



Scoping Visits Report



A transdisciplinary research project with funding by the EU and the UKRI



**Pandemic literacy and viral zoonotic spillover risk at the frontline of
disease emergence in Southeast Asia to improve pandemic
preparedness**

PANDASIA

Scoping Visits Report

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Project Partners

No.	Abbreviations	Full name	Country	Main roles
1	NMBU	Norwegian University of Life Sciences	Norway	Coordinator
2	NVI	Norwegian Veterinary Institute	Norway	WP4
3	UKHD	Universitätsklinikum Heidelberg University	Germany	WP5 lead
4	IZW	Leibniz Institute for Zoo and Wildlife Research	Germany	WP2-WP3
5	QMUL	Queen Mary University of London	UK	WP1
6	CU	Chulalongkorn University	Thailand	WP1 lead
7	UMU	Umeå University	Sweden	WP4 lead
8	KKU	Khon Kaen University	Thailand	WP3 lead
9	MU	Mahidol University	Thailand	WP2 lead
10	SUPA71	SUPA71 Co., Ltd.	Thailand	WP6 lead


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Authors and Acknowledgements

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List of Acronyms

AEFI	Severe Adverse Events Following Immunization
AFP	Acute Flaccid Paralysis
AHV	Animal Health Volunteer
CUEIDAs	Center of Excellence for Emerging and Re-emerging Infectious Diseases in Animals
DDC	Department of Disease Control
DHF	Dengue/ Dengue Hemorrhagic Fever (DHF)
DHO	District Health Office
DLD	Department of Livestock Development
DNP	Department of National Parks, Wildlife and Plant Conservation
DOE	Division of Epidemiology
EH	EcoHealth
EID	Emerging Infectious Disease
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GloPID-R	Global Research Collaboration for Infectious Disease Preparedness
GMS	Greater Mekong Subregion
HFM	Hand, Foot, and Mouth Diseases
HPH	Health Promoting Hospitals
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and
MOAC	Ministry of Agriculture and Cooperatives
MONRE	Ministry of Natural Resources and Environment
MOPH	Ministry of Public Health
NIAH	National Institute of Animal Health
OH	One Health
PDPA	Personal Data Protection Act
PHO	Provincial Health Office
PLO	Provincial Livestock Office
TB	Tuberculosis
UHC	Universal Health Coverage
VHV	Village Health Volunteer
WHO	World Health Organization
WP	Work Package

1. Executive Summary

The PANDASIA is transdisciplinary research to develop better understanding of zoonotic spillover, with the goal of improving global pandemic preparedness. The project aims to achieve this by collecting extensive data from social, biological, and molecular sources and develop predictive models of zoonotic spillover rates and disease emergence in high-risk settings in Thailand. The project will include several activities, such as baseline and endline quantitative surveys and qualitative data collection among villagers and relevant stakeholders, such as human and animal health officials, environmental protection staff, village health volunteers (VHVs), animal health volunteers (AHVs), and local authorities, such as village chiefs.

Scoping visits were conducted to prepare for the implementation of the project and to obtain required local approvals. Work Package One led by Chulalongkorn University (CU), conducted several visits during March-April 2023, and two districts were selected in each designated province – two provinces were previously selected. Districts of *Mae Fah Luang* and *Wieng Kaen* in **Chiang Rai** Province and *Pong Nam Ron* and *Soi Dao* in **Chanthaburi** Province were selected as project's implementation sites.

The selection was based on human and animal surveillance data concerning zoonotic diseases; insights from relevant officials concerning human-animal interactions; and the willingness of local facilities and authorities to participate in the project. The scoping visits found that villagers frequently crossed the borders between Thailand and Lao People's Democratic Republic (Lao PDR), Cambodia, and Myanmar to trade local wild foods at markets near the border areas. Consequently, various military setting shelters are located around the areas to monitor and prevent any illegal migrations or trades between the countries. The team has obtained better understanding of the local settings and has liaised with central and provincial human health and animal health offices.

Certain challenges can be anticipated related mostly to security, and data privacy. The consortium of PANDASIA is working closely to mitigate these challenges and address any local concern, additionally we have obtained all required ethical approval to conduct our planned activities.

2. Introduction

PANDASIA is a transdisciplinary research project aiming to understand the complexity of zoonotic spillover, thereby enhancing the global pandemic preparedness overall. This will be done through a comprehensive collection of social, biological and molecular data and develop predictive modelling of zoonotic spillover rates and disease emergence in high-risk settings in Thailand. This interdisciplinary approach will enable intensive understanding of potential pandemic drivers along nature-rural-urban gradients. PANDASIA consists of seven work packages (WPs), as shown in Figure 1.

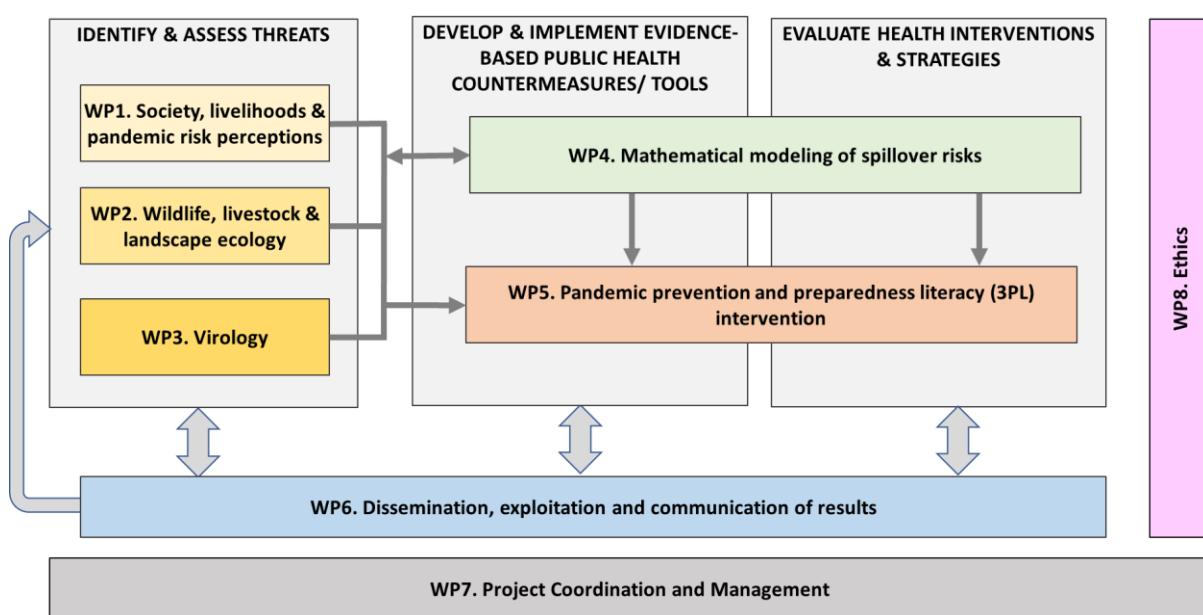


Figure 1. PANDASIA Work Packages

Pandasia project has the following Specific Objectives (SO):

- SO1.** Determine and monitor human and societal factors impacting zoonotic spillover risk by identifying populations, human behaviours, human-animal-environmental interactions, structural drivers and barriers, and relevant policies in study locations (WP1).
- SO2.** Determine the most important wild and domestic vertebrate animal hosts of importance for spillover in each study location, assessing their presence, abundance, diversity (WP2).
- SO3.** Assess and model the potential effect of changes in land use, land cover, climate, and human demographic factors since the year 2000 on spillover risk (WP2).
- SO4.** Identify previously unrecognised pathogens with spillover potential, specifically targeting viral groups in vertebrate animal hosts for which there is strong precedence for viral occurrence and emergence in the region (WP3).
- SO5.** Develop ecological, epidemiological and evolutionary conceptual models to enhance understanding of the significance of the general principles and pathways of spillover

processes, and to guide the development and analyses of a structurally equivalent, yet more specific, data-driven model. (WP4).

- S06.** Develop a point-of-care (POC) virus test kit prototype for use by healthcare providers and professionals to identify spillover at the earliest stages to prevent epidemic or pandemic spread (WP3).
- S07.** Create and test a critical public health measure – a pandemic prevention and preparedness literacy (3PL) intervention to reduce zoonotic transmission and pandemic risk (WP5).

2.1 Healthcare system in Thailand

The Thai healthcare system is known for its universal healthcare coverage and is often cited as an example of successful healthcare reform. [1-3] Here is some information about the Thai healthcare system:

1. **Universal Coverage Scheme (UCS):** The UCS is the flagship program of Thailand's healthcare system. It provides comprehensive healthcare coverage to the entire population, including Thai citizens and legal residents. Under this scheme, individuals have access to a wide range of healthcare services, including preventive, curative, and rehabilitative care.
2. **Primary Care:** The Thai healthcare system emphasizes the importance of primary care as the first point of contact for individuals seeking healthcare services. Primary care services are provided through a network of public and private clinics located throughout the country. These primary care facilities play a crucial role in health promotion, disease prevention, and basic treatment.
3. **Health Infrastructure:** Thailand has a well-developed healthcare infrastructure, with a mix of public and private hospitals and clinics. Public hospitals, operated by the Ministry of Public Health, provide services to the general population, while private hospitals cater to those who can afford to pay for their healthcare.
4. **Funding:** The Thai healthcare system is financed through a combination of taxes, social security contributions, and individual out-of-pocket payments. The UCS is funded by general tax revenue, while other segments of the population may have access to different healthcare schemes based on their employment status or income level.
5. **Achievements and Challenges:** Thailand's healthcare system has achieved notable successes in improving access to healthcare services and reducing health disparities. However, challenges remain, such as uneven distribution of healthcare resources between urban and rural areas, the rising burden of non-communicable diseases, and the need to strengthen the quality of care and patient safety.

In Thailand, Village Health Volunteers (VHVs) and Animal Health Volunteers (AHVs) are integral components of the country's healthcare system, playing critical roles in promoting community health and addressing animal health issues. VHVs focus on human health at the local level, while AHVs concentrate on animal health and veterinary services. [6, 7]

Village Health Volunteers (VHVs) are community-based health workers in Thailand who serve at the grassroots level. They are recruited from local communities and receive training to provide basic healthcare services, health promotion, and disease prevention activities. VHVs work closely with local health centers, healthcare professionals, and public health authorities to address the health needs of their communities. The roles of VHVs encompass various tasks, including health education, health screenings, immunization campaigns, maternal and child health services, and supporting referrals to formal healthcare facilities when necessary. They act as advocates for community health and play a crucial role in improving health outcomes and healthcare access, particularly in rural and underserved areas. While AHVs in Thailand are dedicated to animal health and veterinary services. They play a vital role in promoting animal welfare, preventing the spread of zoonotic diseases, and ensuring the health and productivity of livestock. AHWs are trained to provide basic animal healthcare, vaccination, disease surveillance, and support in animal disease control and prevention programs. AHWs collaborate with veterinary authorities, livestock departments, and local communities to monitor and address animal health issues. Their responsibilities may include livestock management, disease diagnosis and treatment, vaccination campaigns, animal husbandry training, and raising awareness of zoonotic diseases among farmers and animal owners. [6, 7]

During the COVID-19 pandemic, Village Health Volunteers (VHVs) and Animal Health Volunteers (AHVs) in Thailand have played essential roles in supporting public health measures, raising awareness, and ensuring the well-being of both humans and animals. VHVs have been instrumental in disseminating accurate information about COVID-19 to communities. They play a crucial role in educating people about preventive measures such as hand hygiene, mask usage, physical distancing, and proper respiratory etiquette. VHVs have been actively involved in community awareness campaigns, providing guidance on COVID-19 symptoms, testing, and vaccination. VHVs have provided crucial support to individuals and families affected by COVID-19. They have assisted in distributing relief supplies, ensuring access to essential resources, and coordinating with local authorities for medical and social services. VHVs have also offered emotional support and counseling to community members, especially those facing isolation or distress. [8, 9]

While VHVs have assisted in contact tracing efforts by identifying and reporting individuals who may have been exposed to COVID-19. They work closely with local health authorities and contribute to monitoring the health status of individuals under quarantine or self-isolation. VHVs help ensure compliance with public health guidelines and facilitate early detection of potential cases. AHWs have implemented biosecurity measures to prevent the transmission of COVID-19 among animals and from animals to humans. They provide guidance on proper hygiene practices in animal handling, including disinfection and personal protective equipment usage. AHWs also ensure the well-being of livestock and domestic animals by providing veterinary care, vaccination, and promoting good animal husbandry practices. The VHVs are reimbursed for their healthcare-related duties and are supervised directly by the HPH staff. VHVs and AHWs are paid based on the activities they support and are not full-time government employees like the HPH staff.

The VHV's provide healthcare-related support such as hypertension monitoring, malaria treatment follow-up, covid-19 related tasks, as well as other public health and prevention needs impacting their communities. [8-11]

VHVs and AHWs have made significant contributions to healthcare and animal welfare in Thailand. VHVs have improved healthcare delivery and outcomes by increasing health awareness, promoting preventive measures, and providing basic healthcare services at the community level. They have been particularly valuable in rural and remote areas where access to formal healthcare services may be limited. AHWs have played a vital role in animal disease control and prevention, safeguarding the health and productivity of livestock. Their efforts contribute to food security, economic stability, and the prevention of zoonotic diseases that can transmit from animals to humans. The roles of VHVs and AHWs become especially crucial during public health emergencies, disease outbreaks, or natural disasters. Their close connection with the community allows for effective communication, rapid response, and dissemination of essential health information, ensuring timely interventions and minimizing the impact of health crises on both humans and animals. [1, 7, 12]

2.2 Rational for study locations.

The PANDASIA will be implemented in two provinces in Thailand. We have selected **Chiang Rai** and **Chanthaburi** provinces, for their diverse biological, ecological, and societal nature. Each includes a provincial city, district towns, sub-district towns and many villages, nature areas, contiguous forest areas, national parks, scenic sites, which are often frequented by tourists and other visitors. Karstic limestone caves known for housing bat colonies, from which samples can be obtained, are also common.

The final selection of locations will be based on

1. Available information on wildlife contact and consumption,
2. Available information on the presence of wildlife,
3. Willingness of local stakeholders, residents, and authorities to collaborate,

At the end of the scoping visits, two locations were selected in each province of three different environments: 1) natural forest, 2) rural settings, and 3) urban district. Thus, in total, there will be 12 environments (4 forests, 4 villages, 4 urban centers). The team will continue **scoping or field visits** to explore in depth the most suitable locations in the selected provinces and to increase public awareness as well stakeholder's acceptance to engage in the study. This includes provincial health and livestock offices, local, district and provincial leaders, government, non-governmental organizations, and local authorities.

3. Objectives of the Scoping Visits

The objectives of the scoping visits are to:

- 1) Select potential project implementation locations.
- 2) Obtain preliminary data on the human, domestic, and wild animal interface activities.
- 3) Obtain profiles of location characteristics.
- 4) Meet and discuss with relevant community leaders and government stakeholders to obtain approval and cooperation to implement the project.

4. Scoping Visit Procedures

Prof. Dr. Amonsin, with the support of Dr. Suwannarong, planned and implemented the scoping visits.

Details of the visit procedures include:

- 1) Review of human disease surveillance reports via the website of the Division of Epidemiology (DOE), Department of Disease Control (DDC), via <https://ddc.moph.go.th/doe/>.
- 2) Review of relevant literature on previous zoonotic outbreak events in Thailand.
- 3) Review of criteria for the potential project site selection:
 - As stated in the PANDASIA proposal, the potential sites should have preliminary information on wildlife contact and consumption, preliminary information on wildlife presentations/habitats, strong collaboration and coordination of local health facilities, residents, and authorities, and positive results from the scoping visits.
 - As an initial plan, two locations will be selected in each province. Each study location will represent three different environments: 1) natural forest, 2) rural village settings, and 3) district town. In total, there will be 12 environments consisting of four forests, four villages, and four urban centers.
 - Notably, the final decision regarding the study locations will be based on the recommendations by local stakeholders and the results obtained from the site visits.
- 4) Communicate and coordinate with relevant government stakeholders by formal requests to obtain their approvals for initial meetings. The meetings aimed to provide brief project information and outline expectations for collaboration with the respective offices. Formal requests were sent to the:
 - Division of Epidemiology (DOE), Department of Disease Control (DDC), Ministry of Public Health (MOPH): The DOE is a key entity within the Department of Disease Control (DDC), which operates under the Ministry of Public Health (MOPH) in Thailand. The DOE plays a vital role in public health surveillance, epidemiological investigations, and disease control measures.

- Department of Livestock Development (DLD), Ministry of Agriculture and Cooperatives (MOAC): The DLD is an important entity under the Ministry of Agriculture and Cooperatives (MOAC) in Thailand. The DLD plays a crucial role in the development, regulation, and promotion of livestock and animal health-related activities in the country.
 - Department of National Parks, Wildlife and Plant Conservation (DNP), Ministry of Natural Resources and Environment (MONRE): The DNP is a significant entity under the Ministry of Natural Resources and Environment (MONRE) in Thailand. The DNP is responsible for the conservation, protection, and management of national parks, wildlife, and plant resources.
 - Chiang Rai Provincial Health Office (PHO): The Chiang Rai Provincial Health Office is an essential entity responsible for overseeing and managing public health activities within the Chiang Rai province of Thailand. The PHO plays a crucial role in promoting and ensuring the health and well-being of the local population.
 - Chiang Rai Provincial Livestock Office (PLO): The Chiang Rai Provincial Livestock Office is a key entity responsible for the management, development, and regulation of livestock-related activities within the Chiang Rai province of Thailand. The DLO plays a crucial role in promoting and ensuring the growth and sustainability of the livestock sector.
 - Chanthaburi Provincial Health Office (PHO): The Chanthaburi Provincial Health Office (PHO) is a critical organization responsible for overseeing and managing public health activities within the Chanthaburi province of Thailand. The PHO plays a crucial role in promoting and protecting the health and well-being of the local population.
 - Chanthaburi Provincial Livestock Office (PLO): The Chanthaburi Provincial Livestock Office (PLO) is an important organization responsible for the management, regulation, and development of livestock-related activities within the Chanthaburi province of Thailand. The PLO plays a crucial role in promoting the growth, productivity, and sustainability of the livestock sector.
- 5) Arrange meetings to discuss project details and expected outcomes for collaboration and project implementation and visit potential implementation sites.
 - 6) Follow up on the agreements for collaboration and obtain letters of agreement from the sites and stakeholders.
 - 7) Report the scoping visit results (this report).

5. Results of the Scoping Visits

The provinces of Chiang Rai and Chanthaburi (Figures 2 and 3) have been chosen as implementation sites for this project. The selection was based on a review of human and animal surveillance data concerning the number of patients with zoonotic infections in the past five years, as well as discussions and recommendations from the key stakeholders and site visits. A high degree of interaction between humans and domestic and wild animals, and input from human and animal health officials further guided the identification of areas/villages.

The willingness of local health facilities and authorities to participate in project activities for a period of five years also influenced the site selection process. In addition, the following border locations between Cambodia, Lao PDR, Myanmar, and Thailand were identified as sites of wild product trade. In order to select specific project locations, Prof. Dr. Amonsin and Dr. Suwannarong traveled to potential districts, where they met with health officials and jointly determined the specific sites:

Chiang Rai Province:

- Mae Fah Luang District
 - Cluster I: Village (Moo) No. 2 (Ban Saen Ko) and No. 3 (Ban Ar-gu Ar-hi), Terd Thai Subdistrict
 - Cluster II: Village (Moo) No. 9 (Ban Huai Yuak Pa So) and No. 27 (Ban Hin Kam), Mae Song Nai Subdistrict
- Wiang Kaen District
 - Village (Moo) No. 20 (Ban Huai Kook), Por Subdistrict
 - Village (Moo) No. 5 (Ban Cham Pong), Lai Hwao Subdistrict

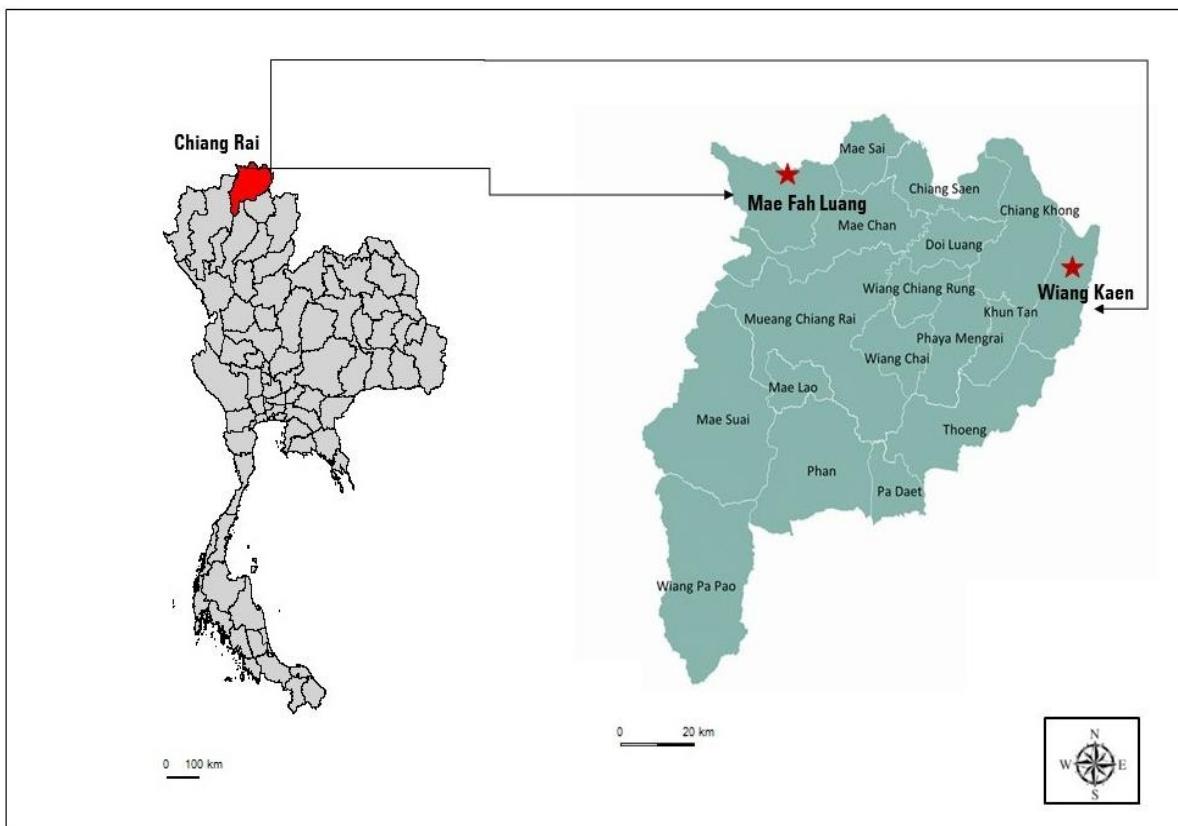


Figure 2. Map of Districts and Study Sites in Chiang Rai Province [13]

Chanthaburi Province:

- Pong Nam Ron District
 - Village (Moo) No. 3 (Ban Pak Kard), Klong Yai Subdistrict
 - Village (Moo) No. 1 (Ban Noen Din Daeng) and No. 7 (Ban Nong Kok), Thep Nimit Subdistrict, near Klong Yai District
- Soi Dao District
 - Village (Moo) No. 2 (Ban Sub Tari)
 - Village (Moo) No. 15 (Ban Sub Tari Song)

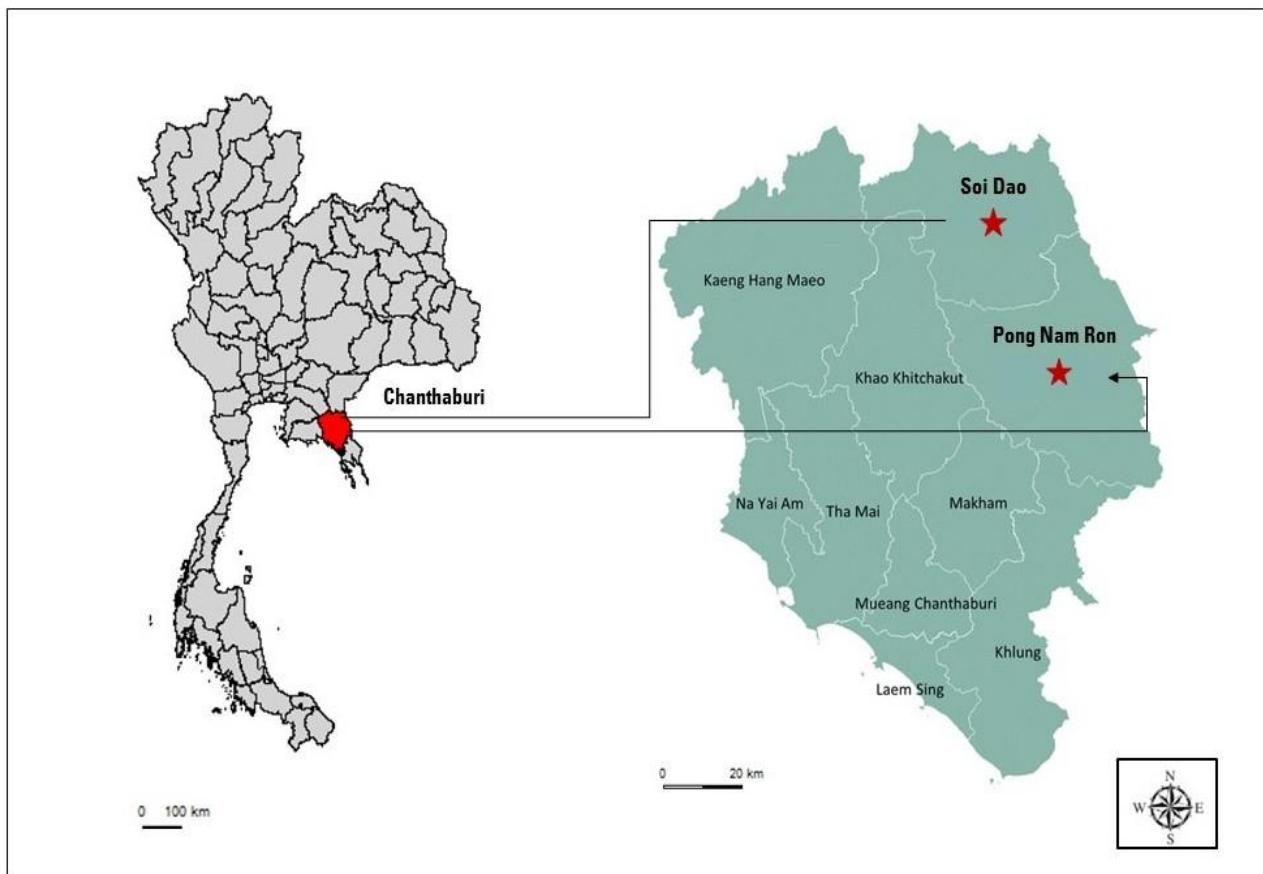


Figure 3. Map of Districts and Study Sites in Chanthaburi Province [13]

Chiang Rai Province

On March 26-31, 2023, Prof. Dr. Amonsin, Dr. Suwannarong, and Dr. visited Chiang Rai Province and the districts. The team met with the deputy of Chiang Rai's Provincial Chief Medical Officer (PCMO), the director of Chiang Rai DLO and his staff, staff from the PHO's epidemiology and communicable disease control sections, Mae Fah Luang Hospital, and Wiang Kaen's district health office. The team also went to various locations to observe the characteristics of the villages and environments. CUEIDAs followed up with the PHO and DLO in the provinces and obtained letters of agreement to

collaborate with the project (see Annex 1). Details of the selected provinces and districts are explained in Section 6.1.



Figure 4. Photos of the meeting at Chiang Rai Provincial Health Office [14]



Figure 5. Photos of the meeting at Mae Fah Luang Hospital, Mae Fah Luang District, Chiang Rai Province [15]



Figure 6. Photos of meeting with Wiang Kaen's district health officer, Wiang Kaen District, Chiang Rai Province [16]

Chanthaburi Province

Prof. Dr. Amonsin and Dr. Suwannarong met with Chanthaburi PCMO, a veterinarian and staff of Chanthaburi DLO, PHO officials from the communicable disease control and health policy sections, and health promoting hospitals (HPHs) in Pong Nam Ron and Soi Dao Districts during April 23 - 25, 2023. CUEIDA followed up with the PHO and DLO in the provinces and obtained letters of agreement to collaborate with the project's activities (see Annex 1). Details of the province and districts are explained in Section 6.2.



Figure 7. Photos of meeting at Pong Nam Ron district, Chanthaburi Province [17]



Figure 8. Photos of the meeting and visit at Soi Dao District, Chanthaburi Province [17]

The team also met with the following offices to provide them with the project's overview and to seek their participation in the project's activities:

Division of Epidemiology (DOE), Department of Disease Control (DDC), Ministry of Public Health (MOPH), Nonthaburi province

Dr. Siriaroonrat of Mahidol University (MU), Dr. Chaiyawong, and Ms. Thammasutti accompanied Dr. Suwannarong to the DOE meeting on May 8, 2023, at the Field Epidemiologist Development Group Meeting Room (FETP Library) in Building 10 on the 3rd Floor of DOE, DDC, Nonthaburi. At this meeting, we met with Dr. Darin Areechokchai, a DOE deputy, and her four team members. The discussion focused on providing project details and outlining expectations for future collaboration. During the discussion, the DOE team expressed major concerns about sharing epidemiology data outside of Thailand, including research databases, because Thailand has recently enforced the Personal Data Protection Act (PDPA). We emphasized that the data will be anonymized and will be stored in Thailand.



Figure 9. Photos of the meeting with DOE, MOPH on epidemiological surveillance data and requesting of an agreement for project collaboration [18]

As reviewed, DOE has provided guidelines for **communicable diseases that require notification within 24 hours**, such as SARS, avian influenza, cholera, acute severely ill or death of unknown etiology, a cluster of diseases with unknown etiology, anthrax, meningococcal meningitis, food poisoning outbreak, encephalitis, acute flaccid paralysis (AFP), severe adverse events following immunization (AEFI), diphtheria, rabies, and COVID-19. In addition, measles, pertussis, hand, foot, and mouth diseases (HFM), influenza, leptospirosis, dysentery, severe pneumonia of unknown etiology, a cluster of infectious cases, and dengue/ dengue hemorrhagic fever (DHF) are considered important communicable diseases. Figure 10 illustrates the flow of the reporting process for communicable diseases. The report forms include a morbidity notifiable card (Form 506), which can be submitted through either paper-based or electronic formats to the epidemiological unit within each health center.

Organization of Surveillance System

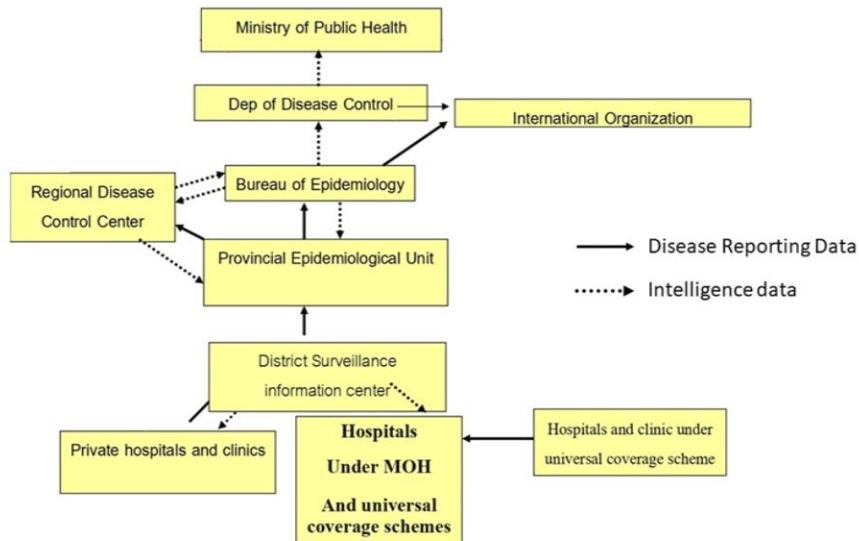


Figure 10. The flow of reporting [20]

Department of Livestock Development (DLD), Ministry of Agriculture and Cooperatives (MOAC)
69/1 Phayathai Road, Ratchathewi, Bangkok.

Dr. Suwannarong and Ms. Thammasutti met with a staff member of DLD on May 23, 2023, to present the project details and seek potential collaboration with DLD. Due to concerns over sharing of information, the staff member proposed to organize another meeting with the DLD Director-General on June 26, 2023. The meeting will include Dr. Siriaroonrat, Dr. Suwannarong, Dr. Chaiyawong, and Ms. Thammasutti. The results of the meeting will be updated for PANDASIA's consortium. (Figure 11)



Figure 11. Photos of the meeting with DLD on animal disease surveillance data [21]

Department of National Parks, Wildlife and Plant Conservation (DNP), Ministry of Natural Resources and Environment

Phahonyothin Rd., Chatuchak, Bangkok.

Due to scheduling conflicts, DNP representatives were unable to meet on-site with the team. However, DNP provided information about the locations and contact information of forest and protected areas and wildlife survey data in the provinces (Annex 2).

6. Profiles of the Selected Sites

6.1 Chiang Rai Province

Chiang Rai is Thailand's northernmost province, situated approximately 785 kilometers north of Bangkok. It spans an area of approximately 11,678 square meters and has an average elevation of 580 meters above sea level. The province is located within the well-known Golden Triangle region, which connects Myanmar, Laos, and Thailand, and serves as a gateway to Myanmar, Laos, and Southern China. Chiang Rai is an important city with its own unique attractions and cultural heritage [22].

The climate in Chiang Rai province, located in northern Thailand, is classified as tropical savanna climate. During the dry season, Chiang Rai experiences cooler temperatures and lower humidity levels. This is the peak tourist season as the weather is pleasant, with temperatures ranging from 15°C (59°F) to 30°C (86°F). It is a popular time to visit due to the clear skies and minimal rainfall. The hot season in Chiang Rai is characterized by high temperatures and low rainfall. Temperatures can soar to 35°C (95°F) or even higher, particularly in April. The humidity levels are relatively low, and it can be quite dry during this period. The rainy season in Chiang Rai brings frequent showers and thunderstorms. The region receives a significant amount of rainfall during this time, with July and August being the wettest months. The temperatures during the rainy season range from 25°C (77°F) to 32°C (90°F). The landscape becomes lush and green, but occasional heavy rainfall can lead to localized flooding. {Chiang Rai, n.d. #33}

Chiang Rai is divided into eighteen districts (Amphur): Muang Chiang Rai, Wiang Chai, Chiang Khong, Thoeng, Phan, Pa Daet, Mae Chan, Chiang Saen, Mae Sai, Mae Suai, Wiang Pa Pao, Phaya Mengrai, Wiang Kaen, Khun Tan, Mae Fa Luang, Mae Lao, Wiang Chiang Rung, and Doi Luang. Within these districts, there are 124 subdistricts (Tambon) and 1510 villages (Mooban). [22, 23] The study areas selected in Chiang Rai province are Mae Fah Luang and Wiang Kaen Districts (Figure 2).

Geographically, the province is separated from Laos by the Mekong River, while the Mae Sai and Ruak Rivers form its boundary with Myanmar. The Kok River is the primary river that flows through it. The eastern part of the province consists of relatively flat plains, whereas the western part is characterized by mountainous terrain. Forests cover a significant portion of the land in this province. [24] The predominant forest types in the area are tropical and subtropical wet broadleaf forests, including evergreen forests, deciduous forests, and planted forests. The land is mainly utilized for agricultural purposes, with a focus on rice cultivation. [24, 25] The land use categories in the region include community areas and buildings, agricultural areas, paddy fields, field crops, perennial and

tree crops, horticulture, pastures, animal farms, aquaculture facilities, integrated agriculture/mixed farming, forest areas, water sources, and miscellaneous areas (Table 1, Figure 12).

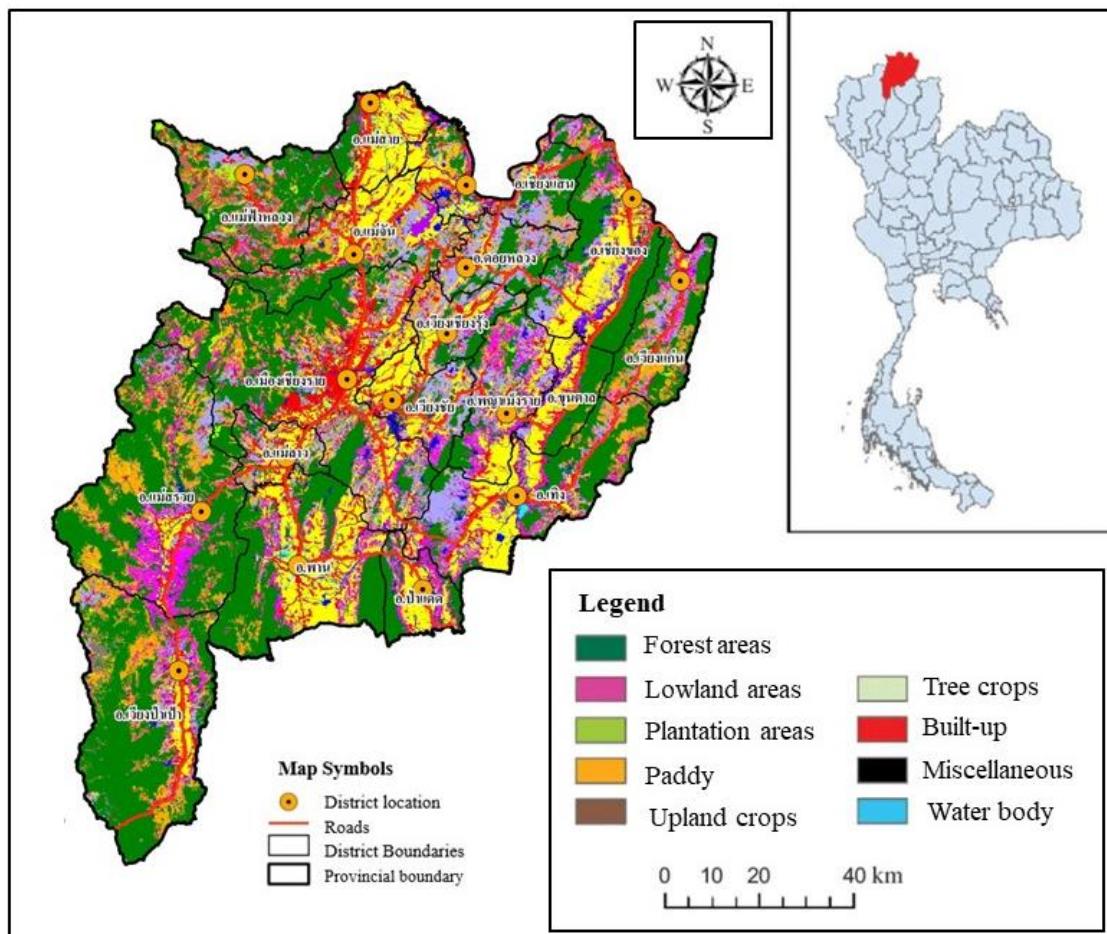


Figure 12. Map of Chiang Rai province, Thailand, showing land use classes in 2020 [26]

Table 1. Types of land use in Chiang Rai Province in 2020 [27]

Type of Land Use	Area	
	Rai (1 rai = 1,600 square meters, 16 Ares, 0.16 hectares, or 0.3954 acres)	Percentage (%)
Community areas and buildings	441,578	6.05
Agricultural areas	3,735,647	51.17
Paddy field	1,440,339	19.73
Field crops	1,034,471	14.15
Perennial plants	645,608	8.85
Tree crops	455,133	6.24
Horticulture	12,642	0.17
Shifting cultivation	102,447	1.41

Type of Land Use	Area	
	Rai (1 rai = 1,600 square meters, 16 Ares, 0.16 hectares, or 0.3954 acres)	Percentage (%)
Pastures and animal farms	10,441	0.14
• Abandoned barn	119	-
• Grassland	2,520	0.03
• Cattle, buffalo and horse farm	1,434	0.02
• Poultry farm	2,309	0.03
• Pig farm	4,059	0.06
Aquatic plants	65	-
Aquaculture facilities	30,286	0.42
• Abandoned aquaculture facility	750	0.01
• Fish farming facility	26,170	0.36
• Shrimp farming facility	3,327	0.05
• Crocodile farm	39	-
Integrated agriculture/mixed farming	4,215	0.06
Forest areas	2,822,664	38.68
• Evergreen forests awaiting recovery	6,353	0.09
• Evergreen forests	432,563	5.93
• Deciduous forests awaiting recovery	81,830	1.12
• Deciduous forests	2,285,338	31.31
• Planted forests awaiting recovery	2,557	0.04
• Planted forests	14,023	0.19
Water areas	182,114	2.50
• Rivers, creeks, canals	45,904	0.63
• Swamps, lakes	25,783	0.35
• Water reservoirs	27,946	0.38
• Farm ponds	15,971	0.22

Type of Land Use	Area	
	Rai (1 rai = 1,600 square meters, 16 Ares, 0.16 hectares, or 0.3954 acres)	Percentage (%)
• Irrigation canals	1,374	0.02
Miscellaneous areas	182,114	2.50
Total	7,298,981	100.00

According to the National Statistical Office (2023), Chiang Rai had a total population of 1,299,758 as of April 2023, including 630,524 men and 669,234 women . In addition to Thai, other ethnic groups that have settled in the province are :

- The **Akha** has the largest population among all hill tribes in the region. They are native to Tibet and Southern China and reside at high altitudes of around 1,200 meters above sea level. To defend themselves from malevolent spirits, the people of Akha erect spirit gateways throughout their villages.
- The **Chin Hor** consists of former Kuomintang members who sought asylum in the area, primarily in Doi Mae Salong.
- The **Hmong** from southern China prefers to live in the highlands than the lowlands. They raise cattle and cultivate rice, corn, tobacco, and cabbage. Their needlework and silver craftsmanship are well-known.
- The **Karen** resides in the region's valleys and riverbanks.
- The **Khon Muang** are city dwellers from Chiang Mai, Lamphun, Lampang, and Phrae in Thailand. Their traditional houses are single-story with wooden gable embellishments called ka-lae. They are well-known for their woodcarving, weaving, lacquerware, and local musical instruments.
- The **Lahu** immigrated to Thailand from Yunnan and settled in the mountains. They are known as hunters and planters.
- The **Lisaw** from southern China and Tibet are known for their colorful clothing and stilted houses. They are skilled hunters as well as rice and corn harvesters.
- The **Tai Lue** live in single-room wooden houses constructed on high piers. They are highly skilled weavers.
- The **Tai Yai** are Burmese in origin. They engage in rice harvesting, farming, cattle raising, and trade. Their well-known skills include weaving, ceramics, wood carving, and bronze ware.
- The **Yao** live atop mountains and cultivate grains and other crops. They are expert blacksmiths, silversmiths, and embroiderers.
- **Other ethnic groups (migrants)**, such as the Burmese, Laotians, and Cambodians, live along the border areas.

Epidemiological Information

According to the human disease surveillance reports in Chiang Rai from 2018 to 2023, the most commonly reported communicable diseases were diarrhea, pneumonia, pyrexia of unknown origin (PUO), followed by scrub typhus, leptospirosis, and melioidosis, respectively.

Number of village health volunteers (VHVs) and animal health volunteers (AHVs)

According to data from the Chiang Rai PHO, a total of 24,959 VHVs were working in Chiang Rai as of May 2023, with 894 VHVs and 77 AHVs working in Mae Fah Luang District and 546 VHVs and 41 AHVs in Wiang Kaen District.

Mae Fah Luang District

Mae Fa Luang District consists of four subdistricts. Originally, it was divided into three subdistricts: Thoet Thai, Mae Salong Nai, and Mae Salong Nok. Mae Fa Luang, the fourth subdistrict of the same name as the district, was established in 1996. The district was named Mae Fa Luang after Princess Mother Srinagarindra, who was affectionately called "Mae Fa Luang" (meaning "Royal Mother from the Sky") by the hill tribes in the area.

Adjoining districts are (from the east clockwise): Mae Sai, Mae Chan, and Muang Chiang Rai of Chiang Rai Province and Mae Ai of Chiang Mai province. Myanmar's Shan State is located to the northwest of Mae Fa Luang. The district's total population is 77,892 people, comprising 38,718 men and 39,174 women (Table 2) [22]

Table 2. Population by subdistrict in Mae Fah Luang District, Chiang Rai Province (as of April 2023) [32]

No.	Subdistrict (in English)	Subdistrict (in Thai)	Number of villages	Male	Female	Total population
1.	Thoet Thai	ເທົດໄກຍ	18	11,967	12,065	24,032
2.	Mae Salong Nai	ແມ່ສລອງໄນ	27	12,927	12,887	25,814
3.	Mae Salong Nok	ແມ່ສລອງນອກ	13	7,475	7,661	15,136
4.	Mae Fa Luang	ແມ່ພ້າຫລວງ	19	6,349	6,561	12,910
Total			77	38,718	39,174	77,892

Epidemiological Information

The officials from Mae Fah Luang District Hospital informed us that leptospirosis outbreaks occurred in their district. This information was further verified with hospital staffs who confirmed the incidence and expressed their interest to engage in the project.

Selected locations in Mae Fah Luang District

- **Cluster I:** Village (Moo) No. 2 (Ban Saen Ko) and No. 3 (Ban Ar-gu Ar-hi), Terd Thai Subdistrict. This area is home to the Khon Muang/Northern Thai, Tai Yai, Lahu/Muser, Akha, Chin Hor/Yunnanese, and Akha ethnic groups. The Terd Thai Subdistrict covers a various landscape, including mountains, valleys, and plains. It is situated in the northern part of Thailand, near the border with Myanmar, and benefits from the mountainous terrain.
- **Cluster II:** Village (Moo) No. 9 (Ban Huai Yuak Pa So) and No. 27 (Ban Hin Kam), Mae Song Nai Subdistrict. This area is home to the Khon Muang/Northern Thai, Lahu/Muser, and Akha ethnic groups. The Mae Song Nai Subdistrict is characterized by lush greenery, rolling hills, and picturesque landscapes. Additionally, the fertile soil and favorable climate support the cultivation of various crops, including tea, coffee, fruits, and vegetables. The areas' agricultural practices contribute to the vibrant and vibrant rural landscape.

As observed, the selected villages are surrounded by small rivers. The areas also feature mountainous terrain and share borders with Myanmar. The villagers primarily engage in agricultural activities, cultivating crops like rice, corn, and cassava. Additionally, they work as merchants with a moderate-income level. Nonetheless, there have been reports of forest burning for the purpose of hunting wild animals. Maps and photos of the villages in this district are shown in Figures 13 and 14.

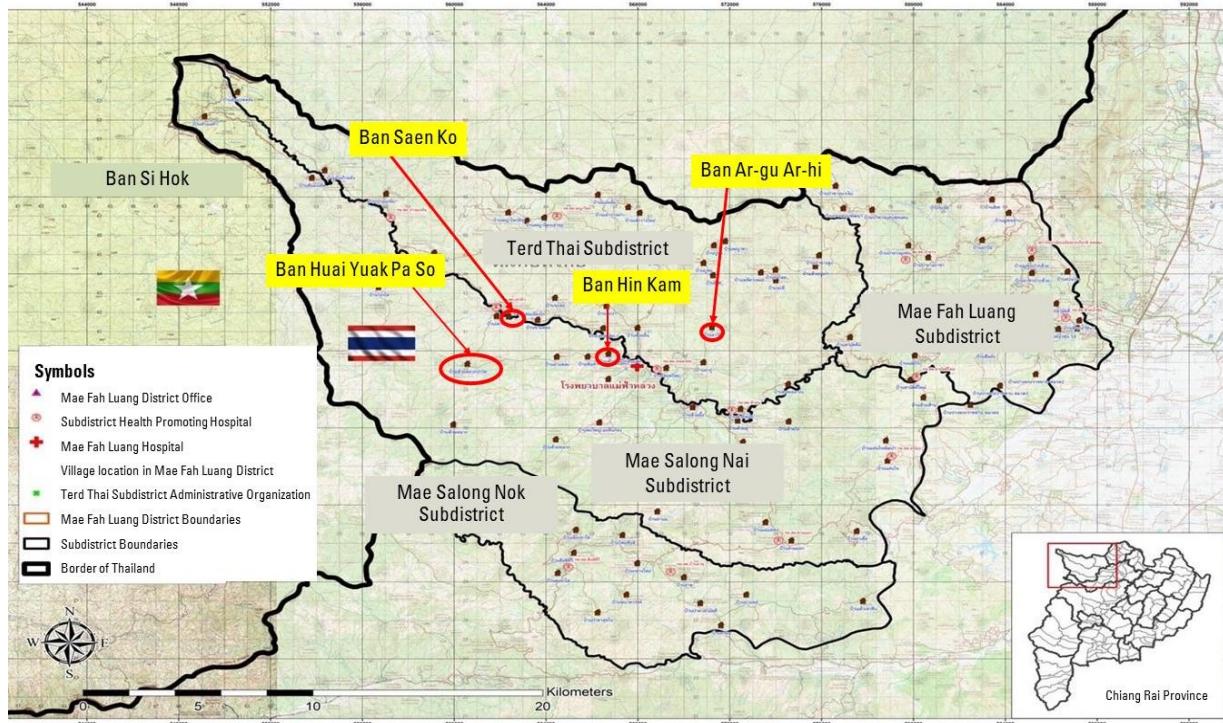


Figure 13. Map of the Mae Fah Luang Sites[33]



Figure 14. Photos around the villages in Terd Thai and Mae Song Nai Subdistricts, Mae Fah Luang District, Chiang Rai Province [34]

Wiang Kaen District

Wiang Kaen is the easternmost district in Chiang Rai province. It shares borders with the districts of Thoeng, Khun Tan, and Chiang Khong of Chiang Rai (clockwise from the south), and Bokeo Province of Laos. The 1,442-m high Phu Chi Fa is located near its border with Thoeng District. Wiang Kaen is further divided into 41 villages. There are four Tambon Administrative Organizations (TAOs) but no municipalities (thesabans). The total population is 37,844 people, comprising 19,069 men and 18,775 women (Table 3).

Table 3. Population by subdistrict in Wiang Kaen District, Chiang Rai Province (as of April 2023) [36]

No.	Subdistrict (in English)	Subdistrict (in Thai)	Number of Villages	Male	Female	Total Population
1.	Muang Yai	ม่วงยาด	9	4,355	4,258	8,613
2.	Po	ปอ	20	9,693	9,362	19,055
3.	Lai Ngao	หล่ายขาว	6	1,747	1,892	3,639
4.	Tha Kham	ท่าข้าม	6	3,274	3,263	6,537
Total			41	19,069	18,775	37,844

This district has an international border check-point where Thais and Laotians can move cross-border openly and exchange wild products. (Figure 15)



Figure 15. The border check-point for migration and product transportation and military station with health facility in a site of Wiang Kaen District, Chiang Rai Province [37]

Epidemiological Information

During the meeting, the local officials of Wiang Kaen District Hospital provided human disease surveillance reports from 2018 to 2022. The reports show that the most commonly reported communicable disease was diarrhea, followed by PUO, pneumonia, dengue fever/ DHF, scrub typhus, influenza (non-specified), and hand foot mouth, respectively.

Selected locations in Wiang Kaen District

- Village (Moo) No. 20 (Ban Huai Kook), Por Subdistrict: This area is home to the Khon Muang/Northern Thai and Hmong ethnic groups. The area is rural, with a sizable portion of land dedicated to agriculture. The district's fertile soils and favorable climate make it suitable for cultivating crops such as rice, fruits, vegetables, and tea. Agriculture plays a vital role in the local economy and contributes to the district's environmental landscape.
- Village (Moo) No. 5 (Ban Cham Pong), Lai Hwao Subdistrict: This area is home to the Khon Muang/Northern Thai, Laotian, Tai Lue, and Hmong ethnic groups. The area is characterized by lush forests and abundant wildlife. The forests in Lai Hwao Subdistrict are home to a variety of plant and animal species, including tropical trees, bamboo, orchids, and numerous bird species. The area's natural habitats support diverse wildlife, including mammals, reptiles, and insects.

The villagers in these areas primarily engage in agriculture, such as rice, corn, and cassava cultivation. The areas are in the mountains and require transportation by 4WD trucks to access the plain areas where military health and educational centers are located. The Royal Princess Sirintorn funds these centers. Due to the military setting, the military is required to approve project activities through the district health office.

Maps and photos of the subdistricts in Wiang Kaen District are shown in Figures 16 and 17.

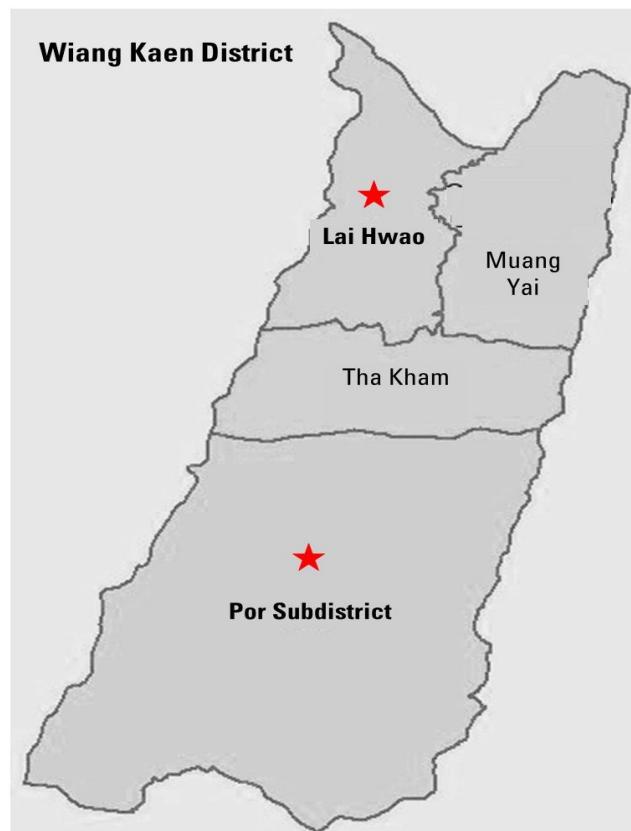


Figure 16. Map of the subdistricts in Wiang Kaen district, Chiang Rai Province [38]



Figure 17. Environmental photos around the villages in Por and Lai Hwao Subdistricts, Wiang Kaen District, Chiang Rai Province [39]

6.2 Chanthaburi Province

Chanthaburi is an eastern province that is located on the Gulf of Thailand's east coast. It is approximately 245 kilometers from Bangkok and covers an area of around 6,338 square kilometers (about 3,961,250 rai). It shares a border with the Cambodian provinces of Battambang and Pailin. Within Thailand, its neighboring provinces consist of Trat in the east, Rayong and Chonburi in the west, and Chachoengsao and Sa Kaeo in the north. [40] Chanthaburi is known for its historical sites, cultural attractions, and its role as a major trading center for gemstones and fruits. In terms of topography, Chanthaburi exhibits three main characteristics [40]:

- (1) The mountainous forested areas of Chanthaburi stretch across the districts of Kaeng Hang Maeo, Tha Mai, Makham, Soi Dao, Pong Nam Ron, and the upper Khlung. These regions boast the highest elevation of the province, with the peak of Soi Dao Mountain – the highest mountaintop in the east – reaching about 1,675 meters. The mountains feature sanctuaries, national parks, non-hunting areas, and wildlife sanctuaries.
- (2) The upper districts, such as Muang Chanthaburi, Khao Khitchakut, upper Tha Mai, Khlung, and upper Laem Sing, feature both low-lying plains and elevated mountainous terrains.
- (3) Coastal plains, characterized by hills and mangrove forests, could be found in the districts of Na Yai Am, lower Tha Mai, Laem Sing, and Khlung.

Chanthaburi has the following four major rivers [40]:

- (1) The Chanthaburi River originates from the south Soi Dao Mountain in Pong Nam Ron District, the Sam Ngam Mountain, and the Cha-Om Mountain in Makham. It flows across a distance of 123 kilometers, passing through Muang Chanthaburi District to the Gulf of Thailand in Laem Sing District.

- (2) The Phangrat River is formed by two short rivers that originate in the districts of Klaeng in the province of Rayong and Na Yai Am in the province of Chanthaburi. The mouth of the river is located about 30 kilometers from Rayong and Chanthaburi.
- (3) The Welu River originates from the Cha-Om Mountain, Makok Mountain, and Srabap Mountain. It flows through Khlung District for about 88 kilometers, eventually emptying into the sea near Chik Island Khlung.
- (4) The Tanot River and Praket River, which together make up the Wangtanot River, flow approximately 6 kilometers to the sea near the village of Pak Nam Khaem Nu in Tha Mai District.

Chanthaburi encompasses several types of land uses. These include community areas and buildings, agricultural areas, paddy fields, field crops, perennial plants, tree crops, horticulture, pastures, animal farms, aquaculture facilities, integrated agriculture/mixed farming, forest areas, water sources, and miscellaneous areas. [41] (Table 4, Figure 18)

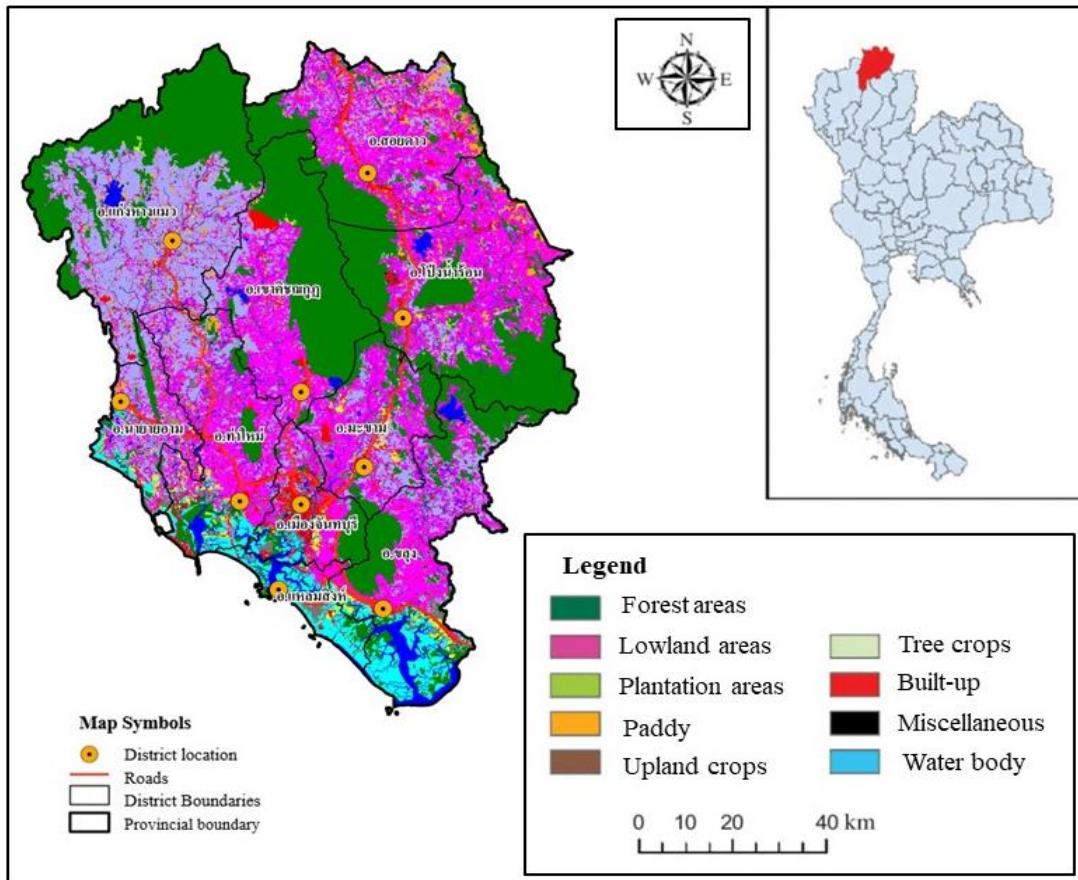


Figure 18. Map of Chanthaburi province, Thailand, showing land use classes [42]

Table 4. Types of land use in Chanthaburi Province in 2021 [41]

Type of Land Use	Area	
	Rai (1 rai = 1,600 square meters, 16 Ares, 0.16 hectares, or 0.3954 acres)	Percentage (%)
Community areas and buildings	150,582	3.79
Agricultural areas	2,265,768	57.20
Paddy field	49,474	1.25
Field crops	82,636	2.09
Perennial plants	856,188	21.61
Tree crops	1,103,172	27.86
Horticulture	8,595	0.21
Pastures and grazing houses	805	0.02
• Abandoned barn	35	-
• Grassland	106	-
• Cattle, buffalo and horse farm	39	-
• Poultry farm	381	0.01
• Pig farm	244	0.01
Aquaculture facilities	164,869	4.16
• Abandoned aquaculture facility	31,869	0.80
• Mixed aquaculture facility	9,049	0.23
• Fish farming Facility	407	0.01
• Shrimp farming facility	123,544	3.12
Integrated agriculture/mixed farming	29	-
Forest areas	1,293,738	32.67
• Evergreen forest awaiting recovery	1,252	0.03
• Evergreen forest	983,640	24.83
• Deciduous forest awaiting recovery	10,573	0.27

Type of Land Use	Area	
	Rai (1 rai = 1,600 square meters, 16 Ares, 0.16 hectares, or 0.3954 acres)	Percentage (%)
• Deciduous forest	234,679	5.93
• Mangrove forest awaiting recovery	1,110	0.03
• Mangrove forest	62,484	1.58
Water areas	138,958	3.52
• River, creek, canal	73,738	1.86
• Swamps, lakes	7,842	0.20
• Sea	14,511	0.37
• Water reservoir	25,186	0.64
• Farm pond	17,333	0.44
• Irrigation canal	348	0.01
Miscellaneous areas	112,204	2.82
Total	3,961,250	100.00

Forests cover a total of land area of 1,293,738 rai, accounting for 32.67% of the total province area. This forested land serves as a habitat for numerous species. The province is home to 276 species of birds, over 88 species of reptiles, 29 species of amphibians, 122 species of mammals, and more than 47 species of freshwater fish.

The climate in Chanthaburi province follows a tropical monsoon pattern and can be categorized into three distinct seasons :

- 1) Winter (October to mid-February): During this period, the northeast monsoon and cold air masses from China influence Thailand's weather. Due to Chanthaburi's proximity to the coast and its low altitude, the sea breeze has a strong cooling effect.
- 2) Summer (mid-February to mid-May): Although the season is characterized by hot weather, the sea breeze helps to alleviate the heat.
- 3) Rainy Season (mid-May to mid-October): This coincides with the southwest monsoon season, resulting in humid and rainy weather. The flow of humidity from the Andaman Sea through the Gulf of Thailand contributes to the abundant rainfall.

According to the National Statistical Office (2023), Chanthaburi province had a total population of 535,883 as of April 2023. Of these, 261,797 were male and 274,086 were female. In terms of administration, Chanthaburi is divided into 10 districts, 76 subdistricts, 731 villages, and 33 communities. Within these communities, there are local administrative organizations, totaling 82 organizations. These include 1 provincial administrative organization, 5 town municipalities, 42

subdistrict municipalities, and 34 subdistrict administrative organizations. Pong Nam Ron and Soi Dao districts have been selected as the study areas in Chanthaburi Province (Figure 3).

Epidemiological Information

According to the human disease surveillance reports from 2018 to 2023, most of the reported communicable disease cases were diarrhea, followed by pneumonia, influenza, HFM, food poisoning, PUO, dengue/ DHF, pulmonary tuberculosis (TB), and leptospirosis, respectively.

Numbers of VHVs and AHVs

As of May 2023, Chanthaburi PHO reported a total of 9,103 VHVs working in the province. Specifically, there were 1,124 VHVs and 47 AHVs working in Pong Nam Ron District and 684 VHVs and 70 AHVs in Soi Dao District.

Pong Nam Ron District

Pong Nam Ron is the easternmost district in Chanthaburi. Within the province, its neighboring districts are Khlung, Makham, Khao Khitchakut, and Soi Dao (clockwise from the southwest). Outside of Thailand, it borders Pailin and Battambang of Cambodia to the east. The district has two border crossings into Cambodia, as follows :

- Ban Phakkat in Klong Yai Subdistrict: This crossing connects to Phsar Prum in Sala Krau District, Pailin Province, on the Cambodian side of the border.
- Ban Laem in Thep Nimit Subdistrict: This crossing connects to Daun Lem in Kamrieng District, Battambang Province, on the Cambodian side of the border.

The district is further divided into 47 villages across the five subdistricts. Pong Nam Ron is also a township (Thesaban Tambon) encompassing areas of Thap Sai and Pong Nam Ron subdistricts. Additionally, there are five Tambon Administrative Organizations (TAOs) (Figure 19). The total population of Pong Nam Ron is 46,352 people, comprising 23,982 men and 22,370 women (Table 5) [46]

Table 5. Population by subdistrict in Pong Nam Ron District, Chanthaburi Province (as of April 2023) [41]

No.	Subdistrict (in English)	Subdistrict (in Thai)	Number of Villages	Male	Female	Total Population
1.	Thap Sai	ทับไทร	13	6,680	6,666	13,346
2.	Pong Nam Ron	ปงน้ำร้อน	9	6,567	5,358	11,925
3.	Nong Ta Khong	หนองตาคง	10	5,170	4,908	10,078
4.	Thep Nimit	ເທັນມືດ	8	2,919	2,762	5,681
5.	Khlong Yai	คลองใหญ่	7	2,646	2,676	5,322
Total			47	23,982	22,370	46,352

In addition, the district also has a international border checkpoint between Cambodia and Thailand. Goods traded across the border include agricultural products, such as mangoes and rice.

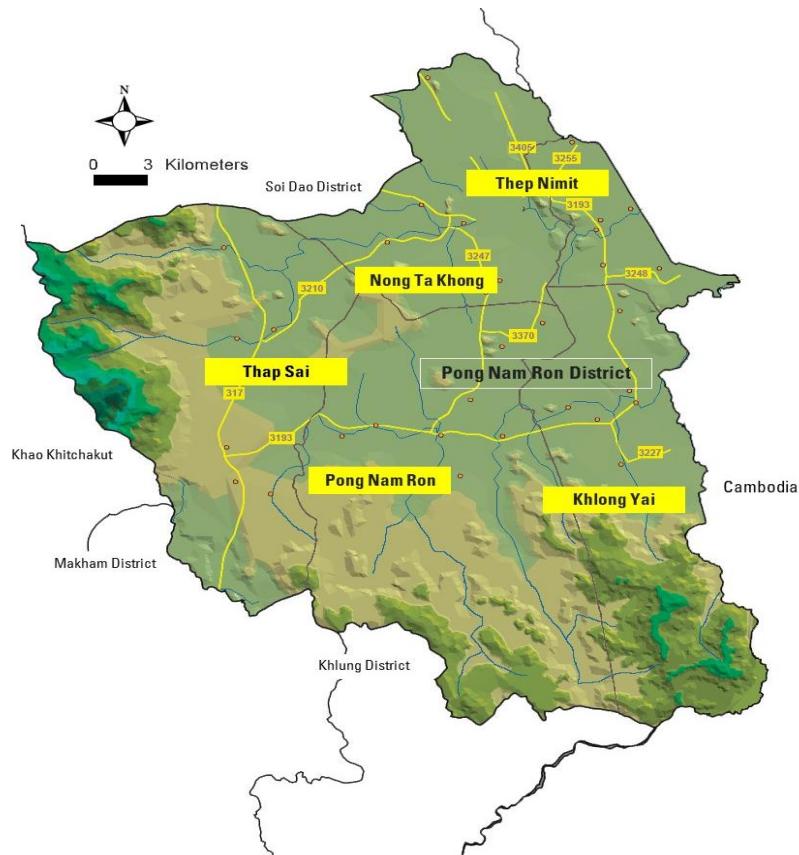


Figure 19. Map of subdistricts in Pong Nam Ron District [47]



Figure 20. Photos of the international border check-point between Cambodia and Thailand in Pong Nam Ron District, Chanthaburi Province [48]

Epidemiological Information

According to human disease surveillance reports from 2018 to 2023, diarrhea was the most commonly reported infectious disease in the district, followed by pneumonia, influenza, HFM, food poisoning, PUO, dengue/DHF, and pulmonary TB, respectively.

Selected locations in Pong Nam Ron District

- Village (Moo) No. 3 (Ban Pak Kard), Klong Yai Subdistrict: This area is home to Thais and non-registered Cambodians. The area is located in the eastern part of Chanthaburi Province, near the border with Cambodia. The Klong Yai Subdistrict is known for its diverse natural environment and picturesque landscapes. Klong Yai Subdistrict is a part of this district and likely shares similar environmental characteristics.
- Village (Moo) No. 1 (Ban Noen Din Daeng) and No. 7 (Ban Nong Kok), Thep Nimit Subdistrict, near Klong Yai: This area is home to Thais and non-registered Cambodians. Thep Nimit Subdistrict is a part of Pong Nam Ron District and shares similar environmental characteristics. The area is characterized by a mix of mountainous terrain, fertile plains, and natural water sources. It is surrounded by lush greenery and dense forests, which are important for the overall ecological health of the area and provide habitat for various plant and animal species.

There is a military shelter in the vicinity to ensure the security and well-being of the people residing along the borders with Cambodia.



Figure 21. Photos of the meeting at the military shelter in Pong Nam Ron District, Chanthaburi Province [49]

Soi Dao District

Soi Dao District is located in the north of Chanthaburi Province. Initially, Soi Dao was established as a minor district (King Amphur) on January 1, 1988, when the government subdivided Pong Nam Ron District. Later, on May 9, 1992, its status was elevated to a full-fledged district.

Soi Dao District is surrounded by the districts of Pong Nam Ron, Khao Khitchakut, and Kaeng Hang Maeo of Chanthaburi Province; and Wang Sombun and Khlong Hat of Sa Kaeo Province (clockwise from the south). The Cambodian province of Battambang is to its east. The district is further divided into 68 villages within its five subdistricts. Sai Khao serves as a township that includes areas of Sai Khao and Pa Tong Subdistricts. Additionally, there are five TAOs (Figure 22). The total population of Soi Dao District is 64,818 people, consisting of 32,525 male and 32,293 female residents (Table 6).

Table 6. Population by subdistrict in Soi Dao District, Chanthaburi Province (as of April 2023) [46]

No.	Subdistrict (in English)	Subdistrict (in Thai)	Number of Villages	Male	Female	Total Population
1.	Patong	ปะตง	11	7,695	7,821	15,516
2.	Thung Khanan	ทุ่งขanan	16	5,386	5,436	10,822
3.	Thap Chang	ทับช้าง	16	8,197	8,105	16,302
4.	Sai Khao	ทรายขาว	13	6,469	6,283	12,752
5.	Saton	ສະຕອນ	12	4,778	4,648	9,426
Total			68	32,525	32,293	64,818

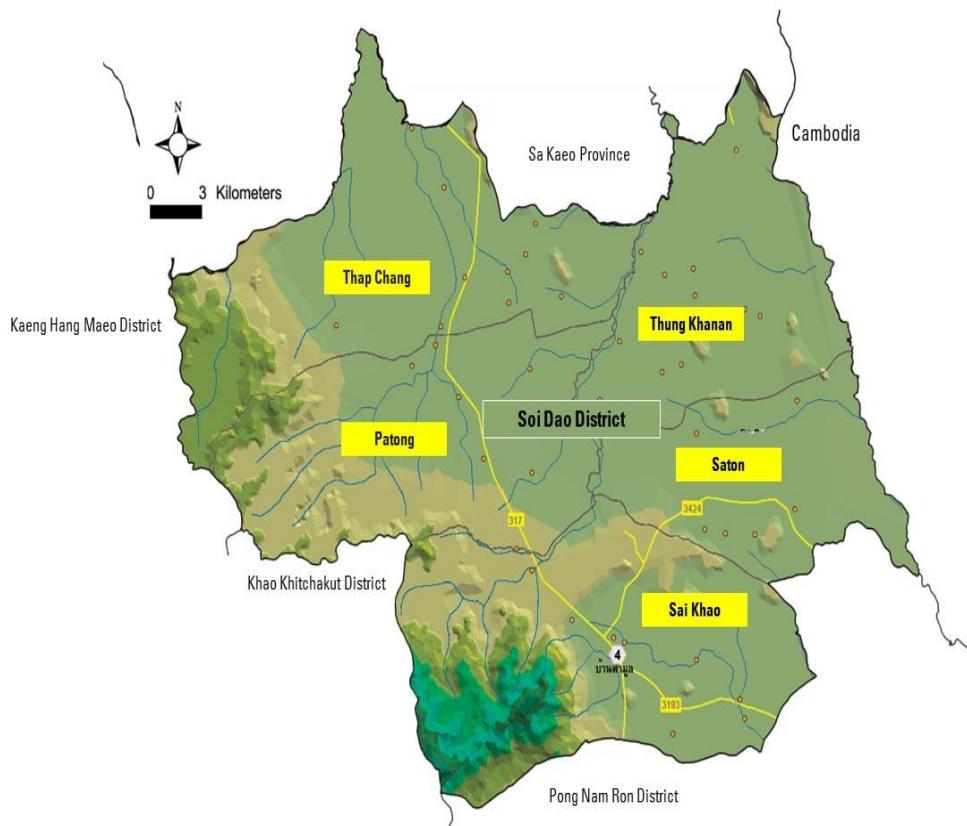


Figure 22. Map of subdistricts in Soi Dao District [52]

Epidemiological Information

Diarrhea was the most frequently reported infectious disease in the district between 2018 and 2023, followed by pneumonia, influenza, HFM, food poisoning, PUO, dengue/DHF, and pulmonary TB, respectively.

Selected locations in Soi Dao District

- Village (Moo) No. 2 (Ban Sub Tari): This area is home to Thais from eastern, northeastern, and central Thailand. The area is characterized by mountainous terrain and dense forests. The district is part of the Eastern Forest Complex, which is known for its rich biodiversity.
- Village (Moo) No. 15 (Ban Sub Tari Song): This area is home to Thais from eastern, northeastern, and central Thailand. This area is close to several national parks and conservation areas, such as the Namtok Phlio National Park and the Khao Soi Dao Wildlife Sanctuary. These protected areas preserve the natural heritage of the region and offer opportunities for eco-tourism and outdoor activities.



Figure 23: Photos of the villages and environment in Thung Khanan Subdistrict, Soi Dao District [53]

Wildlife Survey Data in Chiang Rai and Chanthaburi Provinces by DNP

DNP has provided information on wild animals as requested. The information is summarized as follows:

- **Types and number of wild animals:** Due to the absence of data collection on wild animals in Chiang Rai and Chanthaburi over the last five years, there are no available statistics on the number of wildlife populations and the types of wildlife species that are present in these provinces.
- **Diseases reported in the study locations:** No zoonotic diseases were reported in the area in the past five years. However, the DNP has been sending animal samples for disease detection in wildlife. Details of the samples submitted are as follows:
 - Fiscal year 2018
 - Birds: 12 swabs, 27 blood samples, and 28 serum samples
 - Monkeys: 10 blood samples and 10 serum samples
 - Deer: 4 blood samples and 4 serum samples
 - Fiscal year 2019
 - Birds: 13 swabs and 46 blood samples
 - Wild elephants: 1 blood sample and 1 serum sample
 - Fiscal year 2020
 - Birds: 7 swabs and 24 blood samples

Samples were sent to the National Institute of Animal Health (NIAH) and DLD. **Laboratory results indicated no significant diseases in the wild animals.**

7. Challenges and Recommendations

There are some anticipated challenges may arise during the implementation. It was observed during the scoping visits that villagers frequently cross the borders between Thailand and neighboring countries such as Lao People's Democratic Republic (Lao PDR), Cambodia, and Myanmar. They engage in trading activities including wild animal products and their markets are located near the borders. These borders are naturally controlled by law enforcements i.e., Military check points.

- **Security concerns:** The selected sites are situated along the borders of Myanmar, Lao People's Democratic Republic, and Cambodia, and there are military checkpoints (temporary roadblocks or mobile checkpoints) which can jeopardize the implementation. To ensure the safety of team members, WP1 team will work closely with the local authorities to optimize the number of persons and time for field visits.
- **Burden on local health officials:** Local health officials play a crucial role as gatekeepers. It is important to consider the number of field activities and visitors to secure their engagement.
- **Data privacy:** Health information is always a sensitive topic, there is a need to emphasize that PANDASIA will enforce Thailand's ownership of the data. This is already addressed at PANDASIA Data Management Plan.

8. Impact and Conclusion

In conclusion, several objectives of these scoping visits were successfully achieved. CUEIDAs was able to select potential sites to implement the project, obtain extensive information on the sites, and obtain agreement letters from certain stakeholders, and expecting more to come see Annex 1.

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Annex 1 – Stakeholder agreement letters

Annex 1.1. Agreement letter from Division of Epidemiology, Department of Disease Control, Ministry of Public Health

ที่ สค ๐๘๐๘.๙/๑๔๖๖



กองราชบัตรไทย กรมควบคุมโรค
ถนนติวนันท์ จังหวัดนนทบุรี ๑๑๐๐๐

๑๙ มิถุนายน ๒๕๖๖

เรื่อง ตอบรับความร่วมมือเข้าร่วมโครงการ PANDASIA

เรียน หัวหน้าศูนย์เชี่ยวชาญเฉพาะทางโรคอุบัติใหม่และโรคอุบัติขึ้นในสัตว์
อ้างถึง หนังสือศูนย์เชี่ยวชาญเฉพาะทางโรคอุบัติใหม่และโรคอุบัติขึ้นในสัตว์ ที่ อบ.๓๕/๒๕๖๖
ลงวันที่ ๗ มิถุนายน ๒๕๖๖

ตามหนังสือที่อ้างถึง เนื่องด้วยศูนย์เชี่ยวชาญเฉพาะทางโรคอุบัติใหม่และอุบัติขึ้นในสัตว์
คณะสัตวแพทย์ศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย ได้ดำเนินโครงการ “Pandemic literacy and viral
zoonotic spillover risk at the frontline of disease emergence in Southeast Asia to improve
pandemic preparedness (PANDASIA) โดยทีมผู้วิจัยได้เข้าร่วมประชุมกับเจ้าหน้าที่ผู้เกี่ยวข้องกับข้อมูล
เพื่อรับทราบจากสัตว์สู่คน กองราชบัตรไทย เมื่อเดือนพฤษภาคม ๒๕๖๖ ที่ผ่านมา เพื่อขอแจ้งรายละเอียดของ
โครงการ และได้รับความร่วมมือในการตั้งกล่าว ความลับลี้ดแล้ว นั้น

กองราชบัตรไทย มีความยินดีตอบรับเข้าร่วมโครงการ PANDASIA ซึ่งจะเริ่มดำเนินโครงการ
ตั้งแต่เดือนมิถุนายน ๒๕๖๖ ถึงเดือนธันวาคม ๒๕๖๗ เป็นระยะเวลา ๕ ปี หากทีมผู้วิจัยต้องการข้อมูลเพิ่มเติม
สามารถติดต่อได้ที่ โทร. ๐ ๒๕๘๐ ๓๘๘๘

จึงเรียนมาเพื่อโปรดพิจารณาดำเนินการต่อไปด้วย จะเป็นพระคุณ

ขอแสดงความนับถือ

(นายจักรรัฐ พิทยานันท์)
ผู้อำนวยการกองราชบัตรไทย

กลุ่มสารสนเทศทางระบบวิทยา กองราชบัตรไทย
โทร. ๐ ๒๕๘๐ ๓๘๘๘
โทรสาร ๐ ๒๕๘๐ ๓๘๘๘

Annex 1.2. Agreement letter from Chiang Rai Provincial Livestock Office



ที่ ๗๗๐๐๐

สำนักงานปศุสัตว์จังหวัดเชียงราย
เลขที่ ๘๘๕ ถนนพหลโยธิน ตำบลเวียง
อำเภอเมือง จังหวัดเชียงราย

มิถุนายน ๒๕๖๖

เรื่อง ตอบรับเข้าร่วมโครงการ PANDASIA
เรียน หัวหน้าศูนย์เชี่ยวชาญเฉพาะทางโรคอุบัติใหม่และอุบัติซ้ำในสัตว์
อ้างอิง หนังสือที่ อป ๓๖/๒๕๖๖ ลงวันที่ ๗ มิถุนายน ๒๕๖๖

ตามหนังสือที่อ้างถึง ความลับอี้ดแจ้งแล้วนั้น เนื่องด้วยศูนย์เชี่ยวชาญเฉพาะทางโรคอุบัติใหม่และอุบัติซ้ำในสัตว์ คณะสัตวแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย ได้ดำเนินโครงการ “Pandemic literacy and viral zoonotic spillover risk at the frontline of disease emergence in Southeast Asia to improve pandemic preparedness (PANDASIA)” โดยทีมผู้จัดได้เข้าพบข้าพเจ้าและเจ้าหน้าที่ผู้เกี่ยวข้อง ณ สำนักงานปศุสัตว์จังหวัดเชียงราย เมื่อเดือนมีนาคม ๒๕๖๖ ที่ผ่านมา เพื่อชี้แจงรายละเอียดโครงการฯ และได้เชิญเข้าร่วมโครงการตั้งแต่วันนั้น

ในการนี้ ข้าพเจ้าและเจ้าหน้าที่ผู้เกี่ยวข้องมีความยินดีเข้าร่วมโครงการ PANDASIA ซึ่งจะเริ่มดำเนินโครงการตั้งแต่เดือนมิถุนายน ๒๕๖๖ ถึงเดือนธันวาคม ๒๕๗๐ เป็นระยะเวลา ๔ ปี หากทีมผู้จัดต้องการข้อมูลเพิ่มเติม สามารถติดต่อได้ที่เบอร์โทรศัพท์ ๐๕๓ ๗๗๑ ๖๐๔ แฉล ๐๕๓ ๗๗๔ ๙๗๔

จึงเรียนมาเพื่อโปรดพิจารณาดำเนินการต่อไปด้วย จักขอบคุณยิ่ง

ขอแสดงความนับถือ

(นายพีระพล น้อยนาฝ่าย)
ปศุสัตว์จังหวัดเชียงราย

สำนักงานปศุสัตว์จังหวัดเชียงราย
โทรศัพท์ ๐๕๓ ๗๗๑ ๖๐๔ แฉล ๐๕๓ ๗๗๔ ๙๗๔
โทรสาร ๐๕๓ ๗๗๑ ๖๐๔

Annex 1.3. Agreement letter from Chanthaburi Provincial Livestock Office

ที่ จบ ๐๐๐๔/ ๒๐๒๔



สำนักงานปศุสัตว์จังหวัดจันทบุรี
ถนนท่าแหลม จบ ๒๕๐๐๐

๑๗ มิถุนายน ๒๕๖๖

เรื่อง การดำเนินโครงการ PANDASIA

เรียน หัวหน้าศูนย์เชี่ยวชาญเฉพาะทางโรคอุบัติใหม่และอุบัติซ้ำในสัตว์

อ้างถึง หนังสือที่ อบ ๓๗/๒๕๖๖ ลงวันที่ ๗ มิถุนายน ๒๕๖๖

ตามหนังสือที่ อ้างถึงศูนย์เชี่ยวชาญเฉพาะทางโรคอุบัติใหม่และอุบัติซ้ำในสัตว์ คณะกรรมการฯ ได้ดำเนินโครงการ “Pandemic literacy and viral zoonotic spillover risk at the frontline of disease emergence in Southeast Asia to improve pandemic preparedness (PANDASIA) ” ในพื้นที่จังหวัดจันทบุรี นั้น

สำนักงานปศุสัตว์จังหวัดจันทบุรี ยินดีให้การสนับสนุนการดำเนินโครงการ PANDASIA ดังกล่าว หากทีมผู้วิจัยต้องการข้อมูลโดยสามารถประสานงานงานนายนักรกิจ พลศรี หัวหน้ากลุ่มพัฒนาสุขภาพสัตว์ เบอร์โทร ๐๘๙ - ๘๔๔๘๘๘๕

จึงเรียนมาเพื่อโปรดทราบ

ขอแสดงความนับถือ


(นายชาติชาย ยิ่มเครือ)
ปศุสัตว์จังหวัดจันทบุรี

กลุ่มพัฒนาสุขภาพสัตว์
โทรศัพท์ ๐๓๘ ๓๓๒ ๖๐๑
E-Mail : Pvlo_ctr@dld.go.th

Annex 2 –Locations and Contact Information of Forest and Conserved Areas

Chiang Rai Province

1. **Khun Chae National Park.** Address: Mae Chedi Mai Subdistrict, Wiang Pa Pao District, Chiang Rai Province 57260. Tel: 0 5372 7369, 084 366 5213
2. **Doi Luang National Park.** Address: Mae Yen Subdistrict, Phan District, Chiang Rai Province 57280, Tel: 0 5316 3363, 081 960 2456
3. **Tham Luang - Khun Nam Nang Non-National Park.** Address: Ban Jong Village, Moo 9, Pong Pha Subdistrict, Mae Sai District, Chiang Rai Province, Tel: 083 753 2431
4. **Phu Chi Fa National Park.** Address: 43/1 Moo 24, Tap Tao Subdistrict, Thoeng District, Chiang Rai Province, Tel: 084 807 9848
5. **Lam Nam Kok National Park.** Address: Doi Hang Subdistrict, Muang Chiang Rai District, Chiang Rai Province 57000.

Chanthaburi Province

1. **Khao Khitchakut National Park.** Address: Khao Khitchakut National Park, Phluang Subdistrict, Khao Khitchakut District, Chanthaburi Province 22210, Tel: 0 3960 9666 (office), 0 3960 9672 (Visitor Center).
2. **Khao Sip Ha Chan National Park.** Address: Khao Sib Ha Chan National Park, Pong Ket Subdistrict, Khun Song Subdistrict, Kaeng Hang Maeo District, Chanthaburi Province 22160, Tel: 098 927 1499
3. **Namtok Phlio National Park.** Address: 41 Moo 12, Phlio Subdistrict, Laem Sing District, Chanthaburi Province 22190, Tel: 0 3943 4528.
4. **Khao Soi Dao Wildlife Sanctuary.** Address: Khao Soi Dao Wildlife Sanctuary, Sai Khao Subdistrict, Soi Dao District, Chanthaburi Province 22140, Tel: 0 3936 4420
5. **Khao Ang Rue Nai Wildlife Sanctuary.** Address: Khao Ang Rue Nai Wildlife Sanctuary, P.O. Box 4, Sanam Chai Khet District, Chachoengsao Province 24160, Tel: 0 3850 2001.
6. **Khlong Krua Wai Chaloem Phrakiat Wildlife Sanctuary.** Address: Khlong Krua Wai Chaloem Phrakiat Wildlife Sanctuary, P.O. Box 9, Makham Post Office, Makham District, Chanthaburi Province 22150, Tel: 081 003 1164



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UNIVERSITY



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und Wildforschung
IM FORSCHUNGSVERBUND BERLIN E.V.



Chula
Chulalongkorn University



มหาวิทยาลัยขอนแก่น
KHON KAEN UNIVERSITY



Mahidol University
Wisdom of the Land

