVES	*Ciconia episcopus*	Asian Woollyneck	VU	VU	The species is known from the Mae Khlong in Thailand to the lower Mekong basin (Cambodia, Lao PDR,Thailand, and Viet Nam), and from Indonesia (Borneo and Sumatra; Kottelat et al. 1993) and Malaysia (Sarawak; Menon 1977).	The species' distribution overlaps with the EAAA for birds. However, the species frequents water bodies and is considered extinction or near extinction in Vietnam. Therefore, it is unlikely that the species will occur in the EAAA1 and suffer a loss in population of this species within the EAAA will lead to it become EN or CR.
AMPHIBIA	*Leptobrachium leucops*	N/A	VU	N/A	This montane species is known from Bidoup-Nui Ba National Park, Lam Dong and Khanh Hoa Provinces; Phuoc Binh National Park, Ninh Thuan province, and Ta Dung Nature Reserve, Dak Nong Province. EOO is less than 50,000 km2. This species is associated with montane evergreen cloud forest. The harvest of timber and non-timber forest products	The species favours tropical forest which the EAAA2 does not support. The EAAA2 is therefore unlikely to be a critical habitat for this species which sustains equal or more than 10% of the global population and 10 reproduction units.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					are likely to result in some habitat loss and modification, which is a potential threat to the species. The construction of a road through Bidoup-Nui Ba National Park may serve as a barrier to dispersal and is likely to increase habitat disturbance.	
MAMMALIA	*Arctonyx collaris*	Greater Hog Badger	VU	N/A	The species is known from the Mekong (lower), Chao Phraya and Bangpakong river drainages. The species is possible extinct in Viet Nam	The species is possible extinct in Vietnam. It is unlikely to occur within the EAAAs.
AMPHIBIA	*Microhyla pineticola*	Pine Narrow-Mouth Frog	VU	N/A	This specie is found in Lam Dong. The population treng is decreasing. This specie is not mentioned in Vitenam Redlist. This is a terrestrial montane species and is associated with mixed tropical forest as well as dry pine forest with an herbaceous understory (Poyarkov et al. 2014). The EOO is 11908 km2	The species favours tropical forest which the EAAA2 does not support. The EAAA2 is therefore unlikely to be a critical habitat for this species which sustains equal or more than 10% of the global population and 10 reproduction units.
REPTILIA	*Physignathus cocincinus*	Chinese Water Dragon	VU	VU	It remains locally common in forested areas along streams in Viet Nam . The first population-level mark-recapture survey of this species, across 14 stream transects in Thua Thien Hue Province in 2016 and 2017, found that the population appeared stable in two of three districts in this province over this short period but that the population size in this area may have been as low as 232-250 individuals in 2017 (Nguyen et al. 2018).	The species favours forest and wetlands, the type of habitats that the EAAA2 does not support. It is unlikely that the Project will affect a population of this species that lead to it become EN or CR.
MAMMALIA	*Capricornis sumatraensis*	Mainland Serow	VU	EN	The Mainland Serow occurs across eleven countries, including China, Southeast Asia and Himalayan range. In other countries, they are quite widely distribued, especially in protected forests in Nepal. In Viet Nam the serows were recorded in almost all protected areas from northern to the south-central areas of the country, especially where forested limestone mountains and cliffs occured. During mammal surveys from 1999 to 2008, serows were found in the northern and in the southern central areas of Vietnam. The species has also been recorded from offshore	The species' distribution does not overlaps with the EAAA2.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					islands in the north, e.g. Cat Ba island. However, there is no further information available on its distribution status and it is believed that this sub-species has significantly declined due to poaching in Viet Nam.	
AMPHIBIA	*Feihyla palpebralis*	N/A	NT OR LR/NT	N/A	This species is known from Hekou and Pingbian in Yunnan, China, from Tam Dao in northern Viet Nam (Nguyen Quong Truong pers. comm.), and from the higher altitudes of the Lang Bian plateau of southern Viet Nam (Bourret 1942; Inger, Orlov and Darevsky 1999). It probably occurs more widely than current records suggest. It has been recorded from 700-2,000m asl. This species is known from pools and swampy riparian areas in forest, although the non-breeding habitat is poorly known. Single eggs are laid on plant stems above water.	The species favours tropical forest, moist areas which the EAAA2 does not support. The EAAA2 is therefore unlikely to be a critical habitat for this species which sustains equal or more than 10% of the global population and 10 reproduction units.
ACTINOPTERYGII	*Cirrhinus molitorella*	Mud Carp	NT OR LR/NT	N/A	This widespread species is scattered across eastern North America, western Greenland, Europe, Africa, Asia and Australasia. The global population is 1,400,000-2,100,000[183]. The estimated EOO is 304,000,000 km2. The estimated population is unknow	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Anguilla bicolor*	Shortfin Eel	NT OR LR/NT	VU	The population is unknown but considered decreasing. The EOO is approximately 2,270,000km2. This species can be found in Cambodia; Myanmar; Thailand and Viet Nam	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Takifugu ocellatus*	Ocellated Puffer	NT OR LR/NT	N/A	*Takifugu ocellatus* is distributed in the northwest Pacific in coastal areas of China south to Viet Nam and South Korea at depths ranging from very shallow waters to 20 metres. This species' dependence on freshwater systems to spawn and its predictable, seasonal mass spawning migrations into freshwater systems render it particularly vulnerable to overfishing. It is rarely found in Viet Nam.	This is an aquatic species. The project is unlikely to impact aquatic species.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
AVES	*Psittacula finschii*	Grey-headed Parakeet	NT OR LR/NT	N/A	The species is widespread in the Chao Phraya in Thailand, and the middle and lower Mekong in Thailand (Lao PDR, Cambodia and Viet Nam; Kottelat and Ng 2000) including tributaries (e.g., the Xe Bang Fai (Kottelat 2001), and the Mun River in eastern Thailand).	The species' distribution overlaps with the EAAA for birds. It can be found in forest, shrubland artificial habitats, the type of habitats that the EAAA covers. However, it has a large EOO that is unlikely to meet the threshold for criteria 1 and 3.
AVES	*Zapornia paykullii*	Band-bellied Crake	NT OR LR/NT	N/A	It breeds in lowland marshes and meadows with tussocks, thickets or small trees, and is often found near villages and along field edges. It winters in wet grassland, swamps and paddyfields. n Russia, although it is still common in parts of its breeding range in most areas, it appears only sporadically. It occurs on passage and/or in winter in North Korea, South Korea, China (Inner Mongolia, Shandong and southwards to southern China, including Hong Kong (China)), central Thailand, Vietnam.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Limosa limosa*	Black-tailed Godwit	NT OR LR/NT	N/A	This species is native but not breeding in Vietnam. The global population is considered estimated is unknow. Its Estimated Extent of Occurrence (EOO) is estimated at 30,300,000 km2 . However there have been very few south east Asian records in recent years and very little information is available from the assumed wintering areas. Its status and winter distribution urgently require investigation.	This species has a large EOO compared with the EAAA1 that is unlikely to meet the threshold for criterion 3.
AVES	*Limosa lapponica*	Bar-tailed Godwit	NT OR LR/NT	N/A	The species is extinct in Vietnam. Migrate to Asia starting from March to May approximately. The species is threatened by the degradation of stopover and non-breeding sites due to land reclamation, shellfisheries, pollution, human disturbance, reduced river flows, and in some areas the invasion of mudflats and coastal saltmarshes by mangroves (owing to sea-level rise and increased	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					sedimentation and nutrient loads at the coast from uncontrolled development and soil erosion in upstream catchment areas)	
AVES	*Numenius arquata*	Eurasian Curlew	NT OR LR/NT	N/A	The species has a very large range and is migratory. The species winters in Vietnam. The estimated extent of occurrence 20,700,000km2. The estimated population is approximately 647,500-876,000 individuals globally.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Calidris ruficollis*	Red-necked Stint	NT OR LR/NT	N/A	During the breeding season the species uses low altitude montane tundra in the subalpine belt. In the non-breeding season it mainly uses coastal and intertidal mudflats, sheltered inlets, bays and lagoons but it also uses freshwater, brackish and saltwater wetlands and occasionally sandy beaches and rocky shorelines. The species is restricted to the East Asian-Australasian Flyway and habitat loss at critical stopover sites in the Yellow Sea is suspected to be the most important threat to this species.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Calidris ferruginea*	Curlew Sandpiper	NT OR LR/NT	N/A	The species has a very large range and is migratory. The species winters in Vietnam. The estimated extent of occurrence 3,050,000km2. The estimated population is approximately 90,000 individuals.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Vanellus duvaucelii*	River Lapwing	NT OR LR/NT	N/A	The population is unknown but considered stable. The EOO is approximately 8,120,000km2. This species can be found in Bangladesh; Brunei Darussalam; Cambodia; China; India; Indonesia; Laos; Malaysia; Myanmar; Philippines; Singapore; Thailand and Viet Nam.	This species has a large EOO compared with the EAAA that is unlikely to meet the threshold for criterion 3.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
AVES	*Sterna aurantia*	River Tern	NT OR LR/NT	N/A	This species occurs across a wide range in southern and south-east Asia,It inhabits rivers and freshwater lakes, also occurring rarely on estuaries, and breeds on sandy islands	This species has a large EOO compared with the EAAA1 that is unlikely to meet the threshold for criterion 3.
AVES	*Anhinga melanogaster*	Oriental Darter	NT OR LR/NT	VU	This species is native in Vietnam. The global population is considered estimated at 22000 individuals. Its Estimated Extent of Occurrence (EOO) is estimated at 19,400,000 km2 . This species occurs in Vietnam (previously widespread breeder, once locally common but now almost extinct, however, increasing numbers are now recorded in the non-breeding season)	This species has a large EOO compared with the EAAA1 that is unlikely to meet the threshold for criterion 3.
AVES	*Mycteria leucocephala*	Painted Stork	NT OR LR/NT	N/A	The species was formerly widespread resident in Vietnam but now only a rare non-breeding visitor). It frequents freshwater marshes, lakes and reservoirs, flooded fields, rice paddies, irrigation canals, freshwater swamp forest, river banks, intertidal mudflats and saltpans. There are an estimated 15,000-25,000 individuals in South Asia (Wetlands International 2013) and fewer than 10,000 in South-East Asia. Although it is considered one of the most numerous and secure of Asian storks, this is more a reflection of the rarity and endangerment of most storks in the region, than the security of this species.	This species has a large EOO compared with the EAAA1 that is unlikely to meet the threshold for criterion 3.
AVES	*Calonectris leucomelas*	Streaked Shearwater	NT OR LR/NT	N/A	This species is consistently distributed throughout eastern Asia, Southeast Asia and Australasia. Its EOO is 45,800,000km2. The global population has been estimated at 3,000,000 individuals and considering decreasing. This species was found in sea area of Vietnam. The prevalence of threats from introduced predators on the species's main breeding grounds in Japan and additional	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					factors such as fisheries bycatch and human disturbance suggests that the species is in overall decline.	
AVES	*Hydrobates monorhis*	Swinhoe's Storm-petrel	NT OR LR/NT	N/A	The species breeds on Russia and Japan. It is extant in Viet Nam but seasonality is uncertain. Brooke (2004) estimated the global population to number c.100,000 individuals, which roughly equates to 66,666 mature individuals. This marine species can be found over pelagic and inshore waters. Its feeds mainly on the wing by dipping and does not patter. Breeding starts in April forming loose colonies on offshore islands in burrows.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
ACTINOPTERYGII	*Butis butis*	Crimson-tipped Gudgeon	LC OR LR/LC	N/A	This species has a wide geographic range. There is no specific population information available for this species, however, it is usually abundant and common throughout its range. This tropical species is found in coastal marine to brackish habitats, mangroves and in the lower reaches of freshwater streams, usually on mud bottoms.	This is an aquatic species. The project is unlikely to impact aquatic species.
REPTILIA	*Crocodylus porosus*	Saltwater Crocodile	LC OR LR/LC	EW	This species is native in Laos, China, Cambodia, Thailand, Vietnam. . The species can be found from 0-770m in altitude. This speice is mentioned as EW in Vietnam Red List. The saltwater crocodile is a crocodilian native to saltwater habitats.The Saltwater Crocodile is found throughout Southeast Asia, India and Australasia. The EOO for this species is unknown. There is an estimated 200,000 – 300,000 individuals globally	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Favonigobius reichei*	Indo-pacific Tropical Sand Goby	LC OR LR/LC	N/A	This species is found in the Indo-West Pacific from East Africa to the Philippines (Kottelat 1993), north to Japan (Masuda et al. 1984), and south to northern Australia. This species is very widespread with several geographic subpopulations. This species is found over sandy and muddy bottoms, often in	This is an aquatic species. The project is unlikely to impact aquatic species.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					weedy areas of the intertidal zone, as well as in mangroves, estuaries, lagoons and rivers.	
MAMMALIA	*Petaurista elegans*	Spotted Giant Flying Squirrel	LC OR LR/LC	EN	This species is found in Laos, Myanmar, Butan, Malaysia, Vietnam. EN in Vietnam Redlist. This montane species has been found in temperate pine forests, wet tropical evergreen forest and dry evergreen forest (Evans et al. 2000, Molur et al. 2005, Smith and Xie 2008). It is found in tall trees, but also often in rhododendron scrub and on rock cliffs (Smith and Xie 2008).	The species lives in forest, the type of habitat that the EAAA2 does not cover.
MAMMALIA	*Rattus osgoodi*	Osgood's Vietnamese Rat	LC OR LR/LC	N/A	This species is found in a wide variety of primary and secondary montane habitats. Musser and Newcomb (1985) note that they "suspect that this species is terrestrial and lives in grass and dense shrubbery providing good cover that may occur either along forest margins or scattered through forest with an open canopy. Thick scrub cover adjacent to agricultural fields may also be good habitat".	The species' distribution does not overlaps with the EAAA2.
ACTINOPTERYGII	*Nematalosa nasus*	Bloch's Gizzard Shad	LC OR LR/LC	VU	This species is relatively widespread in the Indo-West Pacific, where it can be abundant but not frequently encountered. t is mainly found in estuaries and coastal areas, but occasionally ascends into the upper reaches of the tidal zone (Rainboth 1996) and is also common in the mangrove areas of southern India (Kathiresan and Rajendran 2002). This species also inhabits coral reefs (Nguyen and Nguyen 2006). This species is known to occupy a depth range between 0 - 30 metres.	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Caranx sexfasciatus*	Bigeye Trevally	LC OR LR/LC	N/A	Caranx sexfasciatus is a widely distributed species throughout the tropical Indo-west Pacific, from Eastern Africa to the West coasts of the central Americas. Found in multiple marine and freshwater system from rivers and lagoons as juveniles, to schools in open oceanic waters. Caranx sexfasciatus is widespread and although the population size is not known as a	This is an aquatic species. The project is unlikely to impact aquatic species.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					whole, it is thought to be locally abundant in some areas of its range. However, due to the importance of this species as a food source, it may be declining in population as a result of fishing. It inhabits water bodies with maximum 146m.	
ACTINOPTERYGII	*Ambassis urotaenia*	Bleeker's Glass Perchlet	LC OR LR/LC	N/A	This species occurs in brackish waters of estuaries, tidal creeks and mangroves, and can sometimes be found in upper streams (Masuda et al. 1984). This species can be found in large schools. It has been reported to be common throughout its broad Indo-Pacific distribution.	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Eleotris fusca*	Brown Spinecheek Gudgeon	LC OR LR/LC	N/A	Eleotris fusca is widespread and exists in many habitats. This species inhabits a variety of habitats ranging from freshwater streams to brackish estuarine and coastal areas; it is most often found in small coastal freshwater streams. It is commonly found under logs and rootstocks in muddy reaches of estuaries and mangrove swamps and freshwater streams leading into coastal lagoons. There is no information on the population status of this species.	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Channa gachua*	Dwarf Snakehead	LC OR LR/LC	N/A	The species has a very wide distribution; it is recorded from Iran, Iraq, Afghanistan, Pakistan, Nepal, India, Sri Lanka, Bangladesh, Bhutan, China, Myanmar, Thailand, Laos, Cambodia, Viet Nam, Malaysia, Indonesia, and Singapore. Population is unknown, but as presently grouped, it is common and widespread.	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Bostrychus sinensis*	Four-eyed Sleeper	LC OR LR/LC	N/A	The species has an Indo-West Pacific distribution; throughout coastal south and southeast Asia, including Viet Nam. This species is widespread in the lower reaches of coastal freshwater, brackish and coastal marine habitats. It is a popular food fish in areas around the Mekong Delta and in Viet Nam, but it is not abundant where it occurs. The current population trend is assumed to be stable.	This is an aquatic species. The project is unlikely to impact aquatic species.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					As this species occurrence is linked to mangroves and estuaries, any threats to these habitats may affect its populations.This species is cultured in China, and in Viet Nam, for local and international consumption.	
ACTINOPTERYGII	*Anguilla marmorata*	Marbled Eel	LC OR LR/LC	VU	Although no where common A. marmorata has a widespread distribution from Africa east into Asia. Breeds at sea and migrates into freshwaters as juveniles (glass eels>elvers). Elvers migrate high up rivers into often headwater streams. This species is harvested for human consumption.	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Rasbora daniconius*	Slender Barb	LC OR LR/LC	N/A	Rasbora daniconius occurs in the Mekong, Chao Phraya and Salween basins, the northern Malay Peninsula. This fish is often harvested with other smaller fish as food, locally, and for use in poultry feed. It occurs in a variety of habitats: ditches, ponds, canals, streams, rivers and inundated fields, but is primarily found in sandy streams and rivers. It is also found in brackish waters. It sometimes forms large schools.	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Anabas testudineus*	Climbing Perch	LC OR LR/LC	N/A	The species is widely distributed in Pakistan, India, Bangladesh, Nepal, Bhutan (most likely), Sri Lanka, Myanmar, Thailand, Cambodia, Laos, Vietnam. This species inhabits freshwater, mostly in rivers, canals, lakes, ponds, swamps, estuaries and paddy fields. In Sri Lanka, it is essentially a lowland fish. Adults occur in medium to large rivers, brooks, flooded fields and stagnant water bodies including sluggish flowing canals, and it is often found in areas with dense vegetation. It can tolerate extremely unfavorable water conditions and is associated mainly with turbid, stagnant and heavily polluted waters. They are a common species found in the waterways within the city. Although this is considered to be a widespread and abundant species, it almost certainly consists of more than one species that would be more	This is an aquatic species. The project is unlikely to impact aquatic species.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					geographically circumscribed. Therefore, information on the population status should be considered to be poorly known. It has been commercially farmed for food in several countries.	
ACTINOPTERYGII	*Mastacembelus armatus*	Spiny Eel	LC OR LR/LC	N/A	The species is widely distributed throughout mainland Southeast Asia. Inhabits rivers, marshlands and vegetated water bodies, localized movement between still to flowing waters. Common in suitable habitats throughout its range. Locally and internationally consumed (exported from Cambodia to Thailand and other countries as processed products), and found in the ornamental fish trade.	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Cyclocheilichthys armatus*	Ca Coc Gai	LC OR LR/LC	N/A	The species is widespread in both Indochinese and Sundaic basins as it is found in Thailand, Lao PDR, Cambodia as far as southern Viet Nam. ts extent of occurrence (EOO) is estimated at 3,585,400 km2. Little is known about the population status of the species, and the overall trend is unknow. This fish is a benthopelagic large-sized carp that appears to occur in the lower and middle reaches of the river basin, while it inhabits various types of freshwater habitat that range from large rivers and streams (usually during the dry season) to flooded riparian forests (as it migrates there to spawn during the rainy season). It is also found in reservoirs.	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Caragobius urolepis*	Scaleless Worm Goby	LC OR LR/LC	N/A	This species is widespread from coastal eastern India to Japan to New Guinea and Fiji. This species may be locally common in suitable habitats such as estuaries and mudflats (Pantallano et al. 2018). It burrows within the muddy substrate and is rarely encountered unless targeted collections are made.	This is an aquatic species. The project is unlikely to impact aquatic species.
MAGNOLIOPSIDA	*Oenanthe javanica*	Water Dropwort	LC OR LR/LC	N/A	The species occurs over a very wide area and although the habitats in which it occurs are often threatened by drainage, forest clearance, logging, poor watershed management and	The species lives in wetlands, the type of habitat that the EAAA2 does not support. The EAAA2 is therefore unlikely to be a critical habitat for this species which sustains equal or

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					development, it is unlikely to become extinct in the short term and so is assessed as Least Concern.	more than 10% of the global population and 10 reproduction units.
LILIOPSIDA	*Monochoria vaginalis*	Pickerel Weed	LC OR LR/LC	N/A	This species is widely distributed throughout southeast Asia, from the Mae Klong and Chao Phraya basins in Thailand, the Mekong basin, to both slopes of the Malay Peninsula and to Indonesia (Java (Citarum (Tjitarum) River, Parongkalong, Preanger Province), central Sumatra (Tan and Ng 2000) and Kalimantan, western Borneo (Roberts 1989). Range extends in Indochina to the Mekong delta in Viet Nam (Khoa and Huong 1993).	The species lives in wetlands, the type of habitat that the EAAA2 does not support. The EAAA2 is therefore unlikely to be a critical habitat for this species which sustains equal or more than 10% of the global population and 10 reproduction units.
ACTINOPTERYGII	*Pseudapocryptes elongatus*	N/A	LC OR LR/LC	N/A	This species distribution ranges from India to Tahiti and north to China. The species has a wide distribution although the trend is unknown. It is found in mudflats of estuaries and the freshwater tidal zone of rivers	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Nematalosa galatheae*	Galathea Gizzard Shad	LC OR LR/LC	N/A	This species occurs in the Indian Ocean, the Bay of Bengal, and the Andaman Sea from the Karnataka Coast of India to Thailand at the mouth of the Pakcham River, Penang; throughout the Gulf of Thailand from Viet Nam. Based on data from other related species, this species' depth range is estimated to be 0-50 m. No population data are available for this species. It inhabits coastal marine waters, but enters (and presumably breeds in) freshwater, though more specimens and data are needed.	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Bathygobius fuscus*	Brown Frillfin	LC OR LR/LC	N/A	Bathygobius fuscus occurs throughout the intertidal areas of the Persian Gulf. Population information for Bathygobius fuscus in the Persian Gulf is limited. Bathygobius fuscus occurs mostly in marine coastal areas, but it can also be found in estuaries and sometimes in freshwater streams (Hoese 1986). B. fuscus is a tropical, reef-associated species that is common	This is an aquatic species. The project is unlikely to impact aquatic species.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					on intertidal reef flats and shallow waters among sand and rubble, on coral or rocky reefs.	
REPTILIA	*Varanus salvator*	Common Water Monitor	LC OR LR/LC	EN	EN in Vietnam Redllist. This specie is found in India, Myanmar, Indonesia, Vietnam. This species is semi-aquatic and opportunistic and inhabits a variety of natural habitats, such as primary forests and mangrove swamps (Gaulke and Horn 2004, Weijola 2010). The presence of man does not deter these monitors from areas with human disturbance (Gaulke et al. 1999), as they have been reported to thrive in agricultural areas (e.g., rice, oil palm) and even cities with canal systems (e.g. in Sri Lanka, where they are not or hardly disturbed, hunted and prosecuted by man; M. Gaulke pers. comm.) and second-growth forest (S. Sweet pers. comm.). Furthermore, their aquatic habits provide them with a measure of safety (E. Pianka pers. comm.), and their generalist diet may provide added ecological plasticity to this species (Somaweera and Somaweera 2009). In Borneo and Sulawesi, the species in this complex seem to be less tolerant of human activities and do not generally thrive in agricultural regions where there is extensive loss of natural vegetation.	The species lives in wetlands, the type of habitat that the EAAA2 does not support. The EAAA2 is therefore unlikely to be a critical habitat for this species which sustains equal or more than 10% of the global population and 10 reproduction units.
ACTINOPTERYGII	*Laides longibarbis*	N/A	LC OR LR/LC	N/A	Although there is no information on the population and its trends for this species, it is still relatively abundant throughout most of Indochina. The species is known from the Mekong, Mae Klong and Chao Phraya river drainages in Indochina, and from the Mekong River drainage in southern China. The species typically inhabits the main channels of rivers and large streams and has been known to take refuge in pools in the Mekong mainstream during the dry season (Poulsen 2002). Thought to be migratory (Rainboth 1996), carrying out short migrations from dry season pools to nearby tributaries to	This is an aquatic species. The project is unlikely to impact aquatic species.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					spawn during the wet season, and then returning to the mainstream Mekong during the dry season.	
ACTINOPTERYGII	*Channa lucius*	Forest Snakehead	LC OR LR/LC	N/A	This species is widely distributed throughout river drainages in mainland Southeast Asia. Channa lucius inhabits lakes, ponds, well-shaded forest streams, peat swamps and middle zones of rivers. It prefers faster moving waters and has been recorded in waters of temperature 24-29"C, pH 5.5-6.0 or less, with anion excess and low calcium. otal population size is unknown, but the population trend is suspected to be stable or declining at a rate that precludes it from a threatened category.	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Mystus singaringan*	N/A	LC OR LR/LC	N/A	This species is known from the Dong Nai River drainage westwards to the Mae Khlong drainage in the Indochinese Peninsula. This species inhabits a wide variety of lentic and lotic freshwater habitats, although it is more frequently encountered in larger, slower-flowing rivers with a substrate of sand or mud. This species moves into the flooded riparian forests during periods of high water and returns to rivers during the dry season. It is known to suffer stress due to high current velocity.	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Cyclocheilichthys repasson*	Pla Saition Tah Khao	LC OR LR/LC	N/A	The species is widespread in both Indochinese and Sundaic basins of Southeast Asia. This fish is locally and seasonally common throughout its range. The population trend is not known for certain, but it is considered to be relatively stable. Total adult population size is also uncertain, but it is estimated to be possibly more than 10,000 individuals given its wide distribution range. This fish is a benthopelagic large-sized carp that appears to occur in the lower, middle, and upper reaches of the river basin. It inhabits various types of riverine habitat, ranging from the mainstream tributaries up to submontane streams, as well as lowland swamps or marshlands given its	This is an aquatic species. The project is unlikely to impact aquatic species.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					lateral movement during the flooding time, which has been coined as a 'black' movement strategy.	
ACTINOPTERYGII	*Pseudomystus siamensis*	Bumble bee catfish	LC OR LR/LC	N/A	This is an abundant species at least throughout the middle and lower Mekong River drainage. The species occurs in a wide range of habitats including rivers and streams, marshlands, and peat swamps. It is slightly adaptive to impounded waters and man-made wetlands. Migratory movements are uncertain, but seems to undertake seasonal movements.	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Oxyeleotris marmorata*	Marbled Goby	LC OR LR/LC	N/A	This species has been recorded from the Mekong and Chao Phraya basins in Thailand, Viet Nam, Lao PDR, Cambodia, etc. The overall population trend for natural populations is unknown. This species has been widely translocated and used in aquaculture and thus, it is difficult to monitor natural populations. This species occurs in various wetlands, including rivers, lakes, ponds, reservoirs, canals, swamps and flooded forests. It generally prefers areas of little or no water movement. It is mainly found in freshwater but is also found in brackish environments.	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Osteochilus lini*	Dusky Face Carp	LC OR LR/LC	N/A	Known from the lower Mekong basin (Lao PDR, Cambodia (including the Tonle Sap), Viet Nam and Thailand). Inhabits marshlands and swamps, moves into streams and river as passage routes, and into flooded forest and fields . In Viet Nam the species is found in coastal drainages to at least the Duc My River (Ninh Hoa Province; Herder and Freyhof 2006) in central Viet Nam.	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Barbonymus schwanefeldii*	Tinfoil Barb	LC OR LR/LC	N/A	This species has been recorded from Asia in the Chao Phraya basin in Thailand; from the Mekong basin in Thailand, Cambodia, Lao PDR, and Viet Nam; Malaysia. Its extent of occurrence (EOO) is estimated at 3,304,093 km2. There is no information available on the global population trends of this	This is an aquatic species. The project is unlikely to impact aquatic species.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					species. This species is found in rivers, streams, canals and ditches (Rainboth 1996) and it occurs in medium-sized rivers, especially tributaries, and enters flooded fields. It requires flowing water and would not be expected in reservoirs, but is found in still water in Singapore where it has been introduced.	
ACTINOPTERYGII	*Parambassis wolffii*	Pa Khap Khong	LC OR LR/LC	N/A	This species is known from the lower Mekong River drainage, the Dong Nai River drainage in southern Vietnam. The extent of occurrence (EOO) is estimated at 2,704,860 km2, based on a minimum convex polygon generated from georeferenced data in Roberts (1995), Aryani (2015) and GBIF (2019). There is no published information on the population size and trend for this species, but it is suspected to be stable or declining. This species inhabits a variety of lotic and lentic habitats, including rivers and lakes.	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Barbichthys laevis*	Sucker Barb	LC OR LR/LC	N/A	The species has a south-eastern Asian distribution. The overall population trend for this species is unknown. The species inhabits medium to large-sized rivers during dry season and in floodplain streams and canals during wet season.	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Cyclocheilichthys apogon*	Beardless Barb	LC OR LR/LC	N/A	It is relatively very broad distribution range across Southeast Asia, with an extent of occurrence of 4,160,000 km2, its large population size of more than 10,000 mature individuals. This fish is locally and seasonally common throughout its range. This fish is a benthopelagic large-sized carp that appears to occur in the lower, middle, and upper reaches of the river basin, while it inhabits various types of riverine habitat that range from the mainstream tributaries up to submontane streams as well as lowland swamps or marshlands given its lateral movement during the flooding time. The species is also found in lakes or reservoirs, ditches, canals, and slow	This is an aquatic species. The project is unlikely to impact aquatic species.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					moving/standing waterbodies. It moves into flooded forests and non-forested floodplains ("black" latitudinal movement).	
ACTINOPTERYGII	*Macrochirichthys macrochirus*	Long Pectoral-fin Minnow	LC OR LR/LC	N/A	This species is known from the Mekong (from Yunnan to Viet Nam). This species is now very rare in some parts of its range and has experienced massive declines, and is likely to have been extirpated from Chao Phraya, Mae Khlong, Lake Songkhla and large parts of Java, and heavily reduced in parts of the Mekong basin. It is found in large rivers and lakes at medium to shallow depths. It prefers the lower to middle reaches of river basins. It moves into flooded forest and returns to the river as water levels subside; this is a 'white' type river migration pattern.	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Ophiocara porocephala*	Spangled Gudgeon	LC OR LR/LC	N/A	This species has an Indo-West Pacific distribution. This species is very common and abundant, but there is limited specific information available on the subpopulations. This species is epibenthic (lives on the surface of sediments at the bottom of the sea) (Daget et al. 1984) and it is usually found in estuaries, mangroves and the lower parts of rivers, often upstream from the tidal zone (Rainboth 1996).	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Gobiodon rivulatus*	Rippled Coralgoby	LC OR LR/LC	N/A	Gobiodon rivulatus is widespread across the Indo-West Pacific. It is found at depths ranging from 1 to 25 m. Additional population information is not available. Gobiodon rivulatus is a freshwater and marine species that inhabits pools, freshwater streams, lagoon mouths and coastal patches of coral reef. t is a coral-commensal species that is found solitary or in groups on branches of Acropora coral .	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Apogon hyalosoma*	Mangrove Cardinalfish	LC OR LR/LC	N/A	This species is found in the Indo-west Pacific from Yaeyama Islands, Japan south to Indonesia, Australia and Papua New Guinea. This species is widespread and can be locally common in suitable habitat. This is an estuarine species whose	This is an aquatic species. The project is unlikely to impact aquatic species.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					adults inhabit mangrove estuaries, tidal creeks and lower reaches of freshwater streams (Allen et al. 2002). It is a euryhaline species (Donaldson and Myers 2002), usually found in brackish or freshwater reaches of river mouths and in mangroves (including Nypa forest). It is found at depths ranging from 1 to 25 m.	
ACTINOPTERYGII	*Glossogobius aureus*	Golden Flathead Goby	LC OR LR/LC	N/A	This widely distributed species is considered common in parts of its range. It is found in a variety of freshwater habitats, including many river systems in protected areas. This species inhabits clear to turbid freshwater streams and rivers, with mud, sand or gravel substrate, where it can be found to depths of less than 1 metre. his species has seasonal recruitment (spawning in summer) unrelated to antecedent hydrology.	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Zenarchopterus gilli*	N/A	LC OR LR/LC	N/A	This species is widely distributed from Madagascar and the Seychelles across the Indian Ocean to India (Andaman Islands), into the Indo-Pacific (Thailand, Viet Nam, Singapore). This is a marine species that also inhabits brackish waters, estuaries, tidal rivers and mangroves and sometimes enters freshwater. It is amphidromous.	This is an aquatic species. The project is unlikely to impact aquatic species.
AVES	*Nettapus coromandelianus*	Cotton Pygmy-goose	LC OR LR/LC	EN	This species is distributed throughout southern Asia, parts of Southeast Asia and northern New Guinea and eastern Australia. It has an EOO of 33,800,000km2. The global population has been estimated at 130,000 – 1,100,000 individuals	The species' distribution overlaps with the EAAA for birds. However, the species is considered rare in Vietnam and only occued in protected areas. Therefore, it is unlikely that the species will occur in the EAAA1 and suffer a loss in population of this species within the EAAA will lead to it become EN or CR.
AVES	*Spatula clypeata*	Northern Shoveler	LC OR LR/LC	N/A	This migratory species is found throughout Europe, North America and Asia. The EOO for the species is 89,900,000km2.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					The global population has been estimated at 4,300,000 – 4,700,000 individuals	population of a species during periods of environmental stress.
AVES	*Spatula querquedula*	Garganey	LC OR LR/LC	N/A	This widespread species is found throughout most of Asia, most of Europe, parts of Africa and parts of Australasia. The species spends its non-breeding season in Vietnam. The global population has been estimated at 2,600,000-2,800,000 individuals. The EOO for the species is 32,500,000km2.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Turnix tanki*	Yellow-legged Buttonquail	LC OR LR/LC	N/A	This migratory species occurs in grassland, forest and shrub land habitat types. This species is found in Bangladesh, Bhutan, Cambodia, China, India, Korea, Democratic People's Republic of, Lao People's Democratic Republic, Myanmar, Nepal, Pakistan, Russian Federation (Eastern Asian Russia), Thailand, Vietnam. Vietnam is identified as an area used for breeding. The EOO is estimated to be 19,400,000km2. The global population size has not been quantified, but the species is apparently common through much of its range and is considered to be stable	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Jynx torquilla*	Eurasian Wryneck	LC OR LR/LC	N/A	This species is found throughout Europe, northern Asia, central Africa and southern Asia. Its EOO is 38,400,000km2. The global number of mature individuals is between 3,000,000 and 7,199,999	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Upupa epops*	Common Hoopoe	LC OR LR/LC	N/A	This migratory species is found throughout Asia, Europe and Africa. The EOO is estimated to be 77,600,000km2. The overall population is estimated at 5,000,000-10,000,000 individuals.	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
AVES	*Eurystomus orientalis*	Oriental Dollarbird	LC OR LR/LC	N/A	The estimated EOO is 32,400,000 km2. The estimated population is unknown	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Alcedo atthis*	Common Kingfisher	LC OR LR/LC	N/A	The estimated EOO is 94,100,000 km2. The estimated population is approximately 700000-1399999 individuals	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Halcyon coromanda*	Ruddy Kingfisher	LC OR LR/LC	N/A	This species is found throughout most of Southeast Asia and Korea and Japan. The EOO is 22,100,000km2. The global population size has not been quantified, but the species is reported to be widespread but generally rare and uncommon	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Halcyon pileata*	Black-capped Kingfisher	LC OR LR/LC	N/A	This migratory species is found consistently throughout Southeast Asia, parts of India, China and Korea. The EOO for this species is 5,160,000km2. The global population is not yet quantified, although, it is estimated that China holds between 100 and 100,000 breeding pairs.	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Merops philippinus*	Blue-tailed Bee-eater	LC OR LR/LC	N/A	This species is found throughout southern Asia, Southeast Asia and New Guinea. The species breeds in Vietnam. It has an EOO of 22,800,000 km2. The species global population has not yet been quantified	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Merops leschenaulti*	Chestnut-headed Bee-eater	LC OR LR/LC	N/A	This species is found and breeds in Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Sri Lanka, Thailand and Vietnam. It has an EOO of 12,000,000km2. The species global population has not yet	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					been quantified, but considered increasing and locally common throughout its very large range.	or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Clamator coromandus*	Chestnut-winged Cuckoo	LC OR LR/LC	N/A	This species is found throughout southern Asia and Southeast Asia. Its EOO is 13,100,000km2. The global population has not yet been quantified, however, considered fairly common within its range	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Cuculus micropterus*	Indian Cuckoo	LC OR LR/LC	N/A	This species is found throughout eastern and southern Asia and Southeast Asia. Its EOO is 26,200,000km2. The global population size has not been quantified, but the species is reported to be fairly common and widespread, while national population estimates include: c.10,000-100,000 breeding pairs and c.1,000-10,000 individuals on migration in China; c.100-10,000 breeding pairs and c.50-1,000 individuals on migration in Korea and possibly c.10,000-100,000 breeding pairs and c.1,000-10,000 individuals on migration in Russia.	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Cacomantis sonneratii*	Banded Bay Cuckoo	LC OR LR/LC	N/A	This species is found throughout Southeast Asia, parts of India and the Himalayas. The species actively breeds in Vietnam. The EOO for this species is 14,800,000km2. The global population has not yet been quantified, however, it is considered fairly common within its range	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Cacomantis merulinus*	Plaintive Cuckoo	LC OR LR/LC	N/A	This species is found throughout Southeast Asia and parts of India. The species actively breeds in Vietnam. The EOO for this species is 12,900,000km2. The global population has not yet been quantified but considered stable. The population in China has been estimated at c.10,000-100,000 breeding pairs and c.1,000-10,000 individuals on migration	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
AVES	*Chrysococcyx xanthorhynchus*	Violet Cuckoo	LC OR LR/LC	N/A	This species is found throughout Southeast Asia and parts of Myanmar. The species actively breeds in Vietnam. The EOO for this species is 10,600,000km2. The global population has not yet been quantified but considered descreasing.	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Eudynamys scolopaceus*	Western Koel	LC OR LR/LC	N/A	This species is found in southern Asia and Southeast Asia. The EOO for this species is 34,200,000km2. The global population has not yet been quantified, although considered common throughout most of its range	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Loriculus vernalis*	Vernal Hanging-parrot	LC OR LR/LC	N/A	This species is found throughout parts of India, Bangladesh, Myanmar, Cambodia, Vietnam, Thailand and Laos. The EOO for this species was 6,460,000km2. The global population for this species has not been quantified	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Hirundapus caudacutus*	White-throated Needletail	LC OR LR/LC	N/A	This species is found in Southeast Asia. The EOO for this species is 6,460,000km2. The global population has not yet been quantified but considered stable	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Hirundapus cochinchinensis*	Silver-backed Needletail	LC OR LR/LC	N/A	This migratory species prefers forest habitat types and is distributed throughout Asia. This species distribution includes Vietnam. This species is also thought to reside in Cambodia, China, India, Laos, Malaysia, Myanmar, Nepal, Singapore and Thailand (Breeding locations unknown). Its EOO is 2,470,000km2. The global population size has not been quantified, but the species is reported to be locally common to uncommon	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
AVES	*Apus pacificus*	Pacific Swift	LC OR LR/LC	N/A	The estimated EOO is 27,400,000 km2. The estimated population is unknow	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Otus spilocephalus*	Mountain Scops-owl	LC OR LR/LC	N/A	The global population size has not been quantified, but the species is described as common in places	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Glaucidium brodiei*	Collared Owlet	LC OR LR/LC	N/A	The global population size has not been quantified, but the species is reported to be common to fairly common throughout most of its range.	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Glaucidium cuculoides*	Asian Barred Owlet	LC OR LR/LC	N/A	The global population size has not been quantified, but the species is reported to be common over most of its range.	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Streptopelia tranquebarica*	Red Turtle-dove	LC OR LR/LC	N/A	This migratory species occurs in forest, shrub land and savannah habitat types. This species is distributed throughout Asia. The species winters in Vietnam, and species distribution includes the Project area. This species breeds in Indonesia and the Philippines. Its EOO is 18,300,000km2. The global population size has not been quantified, but the species is described as common to abundant, while national population sizes have been estimated at c.10,000-100,000 breeding pairs in China and c.10,000-100,000 breeding pairs in Taiwan	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
AVES	*Macropygia unchall*	Barred Cuckoo-dove	LC OR LR/LC	N/A	This species is found throughout parts of Bhutan, China, Indonesia, Malaysia, Nepal, India, Bangladesh, Myanmar, Cambodia, Vietnam, Thailand and Laos. The EOO for this species was 19,000,000km2. The global population for this species has not been quantified, but is considered stable with the population in China estimated at c.100-100,000 breeding pairs.	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Treron curvirostra*	Thick-billed Green-pigeon	LC OR LR/LC	N/A	The estimated EOO is 9,970,000 km2. The global population size has not been quantified, but the species is described as generally common to abundant (Gibbs et al. 2001).	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Treron seimundi*	Yellow-vented Green-pigeon	LC OR LR/LC	N/A	The global population size has not been quantified, but the species is reported to be uncommon to frequent	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Treron sphenurus*	Wedge-tailed Green-pigeon	LC OR LR/LC	N/A	The global population size has not been quantified, but the species is reported to be common to uncommon.	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Amaurornis phoenicurus*	White-breasted Waterhen	LC OR LR/LC	N/A	This migratory species occurs in a variety of habitat types including inland wetlands, coastal/supratidal, shrub land, grassland and aquatic environments. It occurs in countries such as Thailand, China and Nepal, and United Arab Emirates during the non-breeding season. In the breeding season the species is known to occur in British Indian Ocean Territory. This species winters in Vietnam and distribution includes the	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					Project area. The EOO is 39,300,000km2. The global population is estimated between 10,000-100,000 individuals.	
AVES	*Zapornia pusilla*	Baillon's Crake	LC OR LR/LC	N/A	The Baillo's Crake is found in continuously throughout central Asia, parts of Europe, southern Africa, Southeast Asia and parts of Australasia. The species is extant to Vietnam. Its EOO is 74,800,000km2. The population of mature individuals has been estimated at 500000-999999	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Zapornia fusca*	Ruddy-breasted Crake	LC OR LR/LC	N/A	This migratory species breeds in Korea, Democratic People's Republic of; Korea, Republic of; Philippines; Russian Federation (Eastern Asian Russia); Singapore . The EOO is estimated to be 31,400,000km2. The population is unknown and the population trend is considered to be unknown	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Gallicrex cinerea*	Watercock	LC OR LR/LC	N/A	This species is continuously distributed throughout most of eastern and southern Asia (including Southeast Asia).This species distribution includes Vietnam, and includes the Project area. This species utilises Korea during the breeding season. This species EOO is 22,600,000km2. The global population size has not been quantified, though national population estimates include: c.100-10,000 breeding pairs and c.50-1,000 individuals on migration in China; < c.100,000 breeding pairs and < c.1,000 individuals on migration in Taiwan; c.100-10,000 breeding pairs and c.50-1,000 individuals on migration in Korea and < c.50 individuals on migration in Japan	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Porphyrio porphyrio*	Purple Swamphen	LC OR LR/LC	N/A	This species has an extremely large range. Wetlands International (2015) estimate the overall population to be 780,000-2,910,000 individuals. It shows a preference for permanent, fresh or brackish, still or slow-flowing, sheltered, extensive wetlands (del Hoyo et al. 1996) with floating mats of water-lilies (Taylor and van Perlo 1998), tall, dense emergent vegetation, muddy or sandy shorelines and patches of shallow	This species has a large EOO compared with the EAAA that is unlikely to meet the threshold for criterion 3.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					water. Suitable habitats include ponds, lakes, dams, marshes, swamps, rivers, flood-plains, artesian wells, sewage farms, and wet rice-fields.	
AVES	*Fulica atra*	Common Coot	LC OR LR/LC	N/A	The Common Coot is found throughout Europe, most of Asia, northern Africa and most of Australasia, including Vietnam. The species utilises Australia, Kazakhstan, Korea, Mongolia, New Zealand, Norway, The Russian Federation, Tajikistan, Turkmenistan, Uzbekistan and Western Sahara during the breeding season. Its EOO is 152,000,000km2. The global population is estimated at 5300000-6500000	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Gallinago stenura*	Pintail Snipe	LC OR LR/LC	N/A	The Pintail Snipe is found throughout north-eastern Asia and parts of central Asia, parts of southern Asia and Southeast Asia. The species inhabits Vietnam during the non-breeding season. The EOO for this species is 12,900,000km2. The global population of individuals is estimated at 50,000 – 2,000,000	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Gallinago gallinago*	Common Snipe	LC OR LR/LC	N/A	The Common Snipe is found throughout most of Asia (except central parts), Europe and parts of Africa. The species inhabits Vietnam during the non-breeding season. The EOO for this species is 21,500,000 km2. The global population of mature individuals is estimated at 15,000,000 – 29,000,000	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Lymnocryptes minimus*	Jack Snipe	LC OR LR/LC	N/A	The estimated EOO is 10,600,000 km2. The estimated population is unknow	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
AVES	*Numenius phaeopus*	Whimbrel	LC OR LR/LC	N/A	The sea Birds are found in coastal area of Asia, Australia, Africa. The estimated EOO is 31,100,000 km2. The estimated population is unknow	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Tringa erythropus*	Spotted Redshank	LC OR LR/LC	N/A	This species is found throughout northern Asia, parts of Europe, southern Asia and parts of Africa. The species utilises Vietnam during the non-breeding season. The EOO for this species is 7,360,000km2. The global population is estimated at 110,000-270,000 individuals	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Tringa totanus*	Common Redshank	LC OR LR/LC	N/A	This migratory species is found in Europe, Central Asia, Africa and North Asia. The EOO is estimated to be 40,700,000km2. The population is unknown and the population trend is considered to be increasing	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Tringa stagnatilis*	Marsh Sandpiper	LC OR LR/LC	N/A	This migratory species is found in mainly Africa. The EOO is estimated to be 14,500,000km2. The population is unknown and the population trend is considered to be decreasing	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Tringa nebularia*	Common Greenshank	LC OR LR/LC	N/A	This species is fully migratory and generally migrates overland on a broad front, although the majority of Western European birds passes through coastal and estuarine sites	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
						population of a species during periods of environmental stress.
AVES	*Tringa ochropus*	Green Sandpiper	LC OR LR/LC	N/A	This species inhabits northern Asia, most of Africa, southern Asia, Europe and Southeast Asia. The EOO for this species is 24,600,000km2. The global population is estimated at 1,200,000-3,600,000 individuals. The popuation trend is increasing	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Tringa glareola*	Wood Sandpiper	LC OR LR/LC	N/A	This species inhabits northern Asia, most of Africa, southern Asia , Southeast Asia and Australaisa. The species utilises Vietnam during the non-breeding season. The EOO for this species is 23,000,000km2. The global population is estimated at 3,100,000-3,500,000 individuals and tje pupulation trend is stable	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Xenus cinereus*	Terek Sandpiper	LC OR LR/LC	N/A	The species has a very large range and is migratory. The species winters in Vietnam. The estimated extent of occurrence 14,600,000km2. The estimated population is approximately 30,900-101,000 individuals globally.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Actitis hypoleucos*	Common Sandpiper	LC OR LR/LC	N/A	The Common Sandpiper is broadly distributed, found throughout most of Africa, Europe, most of Asia and Australasia. The species has an EOO of 47,200,000km2.The global population has been estimated at 2,600,000-3,200,000.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Arenaria interpres*	Ruddy Turnstone	LC OR LR/LC	N/A	This species is found in coastal area. The species has an EOO of 177,000km2.The global population has been estimated at 300000-500000	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
						population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Calidris temminckii*	Temminck's Stint	LC OR LR/LC	N/A	This species is found in coastal area. The species has an EOO of 9,780,000km2.The global population has been estimated at 110000-850000	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Calidris subminuta*	Long-toed Stint	LC OR LR/LC	N/A	This species has a scattered distribution, found throughout most of Southeast Asia, isolated patches throughout Russia, Australia and New Guinea. The species has an EOO of 11,000,000km2. Suitable habitats include the edges of permanent and temporary lakes, ponds, reservoirs, lagoons, swamps and streams, river flood-plains, marshes, rice-fields, sewage ponds, saltpans and saltmarshes The global population has been estimated at >25,000 individuals	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Hydrophasianus chirurgus*	Pheasant-tailed Jacana	LC OR LR/LC	N/A	This species is found in coastal area. The species has an EOO of 19,700,000km2.The global population is unknow but the population trend is decreasing	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Metopidius indicus*	Bronze-winged Jacana	LC OR LR/LC	N/A	The global population is estimated to number > c.100,000 individuals.	This species has a large EOO compared with the EAAA1 that is unlikely to meet the threshold for criterion 3.
AVES	*Pluvialis fulva*	Pacific Golden Plover	LC OR LR/LC	N/A	This species is found in coastal area of Asia. The species has an EOO of 705,000 km2.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
						population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Pluvialis squatarola*	Grey Plover	LC OR LR/LC	N/A	This species is found in coastal area of Asia. The species has an EOO of 2,910,000km2. thr global population is estimated approximately 490000-630000 individuals	This species has a large EOO compared with the relatively small EAAA. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Charadrius dubius*	Little Ringed Plover	LC OR LR/LC	N/A	Siberian and other Asian populations migrate to wintering grounds in South-East Asia and India (only crossing Japan on the northward return migration) (del Hoyo et al. 1996). Some populations in South-East Asia, India, New Guinea and the Philippines do not migrate but are sedentary or locally nomadic in response to water levels. The European and North African populations migrate across the Sahara Desert between late-July and early-September (leaving breeding grounds June to mid-July) to reach wintering grounds in tropical Africa from late-August onwards (del Hoyo et al. 1996). These population return to their breeding grounds from mid-March, where they breed April-June (Europe) or March-May (North Africa).	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Charadrius mongolus*	Lesser Sandplover	LC OR LR/LC	N/A	The species has a very large range and is migratory. The species winters in Vietnam. The estimated extent of occurrence 47,100,000km2. The global population is about 11,000-12,000 individuals	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Charadrius leschenaultii*	Greater Sandplover	LC OR LR/LC	N/A	The species has a very large range and is migratory. The species winters in Vietnam. The estimated extent of	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					occurrence 9,590,000km2. The estimated population is approximately 154,000 -339,000 individuals globally.	population of a species during periods of environmental stress.
AVES	*Charadrius veredus*	Oriental Plover	LC OR LR/LC	N/A	This species is found in parts of inland Mongolia, coastal eastern Asia, parts of Southeast Asia and northern Australia. The EOO for this species is 1,800,000km2. The global population has been estimated at 160,000 individuals.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Vanellus indicus*	Red-wattled Lapwing	LC OR LR/LC	N/A	The global population is estimated at 50,000-60,000 individuals. t uses open areas near fresh or brackish water: rivers, mudbanks, wet grassland, pools, particularly on cultivated land, such as corn fields, grass fields and large gardens. It also uses open forests, waste, fallow and ploughed land and occasionally grass along highways	This species has a large EOO compared with the EAAA1 that is unlikely to meet the threshold for criterion 3.
AVES	*Glareola maldivarum*	Oriental Pratincole	LC OR LR/LC	N/A	There is evidence to suggest that the European population (200,000-510,000 pairs, occupying 50-74% of the global breeding range) has declined by up to 30% over ten years (three generations), but this may reflect shifts in breeding populations, populations in Asia are not thought to be declining and wintering populations in Africa appear to be increasing.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Stercorarius pomarinus*	Pomarine Jaeger	LC OR LR/LC	N/A	This species breeds in the far north of Eurasia and North America. It is a transequatorial migrant, mostly wintering between the Tropic of Cancer and Tropic of Capricorn and along the coastlines of Australia and Argentina. In Europe, the breeding population is estimated to number c.20,000 breeding pairs, equating to c.40,000 mature individuals (BirdLife International 2015). Europe forms approximately 10% of the global range, so a very preliminary estimate of the global population size is c. 400,000 mature individuals, although	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					further validation of this estimate is needed. Outside the breeding season, it migrates south, including long migrations over land.	
AVES	*Larus brunnicephalus*	Brown-headed Gull	LC OR LR/LC	N/A	This species is found in coastal regions of Southeast Asia, southern Asia and inland western China. The species spends the non-breeding season in Vietnam. The EOO for this species is 851,000km2. The global population has been estimated at 100,000-200,000 individuals	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Larus ridibundus*	Black-headed Gull	LC OR LR/LC	N/A	This species is found throughout Europe, north and west Africa, eastern North America, northern Asia and coastal southern and eastern Asia. This species EOO is 44,500,000km2. The global population is estimated at 4,800,000-8,900,000	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Thalasseus bengalensis*	Lesser Crested Tern	LC OR LR/LC	N/A	Outside the breeding season it ranges on the north African coast (both Mediterranean and Atlantic), on much of the Indian Ocean nearby continents, and in the western Pacific north of Australia up to New Guinea and Vietnam. The species inhabits tropical and subtropical (del Hoyo et al. 1996) sandy and coral coasts and estuaries (Urban et al. 1986), breeding on low-lying offshore islands, coral flats, sandbanks (del Hoyo et al. 1996) and flat sandy beaches (Snow and Perrins 1998), foraging in the surf and over offshore waters (del Hoyo et al. 1996).	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Thalasseus bergii*	Greater Crested Tern	LC OR LR/LC	N/A	This species is coastal area of Asia, Australia. This species EOO is 142,000,000 km2. The global population is unknow but the population trend is stable	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
						population of a species during periods of environmental stress.
AVES	*Sterna dougallii*	Roseate Tern	LC OR LR/LC	N/A	This species breeds in widely but sparsely distributed colonies along the east coast and offshore islands. The global population is estimated to number c.200,000-220,000 individuals. This is a migratory coastal seabird that feeds by plunge diving. It dives from a greater height than other terns. The species nests on sand-	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Sternula albifrons*	Little Tern	LC OR LR/LC	N/A	This species is found throughout Europe, north and west Africa, eastern North America, northern Asia and coastal southern and eastern Asia. This species EOO is 279,000,000 km2 . The global population trend is descreasing	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Onychoprion anaethetus*	Bridled Tern	LC OR LR/LC	N/A	SeaBird. This species EOO is 207,000,000 km2 . The global population is approximately 400,000-100,000 individuals	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Onychoprion fuscatus*	Sooty Tern	LC OR LR/LC	N/A	SeaBird. This species EOO is 195,000,000 km2.The Sooty Tern breeds on tropical islands and ranges through most of the tropical oceans (del Hoyo et al. 1996). The global population is estimated to number c.21,000,000-22,000,000 individuals (Delany and Scott 2006), while the population in Japan has been estimated at <100,000 breeding pairs and <1,000 individuals on migration (Brazil 2009).	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
AVES	*Chlidonias hybrida*	Whiskered Tern	LC OR LR/LC	N/A	This widely distributed Bird is found throughout most of Africa, scattered throughout Europe, scattered throughout central and southern Asia, Southeast Asia and Australasia. This species is found in Vietnam during the non-breeding season. The EOO for this species is 130,000,000km2. The global population has been estimated at 300,000 – 1,500,000 individuals	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Chlidonias leucopterus*	White-winged Tern	LC OR LR/LC	N/A	This widely distributed Bird is found throughout most of Africa, western, central and southern Asia, Southeast Asia and Australasia. The EOO for this species is 27,200,000km2. The global population has been estimated at 3,100,000 – 4,000,000 individuals	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Anous stolidus*	Brown Noddy	LC OR LR/LC	N/A	The Brown Noddy is a tropical seabird with a worldwide distribution. The global population is estimated to number c.180,000-1,100,000 individuals. Although its migratory movements are poorly known and the species is present all year round at most tropical colonies, it is seasonally absent from subtropical colonies and is known to disperse to the open ocean after breeding.	This species has a large EOO compared with the EAAA1 that is unlikely to meet the threshold for criterion 3.
AVES	*Pandion haliaetus*	Osprey	LC OR LR/LC	N/A	This widespread species is found throughout all continents except Antarctica, central Australia, central Asia, the Sahara and southern South America. It has an EOO of 228,000,000. There is an estimated 100,000 – 499,999 mature individuals globally	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Aviceda leuphotes*	Black Baza	LC OR LR/LC	N/A	This small Bird of prey species is found throughout parts of India, Bangladesh, Cambodian, Myanmar, Nepal, Thailand, Indonesia, Malaysia, Singapore, Sri Lanka and Vietnam. The species breeds in Vietnam and prefers forest and inland waters	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					as its habitat type. The EOO for this species is 6,880,000km2. The global population has been estimated at >10,000 individuals.	population of a species during periods of environmental stress.
AVES	*Pernis ptilorhynchus*	Oriental Honey-buzzard	LC OR LR/LC	N/A	This migratory species is found from southern Asia, Southeast Asia to Eastern Russia Asia. Its EOO is 38,200,000km2. The global population is estimated at 100,000 individual and considered stable.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Circus melanoleucos*	Pied Harrier	LC OR LR/LC	N/A	This species is found through southern Asia, parts of Southeast Asia and parts of Mongolia, north eastern China and southeastern Russia. The species spends the non-breeding season in Vietnam. The EOO for this species is 6,080,000km2. There has been an estimated 10,000-100,000 breeding pairs in China during migration.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Accipiter badius*	Shikra	LC OR LR/LC	N/A	This migratory species is native to central and southern Africa, parts of central Asia, southern Asia and Southeast Asia. This species breeds in Vietnam. The global population is considered stable and estimated at 500,000 – 999,999 mature individuals. Its Estimated Extent of Occurrence (EOO) is estimated at 62,500,000km2.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Accipiter gularis*	Japanese Sparrowhawk	LC OR LR/LC	N/A	This migratory species central eastern and Southeast Asia during the non-breeding season and China, Japan, Korea and Eastern Asian Russia during the breeding season. The EOO is 11,400,000km2. The global population is estimated to be in the tens of thousands and considered stable.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
AVES	*Butastur indicus*	Grey-faced Buzzard	LC OR LR/LC	N/A	This species is found throughout most of eastern Asia and Southeast Asia. The species is a resident of Vietnam. The EOO for this species is 3,280,000km2. The global population for this species is estimated at > 100,000 individuals	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Falco tinnunculus*	Common Kestrel	LC OR LR/LC	N/A	The Common Kestrel is distributed throughout Europe, most of Africa (except Sahara) and most of Asia. The EOO is 106,000,000km2. The global number of mature individuals is estimated at 4,000,000 – 6,500,000.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Falco severus*	Oriental Hobby	LC OR LR/LC	N/A	This species is found throughout southern and Southeast Asia (patchy). The species actively breeds in Vietnam. The EOO for this species is 20,300,000km2. The global population of mature individuals is estimated at 670 - 6,700. The species is found in moist lowland and mangrove forests, grasslands, rocky areas and artificial arable land/ plantations. The oriental hobby has a large home range.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Tachybaptus ruficollis*	Little Grebe	LC OR LR/LC	N/A	This migratory species is found in Europe, Central Asia, Africa and North Asia. The EOO is estimated to be 133,000,000km2. The population is unknown and the population trend is considered to be decreasing.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Sula sula*	Red-footed Booby	LC OR LR/LC	N/A	SeaBird The EOO is estimated to be 185,000,000 km2. The population is unknown and the population trend is considered to be decreasing.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
						population of a species during periods of environmental stress.
AVES	*Sula leucogaster*	Brown Booby	LC OR LR/LC	N/A	The Brown Booby can be found throughout the pantropical oceans with few exceptions. The global population is estimated to number >200,000 individuals. This species is strictly marine, generally feeding on inshore waters.	This species has a large EOO compared with the EAAA1 that is unlikely to meet the threshold for criterion 3.
AVES	*Microcarbo niger*	Little Cormorant	LC OR LR/LC	N/A	This species has an extremely large range, te population size is also very large.	This species has a large EOO compared with the EAAA1 that is unlikely to meet the threshold for criterion 3.
AVES	*Phalacrocorax carbo*	Great Cormorant	LC OR LR/LC	N/A	This widespread species is scattered across eastern North America, western Greenland, Europe, Africa, Asia and Australasia. The global population is 1,400,000-2,100,000[183]. The estimated EOO is 304,000,000 km2. The estimated population is unknow	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Egretta sacra*	Pacific Reef-egret	LC OR LR/LC	N/A	This migratory species is found in coastal area of Asia, Australia. The EOO is estimated to be 88,800,000km2. The population is unknown and the population trend is considered to be stable.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Ardea cinerea*	Grey Heron	LC OR LR/LC	N/A	This species is a generalist in its habitat use, although shallow water, relatively large prey, and four or five months of ice-free breeding season are among the essential characteristics of its habitat	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
AVES	*Ardea purpurea*	Purple Heron	LC OR LR/LC	N/A	African and tropical-Asian populations are largely sedentary however, occasionally making local dispersive movements. In migratory populations, the autumn migration occurs from August to October, with the return passage in the spring beginning in March	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Ardea alba*	Great White Egret	LC OR LR/LC	N/A	The species typically breeds in colonies of tens, hundreds or even a thousand pairs. he timing of the breeding season varies geographically (del Hoyo et al. 1992) although temperate breeders tend to nest in the spring and summer (e.g. April to July) and tropical breeders nest in the part of the rain cycle when food becomes maximally available (this may be during the rains or in the dry season).	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Bubulcus ibis*	Cattle Egret	LC OR LR/LC	N/A	This wide ranging migratory species is found consistently through the following areas: USA, South America, Africa, southern Asia and Australasia. The species has an EOO of 349,000,000km2. The global population has been estimated at 4,000,000 – 9,850,000 individuals.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Ardeola bacchus*	Chinese Pond-heron	LC OR LR/LC	N/A	he population size may be moderately small to large, but it is not believed to approach the thresholds for Vulnerable under the population size criterion	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Nycticorax nycticorax*	Black-crowned Night-heron	LC OR LR/LC	N/A	Tropical populations are not migratory but may undergo seasonal post-breeding dispersive movements (del Hoyo et al. 1992). In temperate regions breeding occurs in the local	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					spring, with tropical and subtropical nesting generally coinciding with the rains	population of a species during periods of environmental stress.
AVES	*Gorsachius melanolophus*	Malay Night-heron	LC OR LR/LC	N/A	This species is scattered throughout southern Asia and Southeast Asia. The EOO for this species is 10,400,000km2. The global population has been estimated at 1,300-13,000 mature individuals	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Ixobrychus sinensis*	Yellow Bittern	LC OR LR/LC	N/A	This species is found throughout Southeast Asia, eastern Asia and parts of the Himalayas. Its EOO is 36,000,000km2. The global population has been estimated at 100,000 – 1,000,000	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Ixobrychus eurhythmus*	Schrenck's Bittern	LC OR LR/LC	N/A	This species distribution includes eastern Asia and Southeast Asia. The EOO is 8,610,000km2. The global population is estimated at 670-17000	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Ixobrychus cinnamomeus*	Cinnamon Bittern	LC OR LR/LC	N/A	This species is found parts of India, Pakistan, Bhutan, Myanmar, Bangladesh, Sri Lanka, south-eastern China and Southeast Asia. The EOO for this species 25,400,000km2. The global population has been estimated at 130,000-2,000,000 individuals	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Ixobrychus flavicollis*	Black Bittern	LC OR LR/LC	N/A	This species is distributed throughout parts of the Himalayas, parts of India, Southeast Asia and Australasia. Its EOO is	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					49,200,000km2. The global population has been estimated at 63,000-320,000 individuals	population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Plegadis falcinellus*	Glossy Ibis	LC OR LR/LC	N/A	This species was found mainly in Africa, native but not breeding in Vietnam. EOO is about 223,000,000 km2. The population trend is decreasing. The global population has been estimated at 1,200,000-3,200,000 individuals	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Anastomus oscitans*	Asian Openbill	LC OR LR/LC	VU	This species has an extremely large range. The population trend is not known, but the population is not believed to be decreasing sufficiently rapidly	This species has a large EOO compared with the EAAA1 that is unlikely to meet the threshold for criterion 3.
AVES	*Fregata minor*	Great Frigatebird	LC OR LR/LC	N/A	This species utilises tropical and subtropical oceanic regions within the Pacific Ocean, subtropical regions along the Indian Ocean and a small subtropical section of the Atlantic Ocean. The species only inhabits Vietnam on an uncertain basis (seasonality). The EOO for this species is 126,000,000km2. The global population is uncertain.	This species has a large EOO compared with the EAAA1 that is unlikely to meet the threshold for criterion 3.
AVES	*Fregata ariel*	Lesser Frigatebird	LC OR LR/LC	N/A	Major breeding populations of the Lesser Frigatebird are found in tropical waters of the Indian and Pacific Ocean (excluding the east Pacific), as well as one population in the South Atlantic. Del Hoyo et al. (1992) estimate that the population is likely several hundred thousand individuals. Therefore, the population is tentatively placed here in the range 100,000-499,999 individuals. The Lesser Frigatebird breeds on small, remote tropical and sub-tropical islands, in mangroves or bushes, and even on bare ground.	This species has a large EOO compared with the EAAA1 that is unlikely to meet the threshold for criterion 3.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
AVES	*Bulweria bulwerii*	Bulwer's Petrel	LC OR LR/LC	N/A	This species is pantropical, being found in all three oceans outside the breeding season. Brooke (2004) estimated the global population to number c.500,000-1,000,000 individuals. This species is marine and higly pelagic, usually being found far from land except during the breeding season. The breeding season begins in April or May, with individuals forming colonies in a wide variety of habitats on offshore islands. Nests can be burrows, crevices, cracks or caves, under debris or vegetation cover.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Pitta moluccensis*	Blue-winged Pitta	LC OR LR/LC	N/A	This species is found in throughout parts of Southeast Asia. The species is extant to Vietnam. The EOO for this species is 1,790,000km2. The global population is unquantified, however, it is considered fairly common	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Lanius collurioides*	Burmese Shrike	LC OR LR/LC	N/A	This species is found throughout Bangladesh, southern China, eastern India, Myanmar, Thailand and Vietnam and Cambodia. The EOO for this species is 2,700,000km2. The global population has not yet been quantified, but considered stable.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Artamus fuscus*	Ashy Woodswallow	LC OR LR/LC	N/A	This species is found throughout southern Asia (India, Himalayas, Thailand, Cambodia, Vietnam, and Malaysia). The EOO for this species 9,310,000km2. The global population for this species has not yet been quantified, although it is considered common within its range	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
AVES	*Oriolus chinensis*	Black-naped Oriole	LC OR LR/LC	N/A	This species is found throughout eastern China, parts of southern Asia and parts of Southeast Asia. The EOO is 17,400,000km2. The global population has not yet been quantified, but the species is described as common, while national population estimates include: c.10,000-100,000 breeding pairs and c.1,000-10,000 individuals on migration in China; < c.100 breeding pairs and < c.50 individuals on migration in Taiwan; c.10,000-100,000 breeding pairs and c.1,000-10,000 individuals on migration in Korea and c.10,000-100,000 breeding pairs and c.1,000-10,000 individuals on migration in Russia	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Oriolus tenuirostris*	Slender-billed Oriole	LC OR LR/LC	N/A	This species is found in Myanmar, Butan, Bangladesh, vietnam. EOO is 1,600,000km2. The population trend is decreasing	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Oriolus traillii*	Maroon Oriole	LC OR LR/LC	N/A	This species utilises the Himalayas, Myanmar, Thailand, southern China, Vietnam, Laos and Cambodia. The EOO for this species is 5,200,000km2. The global population has not been estimated, but considered fairly common to uncommon	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Lalage melaschistos*	Black-winged Cuckooshrike	LC OR LR/LC	N/A	This species is found throughout parts of India, the Himalayas, southern Asia and eastern China. The EOO for this species is 8,190,000km2. There is an estimated 10,000 – 100,000 individuals in China.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
AVES	*Pericrocotus roseus*	Rosy Minivet	LC OR LR/LC	N/A	This species is found in throughout the Himalayas, eastern India and parts of Southeast Asia. The species is extant to Vietnam. The EOO for this species is 3,630,000km2. The global population is unquantified, however, considered decreasing.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Pericrocotus divaricatus*	Ashy Minivet	LC OR LR/LC	N/A	This species is found throughout eastern Asia, parts of Southeast Asia and southern Asia. Its EOO is 3,110,000km2. There is not global population estimate for this species yet, however, the species has been described as fairly common.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Pericrocotus ethologus*	Long-tailed Minivet	LC OR LR/LC	N/A	This species is found in Thailand, India, Vietnam. EOO is 10,100,000km2. The population trend is decreasing	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Dicrurus macrocercus*	Black Drongo	LC OR LR/LC	N/A	This species is found throughout southern Asia and parts of Southeast Asia. The EOO for this species is 17,900,000km2. The global population has not yet been quantified, however, there is an estimated 10,000-100,000 breeding pairs in China	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Dicrurus leucophaeus*	Ashy Drongo	LC OR LR/LC	N/A	This species is found throughout southern Asia and parts of Southeast Asia. The EOO for this species is 21,200,000km2. The global population has not yet been quantified, however, there is an estimated 10,000-100,000 breeding pairs in China.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
						population of a species during periods of environmental stress.
AVES	*Dicrurus annectens*	Crow-billed Drongo	LC OR LR/LC	N/A	This species is found throughout parts of Southeast Asia and the Himalayas. The EOO for this species is 2,760,000km2. The global population has not yet been quantified, although considered locally frequent throughout the Indian subcontinent	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Monticola gularis*	White-throated Rock-thrush	LC OR LR/LC	N/A	This species is found in north eastern Asia, parts of China and parts of Southeast Asia. The species spends the non-breeding season in Vietnam. The EOO is 3,270,000 km2. The global population is not yet quantified, however, considered stable.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Monticola solitarius*	Blue Rock-thrush	LC OR LR/LC	N/A	This species is scattered throughout north Africa, southern Asia, Southeast Asia, southern Europe and parts of eastern Asia. Its EOO is 66,600,000km2. The global population of mature individuals is estimated at 1,000,000 – 3,999,999	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Turdus obscurus*	Eyebrowed Thrush	LC OR LR/LC	N/A	This migratory species is found in Europe, Central Asia, Africa and South East Asia. The breeding population is found within Mongolia; Russian Federation (Central Asian Russia) The EOO is estimated to be 6,690,000 km2. The population is unknown and the population trend is considered to be unknown	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Muscicapa sibirica*	Dark-sided Flycatcher	LC OR LR/LC	N/A	This species utilises north-eastern Asia, the Himalayas and parts of Southeast Asia. It is considered extant to Vietnam. It has an EOO of 19,600,000km2. The global population has not	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					been estimated but considered stable. The Chinese population is estimated at 10,000-100,000 breeding pairs.	population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Muscicapa dauurica*	Asian Brown Flycatcher	LC OR LR/LC	N/A	This species utilises north-eastern Asia, southern Asia and Southeast Asia. It is considered a resident of Vietnam. It has an EOO of 37,700,000km2. The global population has not been estimated but considered stable. The Chinese population is estimated at 10,000-100,000 breeding pairs	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Muscicapa ferruginea*	Ferruginous Flycatcher	LC OR LR/LC	N/A	This species utilises Bhutan, India, Myanmar, Nepal, Chian, Vietnam, Laos, Thailand, Indonesia, Malaysia, Philippines and Singapore. It is considered a resident of Vietnam. It has an EOO of 30,600,000km2. The global population has not been estimated but considered decreasing. The Chinese population is estimated at 54000000-83999999 breeding pairs.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Ficedula mugimaki*	Mugimaki Flycatcher	LC OR LR/LC	N/A	This species is found in north central Asia (e.g. Mongolia) and parts of Southeast Asia. The species spends the non-breeding season in Vietnam. The EOO for this species is 7,500,000km2. The global population has not yet been quantified, although China is estimated to contain 100 – 100,000 breeding pairs.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Eumyias thalassinus*	Verditer Flycatcher	LC OR LR/LC	N/A	This species is found throughout most of southern Asia and parts of Southeast Asia. The species is a resident of Vietnam. The EOO for this species is 13,300,000km2. The global population is unknown, however, considered common within its range.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
AVES	*Calliope calliope*	Siberian Rubythroat	LC OR LR/LC	N/A	This migratory species is found throughout eastern, central and southern Asia. Its EOO is 10,100,000km2. The global population has not been estimated. Although there is an estimated 10,000 – 100,000 breeding pairs in China.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Larvivora cyane*	Siberian Blue Robin	LC OR LR/LC	N/A	This species utilises parts of central, eastern Asia and Southeast Asia. Its EOO is 21,500,000km2. Global population has not yet been quantified, although, there is an estimated 10,000-100,000 breeding pairs in Korea	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Saxicola torquatus*	Common Stonechat	LC OR LR/LC	N/A	This migratory species occurs in forest, desert, inland wetlands, grassland habitat types. This widespread species is found throughout most of Asia, most of Europe and parts of Africa. This species winters in Vietnam, and species distribution includes the Project area. This species uses but is not limited to Korea, Germany, Serbia and Ukraine during the breeding season. Its EOO is 113,000,000km2. The global population of mature individuals is estimated at 55,000,000-94,999,999	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Saxicola caprata*	Pied Bushchat	LC OR LR/LC	N/A	This species is inhabits western and southern Asia, Southeast Asia and New Guinea. The EOO for this species is 30,300,000km2. The global population has not yet been assessed, but considered to be stable	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
AVES	*Agropsar sturninus*	Purple-backed Starling	LC OR LR/LC	N/A	This migratory species occurs in a variety of habitat types including grassland and forest. It occurs in countries such as Cambodia, China and Vietnam during the non-breeding season. In the breeding season the species is known to occur in Korea and Mongolia. The EOO is 4,430,000km2. The global population is unknown, while national population estimates include: c.100-100,000 breeding pairs	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Sturnia sinensis*	White-shouldered Starling	LC OR LR/LC	N/A	This species is found throughout south-eastern China. Taiwan, Thailand, Vietnam, Cambodia and Laos. The species utilises Vietnam in the non-breeding season. The EOO for this species 1,070,000km2. The global population has not yet been quantified, however, considered stable	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Hirundo rustica*	Barn Swallow	LC OR LR/LC	N/A	This widespread species is found on all continents except Antarctica. The species is continuously distributed along eastern Asia. Its EOO is 251,000,000km2. The global population of mature individuals is estimated at 290,000,000 – 499,999,999. This species was identified during field surveys.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Hirundo smithii*	Wire-tailed Swallow	LC OR LR/LC	N/A	The global population size has not been quantified, but the species is reported to be common in Africa, common in Pakistan and locally common in India	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Delichon dasypus*	Asian House Martin	LC OR LR/LC	N/A	This species is found in parts of eastern Asia and southern Asia and also Southeast Asia. Its EOO is16,500,000km2. The global population is increasing. National population estimates include: c.10,000-100,000 breeding pairs and c.1,000-10,000	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					individuals on migration in China; c.10,000-100,000 breeding pairs and c.1,000-10,000 individuals on migration in Taiwan; c.10,000-100,000 breeding pairs, c.1,000-10,000 individuals on migration and < c.1,000 wintering individuals in Japan and c.10,000-100,000 breeding pairs and c.1,000-10,000 individuals on migration in Russia	population of a species during periods of environmental stress.
AVES	*Locustella tacsanowskia*	Chinese Grasshopper-warbler	LC OR LR/LC	N/A	This species is found along southern and eastern Asia. The EOO for this species is 7,070,000km2. The global population has not yet been quantified, however, there is an estimated <100,000 individuals within China	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Locustella lanceolata*	Lanceolated Warbler	LC OR LR/LC	N/A	This species is chiefly found in eastern and northern Asia but is also found in northern Europe and southern Asia. Its EOO is17,600,000km2. The global population of mature individuals is estimated at 600,000 – 1,200,000.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Acrocephalus bistrigiceps*	Black-browed Reed-warbler	LC OR LR/LC	N/A	This species is found throughout Japan, eastern China, eastern Mongolia, Korea and Southeast Asia. The EOO is 6,510,000km2. The global population has not been quantified but considered stable.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Arundinax aedon*	Thick-billed Warbler	LC OR LR/LC	N/A	This species is found throughout eastern Asia and parts of southern Asia. The species spends the non-breeding season in Vietnam. This species EOO is 7,180,000km2. The global population is not considered stable, however, it is considered common in Southeast Asia (during non-breeding season).	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
						population of a species during periods of environmental stress.
AVES	*Phylloscopus schwarzi*	Radde's Warbler	LC OR LR/LC	N/A	This species is found in throughout eastern Asia and parts of Southeast Asia. The species is extant to Vietnam. The EOO for this species is 6,190,000km2. The global population is unquantified, however, it it stable population.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Phylloscopus inornatus*	Yellow-browed Warbler	LC OR LR/LC	N/A	This species is continuously found throughout northern, central and eastern Asia and parts of southern Asia. This species is extant to Vietnam. The EOO is 15,600,000km2. The global population has not yet been quantified, however, the population is considered stable.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Phylloscopus tenellipes*	Pale-legged Leaf-warbler	LC OR LR/LC	N/A	This species is foundin Thailand, Myanmar, China, Vietnam. The EOO for this species is 1,560,000km2.The populationtrend is stable.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Phylloscopus coronatus*	Eastern Crowned Warbler	LC OR LR/LC	N/A	This species is found throughout eastern Asia and parts of South East Asia. The EOO for this species is 7,330,000km2. There is an estimated 10,000 – 100,000 breeding pairs within China.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Alauda gulgula*	Oriental Skylark	LC OR LR/LC	N/A	The population size has not been quantified, but it is not believed to approach the thresholds for Vulnerable under the population size criterion	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
						population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Dendronanthus indicus*	Forest Wagtail	LC OR LR/LC	N/A	This species is found throughout most of eastern and Southeast Asia and southwest India. The EOO is 7,080,0000km2. The global population size has not been quantified, but the species is reported to be locally common.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Motacilla alba*	White Wagtail	LC OR LR/LC	N/A	This species is found throughout all of Eurasia and in parts of north Africa. Its EOO is 37,800,000km2. The global population of mature individuals has been estimated at 135,000,000-221,000,000.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Motacilla cinerea*	Grey Wagtail	LC OR LR/LC	N/A	This widespread species is distributed throughout most of Europe, parts of north and eastern Africa, the Middle East, very large areas of central northern Asia, southern Asia, Southeast Asia and eastern Asia. Its EOO is 60,700,000km2. The number of mature individuals is estimated at 5,000,000 – 19,999,999.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Anthus hodgsoni*	Olive-backed Pipit	LC OR LR/LC	N/A	This species is found throughout most of northern Asia, eastern Asia and southern Asia. The species is extant to Vietnam. Its EOO is 29,200,000km2. The global population is not yet quantified, although considered stable.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
AVES	*Anthus cervinus*	Red-throated Pipit	LC OR LR/LC	N/A	This species is foundin Thailand, Myanmar, China, Vietnam. The EOO for this species is 540,000km2.The population is estimated approximately 2,000,000 mature individuals.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Chloris sinica*	Oriental Greenfinch	LC OR LR/LC	N/A	The Oriental greenfinch is found throughout eastern Asia. Its EOO is 15,000,000km2. The global population has not yet been quantified.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Chloris monguilloti*	Vietnamese Greenfinch	LC OR LR/LC	N/A	It occurs in open pine forest, including Pinus kesiya forest, secondary growth, and forest edges near to cultivation from 1,050-1,900 m, although it has been reported as low as 600m. It is endemic to the Da Lat plateau of south Annam, Vietnam, where it is locally common. The area of suitable habitat for this species is actually thought to be increasing as a result of deforestation, which leads to increases in the area of scrub and Khasi pine Pinus kesiya forest, the growth of which is stimulated by fire The EOO for this species is 20,000 km2. Population numbers are unknown.	The species distribution does not overlap with the EAAA1. It is unlikely to contain a critical habitat for this species which sustains equal or more than 10% of the global population and 10 reproduction units.
AVES	*Emberiza fucata*	Chestnut-eared Bunting	LC OR LR/LC	N/A	This species is found along eastern Asia and within the Himalayas region. Its EOO is 15,600,000km2. The global population size has not been quantified, but the species is reported to be common to locally common	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
AVES	*Caprimulgus jotaka*	Grey Nightjar	LC OR LR/LC	N/A	This migratory species occurs in forest, rocky areas (inland cliffs, mountain peaks) and shrub land habitat types. It resides in Bangladesh, Bhutan, China, Hong Kong, India, Malaysia, Myanmar, Nepal and Pakistan. This species breeds in Korea, Japan, Mongolia and Vietnam. The EOO is 17,700,000km2. The global population is unknown and is stable	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Merops orientalis*	Asian Green Bee-eater	LC OR LR/LC	N/A	This species is found throughout southern Asia. The species is considered a resident of Vietnam. It has an EOO of 11,600,000km2. The species global population has not yet been quantified, but considered increasing and locally common throughout its very large range	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Merops viridis*	Blue-throated Bee-eater	LC OR LR/LC	N/A	This species is found throughout Southeast Asia and south-eastern China. The species is a resident of Vietnam. It has an EOO of 8,760,000km2. The species global population has not yet been quantified, but considered widespread and common	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Charadrius alexandrinus*	Kentish Plover	LC OR LR/LC	N/A	The species has a very large range and is migratory. The species winters in Vietnam. The estimated extent of occurrence 70,700,000km2. The estimated population is approximately 100000-499999 individuals globally.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Ardea intermedia*	Intermediate Egret	LC OR LR/LC	N/A	The global population has not been quantified owing to recent taxonomic splits. Despite the fact that the population trend appears to be decreasing, the decline is not believed to be sufficiently rapid to approach the thresholds for Vulnerable under the population trend criterion	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
						population of a species during periods of environmental stress.
AVES	*Himantopus himantopus*	Black-winged Stilt	LC OR LR/LC	N/A	This widespread species is found throughout most of Australasia, parts of Southeast Asia, most of central and western Asia, most of Europe, parts of Africa, parts of North America and parts of South America. The EOO for this species is 359,000,000km2. The global population has been estimated at 450,000-780,000 individuals	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Hierococcyx sparverioides*	Large Hawk-cuckoo	LC OR LR/LC	N/A	This species is found throughout southern and eastern China, the Himalayas, southern India, Thailand, Myanmar, Cambodia, Vietnam, Laos, Malaysia and Indonesia. The species actively breeds in Vietnam. The EOO is 9,890,000km2. The global population has not yet been quantified, although considered stable	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Butorides striata*	Green-backed Heron	LC OR LR/LC	N/A	This species is foundin Thailand, Myanmar, China, Vietnam. The EOO for this species is 303,000,000 km2.The populationtrend is decreasing.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Otus sunia*	Oriental Scops-owl	LC OR LR/LC	N/A	This migratory species occurs in shrub land and forest habitat types. This species is continuously found throughout eastern Asia, most of southern Asia and parts of Southeast Asia. The species winters in Vietnam, and species distribution includes Project area. The species uses but is not limited to Korea, China, India and Japan during the breeding season. The EOO is 22,200,000km2. The global population size has not been quantified, but the species is reported to be very abundant regionally.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
AVES	*Anas crecca*	Common Teal	LC OR LR/LC	N/A	This migratory species is widely distributed throughout the northern hemisphere. The EOO is 48,200,0000km2. The global population is estimated at 6,600,000 – 7,700,000 individuals.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Buteo japonicus*	Japanese Buzzard	LC OR LR/LC	N/A	This migratory species is known from Southeast Asia, central Asia and Micronesia. The EOO is 10,600,000km2. Due to recent taxonomic splits, the population size of this species is unknown. The population trend is also unknown.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Phylloscopus soror*	AlstrÄ¶m's Warbler	LC OR LR/LC	N/A	This species is foundin Thailand, Myanmar, China, Vietnam. The EOO for this species is 1,290,000 km2.The populationtrend is decreasing.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Acrocephalus orientalis*	Oriental Reed-warbler	LC OR LR/LC	N/A	This migratory species is found throughout Southeast Asia, Japan, eastern China, eastern Mongolia and Korea. This species EOO is 8,170,000km2. The population is not yet quantified, although considered to be decreasing.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Hierococcyx hyperythrus*	Northern Hawk-cuckoo	LC OR LR/LC	N/A	This species is found throughout coastal eastern China and a few parts of Southeast Asia. The EOO for this species is 6,580,000km2. The global population has not yet been assessed, although is considered stable.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
						population of a species during periods of environmental stress.
AVES	*Hierococcyx nisicolor*	Whistling Hawk-cuckoo	LC OR LR/LC	N/A	This species is found continuously throughout Vietnam, Laos, Thailand, Cambodia and parts of China, India, Bhutan, Nepal, Malaysia and Indonesia. The species is a resident of Vietnam. The EOO for this species is 3,980,000km2. The global population size has not been quantified, but the species is reported to be uncommon to rare throughout its range .	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Ficedula albicilla*	Red-throated Flycatcher	LC OR LR/LC	N/A	This species is foundin Thailand, Myanmar, China, Rusia, IndiaVietnam. The EOO for this species is 14,400,000 km2.The population trend is stable.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Garrulax annamensis*	Orange-breasted Laughingthrush	LC OR LR/LC	N/A	This species occurs in secondary forest, edge habitats and undergrowth, even in cultivated habitats adjacent to forest patches from 915-1510m in altitude. It is found in Vietnam with an EOO of 14,100km2. Population numbers are unknown but considered stable.	The species distribution does not overlap with the EAAA1. It is unlikely to contain a critical habitat for this species which sustains equal or more than 10% of the global population and 10 reproduction units.
AVES	*Milvus migrans*	Black Kite	LC OR LR/LC	N/A	This wide ranging migratory species is found throughout Europe, Africa, Australasia and Asia. The EOO is 206,000,000km2. The estimated global number of mature individuals is 1,000,000 – 2,499,999.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Surniculus dicruroides*	Fork-tailed Drongo-cuckoo	LC OR LR/LC	N/A	This species is found throughout parts of the Indian subcontinent and Southeast Asia. The species is a resident of Vietnam. The EOO for this species is 9,710,000km2. The	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					global population has not yet been quantified, but considered declining.	population of a species during periods of environmental stress.
AVES	*Falco peregrinus*	Peregrine Falcon	LC OR LR/LC	N/A	This species is found throughout most of the globe except for the artic and Antarctica. The EOO is 413,000,000km2. The global population of mature individuals is estimated at 100,000 – 499,999.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
ACTINOPTERYGII	*Anodontostoma chacunda*	Shortnose Gizzard Shad	LC OR LR/LC	VU	Anodontostoma chacunda is widespread in the Indo-West Pacific from the Persian Gulf eastward towards the Philippines and southwards to north Australia and New Caledonia. Anodontostoma chacunda occurs in the Indo-West Pacific from the Persian Gulf, east to the coasts of India and Sri Lanka (Ceylon), throughout the Andaman Sea and the Gulf of Thailand, off Malaysia and Viet Nam. Anodontostoma chacunda is an anadromous, pelagic-neritic species that occurs in fresh to marine waters within tropical climates (Whitehead 1985, Riede 2004). A. chacunda is usually found in coastal marine waters, but it occasionally ascends rivers to the inland limit of tidal influence (Rainboth 1996). It inhabits inshore areas and estuaries. Anodontostoma chacunda is commercially targeted by fisheries throughout its range.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Spilopelia chinensis*	Eastern Spotted Dove	LC OR LR/LC	N/A	This species is found in Thailand, Myanmar, Indonesia, China, Vietnam. The EOO for this species is 16,800,000 km2.The populationtrend is increasing	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
AVES	*Cuculus saturatus*	Oriental Cuckoo	LC OR LR/LC	N/A	This species is foundin Thailand, Myanmar, China, Vietnam. The EOO for this species is 35,300,000 km2.The population is estimated approximately 5000000-14999999 mature individuals	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Ceyx erithaca*	Oriental Dwarf-kingfisher	LC OR LR/LC	N/A	This species is found throughout Southeast Asia and parts of India and Sri Lanka. The EOO for this species is 14,600,000 km2. The global population has been described as scarce and declining. Habitats of significance include dry and moist lowland tropical/subtropical forests.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Circus spilonotus*	Eastern Marsh-harrier	LC OR LR/LC	N/A	This migratory species is predominately found in eastern Asia. The EOO is 7,180,000km2. The population is considered stable and there is an estimated 40,000 – 60,000 mature individuals globally.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Gelochelidon nilotica*	Common Gull-billed Tern	LC OR LR/LC	N/A	This widespread species is found in coastal regions of the Americas, Africa, southern Europe, central western Asia, Australasia and Southeast Asia. The species inhabits Vietnam during the non-breeding season. The EOO for this species is 163,000,000km2. The global population of individuals is estimated at 150,000 – 420,000.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Gallinula chloropus*	Common Moorhen	LC OR LR/LC	N/A	This widespread species is found throughout most of Europe, parts of western Asia, most of southern Asia, parts of Africa and eastern Asia. Its EOO is 143,000,000km2. The global population is estimated at 2,900,000 – 6,200,000 individuals.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
						population of a species during periods of environmental stress.
AVES	*Egretta garzetta*	Little Egret	LC OR LR/LC	N/A	The Little egret is found throughout southern Asia, Southeast Asia, Australasia, parts of Europe, parts of Africa and parts of western Asia. Its EOO is 151,000,000km2. The global population is estimated at 660,000-3,150,000.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
ACTINOPTERYGII	*Acentrogobius caninus*	Tropical Sand Goby	LC OR LR/LC	N/A	Acentrogobius caninus is widely distributed in the Indo-West Pacific. t has been collected at depths up to 18 m with one account at 27 m. This widely distributed species is common in museum collections. This species has been recorded from sandy, muddy, estuarine and mangrove creeks, seagrass habitats, and coastal reef flats	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Dicrurus hottentottus*	Hair-crested Drongo	LC OR LR/LC	N/A	This species is found throughout southern Asia and parts of Southeast Asia. The EOO for this species is 22,300,000km2. The global population has not yet been quantified	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Hypothymis azurea*	Black-naped Monarch	LC OR LR/LC	N/A	This species is found throughout most of India, the Himalayas and Southeast Asia. The EOO for this species is 19,800,000km2. The global population has not yet been quantified, although there is an estimated 10,000-100,000 breeding pairs in Taiwan	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Terpsiphone incei*	Chinese Paradise-flycatcher	LC OR LR/LC	N/A	This species is found throughout eastern Asia and parts of Southeast Asia. The species uses Vietnam during the non-breeding season. The EOO for this species is 6,060,000km2.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					The global population has not yet been quantified, but considered stable.	population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Terpsiphone affinis*	Oriental Paradise-flycatcher	LC OR LR/LC	N/A	This species is found throughout Southeast Asia and the eastern parts of Himalayas. The species is a resident of Vietnam. The EOO for this species is 6,060,000km2. The global population has not yet been quantified, but considered stable.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Cyanoptila cyanomelana*	Blue-and-white Flycatcher	LC OR LR/LC	N/A	The Blue-and-white flycatcher is found in parts of eastern Asia (eastern China, Korea, and Japan) and parts of Southeast Asia. It has an EOO of 3,290,000 km2. The global population is not yet quantified, China contains 10,000 – 100,000 breeding pairs.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Delichon lagopodum*	Eastern House Martin	LC OR LR/LC	N/A	The EOO for this species is 12,600,000 km2. The global population has not quantified but considered decreasing	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Cecropis daurica*	Red-rumped Swallow	LC OR LR/LC	N/A	The EOO for this species is 99,900,000km2. The global population is approximately in 10,000,000-500,000,000 individuals	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
AVES	*Anthus richardi*	Richard's Pipit	LC OR LR/LC	N/A	This migratory species is distributed throughout central and eastern Asia.. Its EOO is 16,000,000km2. The global population has not yet been quantified, although considered to be between 90,000-120,000 mature individuals.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Motacilla tschutschensis*	Eastern Yellow Wagtail	LC OR LR/LC	N/A	This species is found in Thailand, Myanmar, Indonesia, China, Vietnam. The EOO for this species is 15,900,000 km2.The populationtrend is estimated approximately 50000000-150000000 mature individuals	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Hypsipetes leucocephalus*	Black Bulbul	LC OR LR/LC	N/A	This species is found throughout most of the Himalayas and most of Southeast Asia. The species is a resident of Vietnam. The EOO for this species is 8,830,000km2. The global population has not yet been quantified.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Phylloscopus plumbeitarsus*	Two-barred Warbler	LC OR LR/LC	N/A	The species is found throughout north eastern Asia and parts of southern Asia. The species uses Vietnam during the breeding season. The EOO for this species is 6,290,000km2. The global population has not yet been quantified, although the species has been considered common or locally common in north east China.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
ACTINOPTERYGII	*Awaous grammepomus*	N/A	LC OR LR/LC	N/A	This widespread species has been reported throughout the Indo-Pacific from India, Sri Lanka, the East Indian region, Indonesia (Java is the type locality), Papua New Guinea, Thailand, Vietnam. Population information of this species is unknown but it appears to be locally common in parts of its	This is an aquatic species. The project is unlikely to impact aquatic species.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					range. This amphidromous species inhabits clear freshwater streams and rivers, swifter flowing streams, tidal-influenced rivers and estuarine areas with sand, mud or gravel substrate. It is found in depths that range from 0.5 m to 12 m.	
AMPHIBIA	*Microhyla picta*	Painted Rice Frog	DD	N/A	This specie is found in coastal area of Vietnam. The EOO is quite small (approx. 3800 km2). To date it is known only from Vietnam, where it is distributed mostly in eastern coastal areas in central and southern parts of the country. There are no records on the ecology and habitat use of this species, however it presumably occurs in forest and reproduces in still water, as with other, better known Microhyla species. The threats to this species are not known. A high rate of forest loss has been identified as a significant threat to biodiversity throughout Lao PDR, with natural forest being cleared for expanding agriculture (Sodhi et al. 2009).	The species favours tropical forest, moist areas which the EAAA2 does not support. The EAAA2 is therefore unlikely to be a critical habitat for this species.
ACTINOPTERYGII	*Megalops cyprinoides*	Indo-Pacific Tarpon	DD	VU	The species is widely distributed in the Indo-Pacific from East Africa to the Society Islands, northward to Japan and southward to Australia. However, very little information is known regarding the life history, demographics, and harvest of this species. The species is common in parts of its range, and over 300 museum records exist. The species is found in depths to 50 m in coastal waters and ranges inland to hundreds of kilometres upstream in rivers and floodplains. It is commonly observed near the surface in shallow inshore waters. This species inhabits coral reefs, small lakes (billabongs), mangrove swamps, rivers, reservoirs, floodplains, coastal bays and canals.	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Schistura dalatensis*	N/A	DD	N/A	The species is considered to be restricted to the headwaters of the Dong Nai River, Lam Dong Province southern Viet Nam,	This is an aquatic species. The project is unlikely to impact aquatic species.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					with an estimated Extent of Occurrence (EOO) of less than 3,500 km^2. It is found in headweater with a stony bottom.	
ACTINOPTERYGII	*Tor tambroides*	N/A	DD	N/A	*Tor tambroides* has been assessed as Data Deficient in view of its confusing taxonomy, and therefore its exact distribution range, population status/trends and threats. The species lives in large streams and rivers with moderate to swift flow. Adults live in deep pools and juveniles are most commonly observed in or near. Adults enter the mainstream Mekong River near the Khone Falls between October and December. Found in rivers during dry season, moves downstream in rainy season, spawns in mouths of small streams. Records of this species in the literature are from the Mekong Basin in southern China (Yunnan) and Lao PDR, Chao Phraya basin in Thailand, Java, Borneo, Sumatra, Brunei, Malay Peninsula and VietNam.	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Tor tambra*	N/A	DD	N/A	This species occurs in the Mekong basin in Yunnan province, China, Lao PDR, Thailand, Cambodia and Viet Nam. Although no specific information is available it is suspected that the overall population of this species is decreasing. This species lives in deep pools in clear water rivers with moderate to swift flow. There are indications that more than one species are confused under the name Tor tambra (Kottelat, pers. comm., 2011), and research is required to confirm the taxonomic status of populations across the species range.	This is an aquatic species. The project is unlikely to impact aquatic species.
ACTINOPTERYGII	*Hypsibarbus pierrei*	Yellow Eyed Silver Barb	DD	N/A	The species has a wide distribution, however it has only been recorded in March and April (non-breeding), and it is unknown where the species migrates to breed; it is not known when they spawn or where their spawning grounds are. There are at least two populations (Mekong and Dong Nai). Even though the species is widespread, the area and location	This is an aquatic species. The project is unlikely to impact aquatic species.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					of the species spawning grounds and therefore the species Area of Occupancy is unknown.	
AVES	*Charadrius dealbatus*	White-faced Plover	DD	N/A	This species is inhabits coastal areas along southern China, Vietnam, Cambodia, Thailand, Malaysia and Indonesia. The species is a resident of Vietnam. Its EOO is 730,000km2. The species breeds in Hong Kong. The global population number and trend of this species is unknown. The species inhabits a broad range of habitats including grasslands, wetlands, deserts, marine intertidal areas, coastal and artificial aquatic areas.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
MAMMALIA	*Crocidura zaitsevi*	Mikhail Zaitsev's Shrew	DD	N/A	This species is found in central and southern Viet Nam in a wide elevation range: from Ngoc Linh Mountain, Kon Tum Province to Phong Nha, Ke Bang Bational Parkand. In northern Vietnam, three localities in southern Viet Nam include Bi Doup, Nui Ba National Park; Hon Ba Mountain, Khanh Hoa Province; and Chu Yang Sin National Park. It lives in mid to high elevation montane evergreen forest.	The species' distribution does not overlaps with the EAAA2. The species is restricted to forest and is unlikely to occur within the EAAA.
ACTINOPTERYGII	*Otolithoides biauritus*	Bronze Croaker	DD	VU	The estimated EOO is 49,700,000 km2. The estimated population is unknow	This is an aquatic species. The project is unlikely to impact aquatic species.
AVES	*Vanellus indicus*	Red-wattled Lapwing	LC OR LR/LC	N/A	The global population is estimated at 50,000-60,000 individuals. It uses open areas near fresh or brackish water: rivers, mudbanks, wet grassland, pools, particularly on cultivated land, such as corn fields, grass fields and large gardens. It also uses open forests, waste, fallow and ploughed land and occasionally grass along highways	This species has a large EOO compared with the EAAA1 that is unlikely to meet the threshold for criterion 3.
AVES	*Spilopelia chinensis*	Eastern Spotted Dove	LC OR LR/LC	N/A	This species is found in Thailand, Myanmar, Indonesia, China, Vietnam. The EOO for this species is 16,800,000 km2.The populationtrend is increasing	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
						population of a species during periods of environmental stress.
AVES	*Cacomantis merulinus*	Plaintive Cuckoo	LC OR LR/LC	N/A	This species is found throughout Southeast Asia and parts of India. The species actively breeds in Vietnam. The EOO for this species is 12,900,000km2. The global population has not yet been quantified but considered stable. The population in China has been estimated at c.10,000-100,000 breeding pairs and c.1,000-10,000 individuals on migration	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Merops orientalis*	Asian Green Bee-eater	LC OR LR/LC	N/A	This species is found throughout southern Asia. The species is considered a resident of Vietnam. It has an EOO of 11,600,000km2. The species global population has not yet been quantified, but considered increasing and locally common throughout its very large range	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Merops philippinus*	Blue-tailed Bee-eater	LC OR LR/LC	N/A	This species is found throughout southern Asia, Southeast Asia and New Guinea. The species breeds in Vietnam. It has an EOO of 22,800,000 km2. The species global population has not yet been quantified	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Upupa epops*	Common Hoopoe	LC OR LR/LC	N/A	This migratory species is found throughout Asia, Europe and Africa. The EOO is estimated to be 77,600,000km2. The overall population is estimated at 5,000,000-10,000,000 individuals.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Lanius collurioides*	Burmese Shrike	LC OR LR/LC	N/A	This species is found throughout Bangladesh, southern China, eastern India, Myanmar, Thailand and Vietnam and Cambodia.	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					The EOO for this species is 2,700,000km2. The global population has not yet been quantified, but considered stable.	population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Dicrurus macrocercus*	Black Drongo	LC OR LR/LC	N/A	This species is found throughout southern Asia and parts of Southeast Asia. The EOO for this species is 17,900,000km2. The global population has not yet been quantified, however, there is an estimated 10,000-100,000 breeding pairs in China	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Saxicola caprata*	Pied Bushchat	LC OR LR/LC	N/A	This species is inhabits western and southern Asia, Southeast Asia and New Guinea. The EOO for this species is 30,300,000km2. The global population has not yet been assessed, but considered to be stable	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
AVES	*Sturnia sinensis*	White-shouldered Starling	LC OR LR/LC	N/A	This species is found throughout south-eastern China. Taiwan, Thailand, Vietnam, Cambodia and Laos. The species utilises Vietnam in the non-breeding season. The EOO for this species 1,070,000km2. The global population has not yet been quantified, however, considered stable	This species has a large EOO compared with the relatively small EAAA1. It is unlikely that the EAAA1 contains ≥ 1% of the global population or support ≥10% of the global population of a species during periods of environmental stress.
REPTILIA	*Dixonius aaronbaueri*	Bauer Leaf-toed Gecko	LC OR LR/LC	N/A	Bauer's Leaf-toed Gecko is found in open areas in multiple habitats, often in coastal areas and sometimes in plantations. It has been recorded close to a permanent stream in lowland forests; on sandy ground among fallen leaves in a mango plantation Mangifera indica in an area of elevated sand dunes surrounded with low, shrub vegetation of Mui Ne; and near rotting logs and a freshwater pond. This species is endemic in Vietnam. The estimated Extent of Occurrence (EOO) is estimated to be approximately 40km2. However, this species	The species distribution does not overlap with the EAAA2. However, the EOO can be much larger and since it can live in a multiple type of habitats, the species may occur in the modified habitat within the EAAA2. The species are not found in the field survey and it is unlikely that the EAAA contains equal or more than 10% of

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
					was found in wide ranges of geography, thus the EOO is possible to extend larger. The presence of this species was known for the Nui Chua National Park, Ninh Thuan Province; Mui Ne and Phu Quy Island.	the global population and 10 reproduction units.
REPTILIA	*Gekko canaensis*	Cà Ná Marbled Gecko	LC OR LR/LC	N/A	This species is known from Cà Ná Cape in the Vĩnh Tan Commune, Tuy Phong District, Binh Thuan Province (Ngo and Gamble 2011) , and adjacent areas in Ninh Thuan Province (N.S. Nguyen pers. comm. 2017) in southern Vietnam. EOO and population size are unknown. It has been observed at night on rocky outcrops following heavy rain. There are no known significant threats to this species. Despite its moderately restricted range, this species appears to be subject to no major threats and is not reliant on any specific vegetation structure, and is thought to have a stable population.	The species' distribution does not overlaps with the EAAA2. Additionally, its habitats are rocky areas on mountains which is limited in the EAAA for non-volant species. t is unlikely that the EAAA2 contains equal or more than 10% of the global population and 10 reproduction units.
AMPHIBIA	*Theloderma laeve*	N/A	DD	N/A	This species is known only from Sui Kat, in the Lang Bian plateau in southern Viet Nam, where it was collected at 1,000m asl. It is known only from a single specimen collected in 1918 and it has not been recorded since, so there is no information regarding its population status.	The species' record are very old and it is unlikely that the species it still extant in Vietnam.
REPTILIA	*Gekko grossmanni*	N/A	DD	N/A	This nocturnal and presumably arboreal species (Das 2010)'s occurence has only been confirmed living in the monsoon evergreen forests of Hon Ba Nature Reserve, where according to Ngo and Chan (2010) it occurs in sympatry with *C. yangbayensis*. However it may be more widespread within Khanh Hoa This species is found on rocky outcrops during the day (N.S. Nguyen pers. comm. 2017). This species is common and the known subpopulation is likely stable, since this species is found in a protected area, but nothing is known of its status more widely.	The species' distribution does not overlaps with the EAAA2. It is unlikely that the EAAA2 contains equal or more than 10% of the global population and 10 reproduction units.

Class name	Scientific name	Common name	IUCN	VRDB	Species Information	Justification
LILIOPSIDA	*Ranalisma rostrata*	Mui Vang	DD	N/A	The plant is described as 'very rare' in southern China and as having been recorded from a single site in Malaysia, from where is has been reported to have been extirpated (Kiew 2005), and there is no readily available information on its status in Viet Nam. The species is described as occurring in muddy places in lowland forest and in marshes. No information is available regarding this species' population and EOO.	No information about this species occurrence within Vietnam.
MAGNOLIOPSIDA	*Pistacia weinmanniifolia*	N/A	DD	N/A	*Pistacia weinmannifolia* is native to southern and southeast regions of China (Guangxi, Guizhou, Sichuan, Xizang and Yunnan) except for a small number of subpopulations recorded in Viet Nam and Myanmar. This species suffers ongoing habitat loss from the development of modern agriculture in the Chinese provinces of Guangxi, Guizhou and south Yunnan. It grows in hill and mountain forests on limestone and in thickets. This species is globally assessed as Data Deficient as although it is widely distributed and documented to be a dominant species, habitat loss is also recorded within this species' range suggesting the species may be in decline.	The species mainly lives in forest which is not covered in the EAAA2. Therefore, the species is unlikely to occur in the EAAA2 with equal or more than 10% of the global population and 10 reproduction units.
MAMMALIA	*Hypsugo dolichodon*	Long-toothed Pipistrelle	DD	N/A	The known distribution of this species is limited to Laos, southern Vietnam, ambodia and Myanmar. The species is known from only about 20 specimens from four countries and seven localities. All of the Vietnamese specimens came from Cat Tien National Park, one of which was collected near the headquarters of the Park, close to the Dong Nai River. This area is generally described as lowland rain forest with dipterocarp trees. The species is at least partly a cave-dweller. No other information about EOO range and population size The species is at least partly a cave-dweller, hence the disturbance of its roosting sites may be a threat	The species mainly lives in caves or forest which habitats the EAAA2 does not contain. Therefore, the species is unlikely to occur in the EAAA2 with equal or more than 10% of the global population and 10 reproduction units.

APPENDIX E LIST OF SOCIAL & ECONOMY RESPONDENTS PHU LAC 2

List of respondents for HH Survey

1	LH-01	Lê Thị Hoa	Male	KP 3	Liên Hương	Tuy Phong
2	LH-02	Lê Quý Đức	Female	KP 1	Liên Hương	Tuy Phong
3	LH-03	Trần Văn Sal	Male	KP 3	Liên Hương	Tuy Phong
4	LH-04	Đường Quang Thông	Male	KP 3	Liên Hương	Tuy Phong
5	LH-05	Trần Hữu Cần	Male	KP 3	Liên Hương	Tuy Phong
6	LH-06	Nguyễn Văn Thường	Male	KP 5	Liên Hương	Tuy Phong
7	LH-07	Ung Văn Bảy	Male	KP 8	Liên Hương	Tuy Phong
8	LH-08	Ngô Tân	Male	KP 8	Liên Hương	Tuy Phong
9	LH-09	Dương Thị Sang	Female	KP 8	Liên Hương	Tuy Phong
10	LH-10	Nguyễn Hữu Quốc	Male	KP 3	Liên Hương	Tuy Phong
11	LH-11	Hồ Ngọc Xuân	Male	KP 3	Liên Hương	Tuy Phong
12	LH-12	Lưu Văn A	Male	KP 3	Liên Hương	Tuy Phong
13	LH-13	Trần Mai	Male	KP 3	Liên Hương	Tuy Phong
14	LH-14	Châu Văn Thọ	Male	KP 3	Liên Hương	Tuy Phong
15	LH-15	Đặng Văn Dư	Male	KP 4	Liên Hương	Tuy Phong
16	LH-16	Đặng Quế	Male	KP 4	Liên Hương	Tuy Phong
17	LH-17	Lâm Hảo	Male	KP 6	Liên Hương	Tuy Phong
18	LH-18	Nguyễn Thị Thu Hương	Female	KP 4	Liên Hương	Tuy Phong
19	LH-19	Nguyễn Văn Minh	Male	KP 6	Liên Hương	Tuy Phong
20	LH-20	Nguyễn Thị Kim Oanh	Female	KP 5	Liên Hương	Tuy Phong
21	LH-21	Huỳnh Lộc	Male	KP 5	Liên Hương	Tuy Phong
22	LH-22	Nguyễn Thanh Liêm	Male	KP 5	Liên Hương	Tuy Phong
23	LH-23	Hồ Ngọc Pháp	Male	KP 3	Liên Hương	Tuy Phong
24	LH-24	Lê Minh Tuấn	Male	KP 6	Liên Hương	Tuy Phong
25	LH-25	Nguyễn Quang Dũng	Male	KP 5	Liên Hương	Tuy Phong
26	LH-26	Nguyễn Quang Lý	Male	KP 5	Liên Hương	Tuy Phong
27	LH-27	Nguyễn Văn Xuân	Male	KP 5	Liên Hương	Tuy Phong
28	LH-28	Nguyễn Thị Kim Lài	Female	KP 4	Liên Hương	Tuy Phong
29	LH-29	Lê Lợi	Male	KP 4	Liên Hương	Tuy Phong
30	LH-30	Lê Văn Lượng	Male	KP 8	Liên Hương	Tuy Phong

31	LH-31	Kim Của	Female	KP 5	Liên Hương	Tuy Phong
32	LH-32	Nguyễn Trợ	Male	KP 8	Liên Hương	Tuy Phong
33	LH-33	Đào Long Phụng	Female	KP 5	Liên Hương	Tuy Phong
34	LH-34	Cao Thị Phúc	Female	KP 4	Liên Hương	Tuy Phong
35	PL-01	Nguyễn Cho	Male	Phú Điền	Phú Lạc	Tuy Phong
36	PL-02	Dương Tân	Male	Phú Điền	Phú Lạc	Tuy Phong
37	PL-03	Nguyễn Hà	Male	Phú Điền	Phú Lạc	Tuy Phong
38	PL-04	Nguyễn Văn Nồng	Male	Phú Điền	Phú Lạc	Tuy Phong
39	PL-05	Cửu Chi Thư	Female	Lạc Trị	Phú Lạc	Tuy Phong
40	PL-06	Mai Thị Hồng Uyên	Female	Lạc Trị	Phú Lạc	Tuy Phong
41	PL-07	Mai Hồng Việt	Male	Lạc Trị	Phú Lạc	Tuy Phong
42	PL-08	Lư Binh	Male	Lạc Trị	Phú Lạc	Tuy Phong
43	PL-09	Kinh Ngọc Quốc Bảo	Male	Lạc Trị	Phú Lạc	Tuy Phong
44	PL-10	Lê Văn Lễ	Male	Lạc Trị	Phú Lạc	Tuy Phong
45	PL-11	Mai Kim Tuyến	Female	Lạc Trị	Phú Lạc	Tuy Phong
46	PL-12	Kim Ngọc Tòng	Male	Lạc Trị	Phú Lạc	Tuy Phong
47	PL-13	Trần Thị Mỹ Duyên	Female	Phú Điền	Phú Lạc	Tuy Phong
48	PL-14	Nguyễn Ngọc Quốc	Male	Phú Điền	Phú Lạc	Tuy Phong
49	PL-15	Lê Minh Hòa	Male	Phú Điền	Phú Lạc	Tuy Phong
50	PL-16	Huỳnh Văn Đông	Male	Phú Điền	Phú Lạc	Tuy Phong
51	PL-17	Bùi Tý	Male	Phú Điền	Phú Lạc	Tuy Phong
52	PL-18	Lê Thị Xuân Hương	Female	Phú Điền	Phú Lạc	Tuy Phong
53	PL-19	Võ Thị Điệp	Female	Phú Điền	Phú Lạc	Tuy Phong
54	PL-20	Nguyễn Hùng	Male	Phú Điền	Phú Lạc	Tuy Phong
55	PL-21	Đặng Thị Thu Chen	Female	Phú Điền	Phú Lạc	Tuy Phong
56	PL-22	Lý Quang Hải	Male	Lạc Trị	Phú Lạc	Tuy Phong
57	PL-23	Võ Phương Vũ	Male	Phú Điền	Phú Lạc	Tuy Phong
58	PL-24	Nguyễn Hữu Bình	Male	Phú Điền	Phú Lạc	Tuy Phong
59	PL-25	Trần Thanh Đề	Male	Phú Điền	Phú Lạc	Tuy Phong
60	PL-26	Nguyễn Hữu Học	Male	Phú Điền	Phú Lạc	Tuy Phong
61	PL-27	Lê Minh Thương	Female	Phú Điền	Phú Lạc	Tuy Phong
62	PL-28	Mai Đa	Male	Lạc Trị	Phú Lạc	Tuy Phong
63	PL-29	Lư Thị Lo	Female	Lạc Trị	Phú Lạc	Tuy Phong

64	PL-30	Huỳnh Đầy	Male	Lạc Trị	Phú Lạc	Tuy Phong
65	PL-31	Mai Thị Thuẫn	Female	Lạc Trị	Phú Lạc	Tuy Phong
66	PL-32	Kinh Hùng Huy	Male	Lạc Trị	Phú Lạc	Tuy Phong
67	PL-33	Qua Đình Thiện	Male	Lạc Trị	Phú Lạc	Tuy Phong
68	PL-34	Đồng Thái Hiệp	Male	Lạc Trị	Phú Lạc	Tuy Phong
69	PL-35	Nguyễn Trung Trực	Male	Phú Điền	Phú Lạc	Tuy Phong
70	PL-36	Võ Ngọc Linh	Male	Phú Điền	Phú Lạc	Tuy Phong
71	PL-37	Nguyễn Văn Đưa	Male	Phú Điền	Phú Lạc	Tuy Phong
72	PL-38	Nguyễn Văn Lượng	Male	Phú Điền	Phú Lạc	Tuy Phong
73	PL-39	Nguyễn Tuấn Tự	Male	Phú Điền	Phú Lạc	Tuy Phong
74	PL-40	Huỳnh Công Đoàn	Male	Phú Điền	Phú Lạc	Tuy Phong
75	PL-41	Đặng Ngọc Thông	Male	Phú Điền	Phú Lạc	Tuy Phong
76	PL-42	Đặng Ngọc Đủ	Male	Phú Điền	Phú Lạc	Tuy Phong
77	PL-43	Đắc Văn Gai	Male	Lạc Trị	Phú Lạc	Tuy Phong
78	PL-44	Lư Văn Vong	Male	Lạc Trị	Phú Lạc	Tuy Phong
79	PL-45	Bích Văn Hanh	Male	Lạc Trị	Phú Lạc	Tuy Phong
80	PL-46	Tôn Thất Trí	Male	Lạc Trị	Phú Lạc	Tuy Phong
81	PL-47	Lưu Duồng	Male	Lạc Trị	Phú Lạc	Tuy Phong
82	PL-48	Mai Vinh Quang	Male	Lạc Trị	Phú Lạc	Tuy Phong
83	PL-49	Bích Xuân Vương	Male	Lạc Trị	Phú Lạc	Tuy Phong
84	PL-50	Kinh Ngọc Thuật	Male	Lạc Trị	Phú Lạc	Tuy Phong
85	PL-51	Bình Tấn Vương	Male	Lạc Trị	Phú Lạc	Tuy Phong
86	PL-52	Đặng Hết	Male	Phú Điền	Phú Lạc	Tuy Phong
87	PL-53	Huỳnh Văn Đi	Male	Phú Điền	Phú Lạc	Tuy Phong
88	PL-54	Đặng Ngọc Bửu	Male	Phú Điền	Phú Lạc	Tuy Phong
89	PL-55	Bích Cương	Male	Lạc Trị	Phú Lạc	Tuy Phong
90	PL-56	Hán Đức Nghĩa	Male	Lạc Trị	Phú Lạc	Tuy Phong
91	PL-57	Huỳnh Ngọc Chuyến	Male	Lạc Trị	Phú Lạc	Tuy Phong
92	PL-58	Kinh Văn Nông	Male	Lạc Trị	Phú Lạc	Tuy Phong
93	PL-59	Kinh Văn Hợp	Male	Lạc Trị	Phú Lạc	Tuy Phong
94	PL-60	Nguyễn Thị Vấn	Female	Lạc Trị	Phú Lạc	Tuy Phong
95	PL-61	Hấp Minh Thuận	Male	Lạc Trị	Phú Lạc	Tuy Phong
96	PL-62	Huỳnh Công Trường	Male	Phú Điền	Phú Lạc	Tuy Phong

97	PL-63	Phan Văn Út	Male	Phú Điền	Phú Lạc	Tuy Phong
98	PL-64	Danh Tuấn Ẩn	Male	Phú Điền	Phú Lạc	Tuy Phong
99	PL-65	Hoàng Văn Hiếu	Male	Phú Điền	Phú Lạc	Tuy Phong
100	PL-66	Nguyễn Thị Chi	Female	Phú Điền	Phú Lạc	Tuy Phong
101	PL-67	Đỗ Hùng	Male	Phú Điền	Phú Lạc	Tuy Phong
102	PL-68	Trần Duy Tống	Male	Phú Điền	Phú Lạc	Tuy Phong
103	PL-69	Nguyễn Đức Kỳ	Male	Phú Điền	Phú Lạc	Tuy Phong
104	PL-70	Võ Thị Bồng	Female	Phú Điền	Phú Lạc	Tuy Phong
105	PL-71	Phạm Thanh Đông	Male	Phú Điền	Phú Lạc	Tuy Phong
106	PL-72	Huỳnh Công Nghiệp	Male	Phú Điền	Phú Lạc	Tuy Phong
107	PL-73	Mai Thị Phơ	Female	Lạc Trị	Phú Lạc	Tuy Phong
108	PL-74	Mai Thị Thia	Female	Lạc Trị	Phú Lạc	Tuy Phong
109	PL-75	Mai Thị Tít	Female	Lạc Trị	Phú Lạc	Tuy Phong
110	PL-76	Phạm Văn Sanh	Male	Lạc Trị	Phú Lạc	Tuy Phong
111	PL-77	Huỳnh Thị Dõng	Female	Lạc Trị	Phú Lạc	Tuy Phong
112	PL-78	Tống Thị Trường	Female	Lạc Trị	Phú Lạc	Tuy Phong
113	PL-79	Hán Đức Sương	Male	Lạc Trị	Phú Lạc	Tuy Phong
114	PL-80	Bích Thị Phương	Female	Lạc Trị	Phú Lạc	Tuy Phong
115	PL-81	Nguyễn Văn Trọng	Male	Phú Điền	Phú Lạc	Tuy Phong
116	PL-82	Phạm Văn Hồng	Male	Phú Điền	Phú Lac	Tuy Phong
117	PL-83	Lê Thị Chư	Female	Phú Điền	Phú Lac	Tuy Phong
118	PL-84	Nguyễn Văn Tờ	Male	Phú Điền	Phú Lac	Tuy Phong
119	PL-85	Lê Thanh Đức	Male	Phú Điền	Phú Lac	Tuy Phong
120	PL-86	Đắc Lực	Male	Phú Điền	Phú Lac	Tuy Phong
121	PL-87	Đắc Thi Thép	Female	Phú Điền	Phú Lac	Tuy Phong
122	PL-88	Bích Thị Tiểu	Female	Phú Điền	Phú Lac	Tuy Phong
123	PL-89	Mai Văn Dũng	Male	Phú Điền	Phú Lac	Tuy Phong
124	PL-90	Thanh Quảng	Male	Lạc Trị	Phú Lac	Tuy Phong
125	PL-91	Thường Phi	Female	Lạc Trị	Phú Lac	Tuy Phong
126	PL-92	Hán Văn Đoàn	Male	Lạc Trị	Phú Lac	Tuy Phong
127	PL-93	Bích Văn Nam	Male	Lạc Trị	Phú Lac	Tuy Phong
128	PL-94	Trần Hải Khang	Male	Phú Điền	Phú Lạc	Tuy Phong
129	PL-95	Đặng Ngọc Trí	Male	Phú Điền	Phú Lạc	Tuy Phong

130	PL-96	Trần Minh Dưỡng	Male	Phú Điền	Phú Lạc	Tuy Phong
131	PL-97	Đỗ Tấn Thông	Male	Phú Điền	Phú Lạc	Tuy Phong
132	PL-98	Nguyễn Văn Công	Male	Phú Điền	Phú Lạc	Tuy Phong
133	PL-99	Trần Thanh Diên	Male	Phú Điền	Phú Lạc	Tuy Phong
134	PL-100	Bùi Thị Thanh Thảo	Female	Phú Điền	Phú Lạc	Tuy Phong
135	PL-101	Nguyễn Muộn	Male	Phú Điền	Phú Lạc	Tuy Phong
136	PL-102	Lê Văn Lắm	Male	Phú Điền	Phú Lạc	Tuy Phong
137	PL-103	Phạm Hữu Kính	Male	Phú Điền	Phú Lạc	Tuy Phong
138	PL-104	Nguyễn Cao Trị	Male	Phú Điền	Phú Lạc	Tuy Phong
139	PL-105	Lê Trường Thành	Male	Phú Điền	Phú Lạc	Tuy Phong
140	PL-106	Phạm Ngọc Đỉnh	Male	Phú Điền	Phú Lạc	Tuy Phong
141	PL-107	Hồ Nam Sách	Male	Phú Điền	Phú Lạc	Tuy Phong
142	PL-108	Nguyễn Thị Hợi	Female	Phú Điền	Phú Lạc	Tuy Phong
143	PL-109	Ngô Văn Long	Male	Phú Điền	Phú Lạc	Tuy Phong
144	PL-110	Huỳnh Văn Tây	Male	Phú Điền	Phú Lạc	Tuy Phong
145	PL-111	Đào Văn Trương	Male	Phú Điền	Phú Lạc	Tuy Phong
146	PL-112	Võ Ngọc Đủ	Male	Phú Điền	Phú Lạc	Tuy Phong
147	PL-113	Võ Văn Lắc	Male	Phú Điền	Phú Lạc	Tuy Phong
148	PP-01	Phạm Thị Mỹ Hạnh	Female	Thôn 1	Phong Phú	Tuy Phong
149	PP-02	Lê Thị Thu Hà	Female	Thôn 1	Phong Phú	Tuy Phong

List of respondents for FGD

No.	Full name	Age	Occupation	Gender
Women group				
1	Nguyễn Thị Cảnh	57	Farmer	Female
2	Nguyễn Thị Bích Kim	51	Farmer	Female
3	Trần Thị Hiền	49	Farmer	Female
4	Trần Thị Lan	60	Farmer	Female
5	Trần Thị Kim Chi	47	Farmer	Female
6	Lê Thị Hoa	51	Farmer	Female
7	Nguyễn Thị Kim Oanh	29	Family-scale shop owner	Female
8	Nguyễn Thị Ái	35	Farmer	Female
Vulnerable group				
1	Đặng Thị Vọng	73	Farmer	Female

No.	Full name	Age	Occupation	Gender
2	Trần Thị Nhiêu	73	Housewife	Female
3	Nguyễn Thị Xăm	70	Day labourer	Female
4	Nguyễn Thị Nam	67	Farmer	Female
5	Phan Thị Lý	65	Day labourer	Female
6	Hồ Thị Lu	67	Farmer	Female
7	Nguyễn Thị Hợi	29	Family-scale shop owner	Female
8	Trần Thị Mỹ Duyên	55	Farmer	Female
9	Đặng Thị Tuyết Nhung	68	Farmer	Female
Cham People group				
1	Kinh Vĩnh Bình	68	Farmer	Male
2	Lựa Thỉnh	66	Farmer	Male
3	Đặng Tá	69	Farmer	Male
4	Mai Thị Kim Mùi	64	Farmer	Female
5	Kinh Thị Thanh Trà	41	Farmer	Female
6	Bích Thị Kim Anh	50	Farmer	Female
7	Nguyễn Thị Ánh Phượng	55	Farmer	Female
8	Đàng quang Lệ	64	Farmer	Female
9	Mai Định	66	Farmer	Male
10	Kinh Thị Thúy Yên	41	Farmer	Female
Farmers Group in Lien Huong				
1	Dương Minh Long	40	Farmer	Male
2	Đào Long Phụng	60	Farmer	Female
3	Kim Của	59	Farmer	Female
4	Nguyễn Văn Lý/	53	Farmer	Male
5	Nguyễn Văn Dũng	42	Farmer	Male
6	Đinh Trần Ngọc Hiểu	43	Farmer	Male
7	Nguyễn Văn Đông	41	Farmer	Male
8	Nguyễn Văn Thu	49	Farmer	Male
Farmers Group in Phu Lac				
1	Danh Tuấn Ẩn	52	Farmer	Male

No.	Full name	Age	Occupation	Gender
2	Trần Huy Thông	63	Farmer	Male
3	Đặng Ngọc Quang	67	Farmer	Male
4	Lê Minh Hòa	31	Farmer	Male
5	Nguyễn Hữu Bình	49	Farmer	Male
6	Võ Thanh Bình	50	Farmer	Male
7	Nguyễn Thị Tánh	62	Farmer	Male
8	Lê Quang Chánh	31	Farmer	Male
9	Nguyễn Văn Hòa	50	Farmer	Male
10	Chương Minh Hùng	48	Farmer	Male
11	Nguyễn Văn Tèo	38	Farmer	Male

APPENDIX F SOCIAL & ECONOMY FGD PHOTO LOG PHU LAC 2

FGDs conducted in the field


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