



# **MONITORING OF INFRASTRUCTURE IMPACTS ON BIODIVERSITY OF NAM HA NATIONAL PROTECTED AREA, LAO PDR**

**Final Report**

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# **MONITORING OF INFRASTRUCTURE IMPACTS ON BIODIVERSITY OF NAM HA NATIONAL PROTECTED AREA, LAO PDR**

## **EXECUTIVE SUMMARY**

The Capacity Building for Biodiversity Impact Assessment (CBBIA) - Small Grants Programme provided funding for “Monitoring of Infrastructure Impacts on Biodiversity of Nam Ha National Protected Area”, a project implemented by IUCN in Lao PDR. The project consisted of a training workshop on monitoring the impacts of roads on protected areas and wildlife in the Nam Ha National Protected Area (NPA) in Louang Namtha Province. This training workshop supplemented the work that IUCN has been doing with the Northern Economic Corridor Project (R3). This project aims to further develop National Route 3 to connect China to Thailand via northern Lao, and by way of the Nam Ha NPA. The Environmental Research Institute (ERI), under the Science, Technology and Environment Agency (STEA) is the third party monitor for this project. IUCN is providing technical support to build ERI's capacity to undertake this task and assist it in meeting its third party monitoring responsibilities. To supplement the training to central-level staff covered under the existing project, IUCN is helping with specific training on biodiversity monitoring related to the road construction for relevant protected area managers, and provincial level and key central-level officials.

A four-day training workshop was conducted by IUCN between 13<sup>th</sup>-16<sup>th</sup> November 2005, in Luang Namtha, within the Nam Ha NPA. A resource manual was prepared with relevant theoretical information, including monitoring checklists and guidelines, to facilitate the training. A group of 13 participants from the central and provincial government agencies attended the training, which included interactive lectures, participatory discussions to share lessons learned, field visits in Nam Ha NPA and group exercises. Outputs from the workshop included an upgraded resource manual and other supplementary materials relating to the biodiversity of Nam Ha NPA. The training programme has helped develop the capacity amongst protected area staff and local officials to monitor the biodiversity impacts of road development projects in and around Nam Ha Protected Area. Participants were able to gain knowledge on the biodiversity (habitats, vegetation types and species etc) of Nam Ha NPA, and learn data recording and reporting techniques, as well as formats for biodiversity monitoring. They were also able to assess potential impacts on Nam Ha NPA from road related infrastructure development. The checklists and monitoring plans prepared by the resource personnel were field tested by the participants in Nam Ha NPA. The most important outcome of the training was that key partners from the central level of the government are now able to conduct future training programmes for officials of provincial authorities.

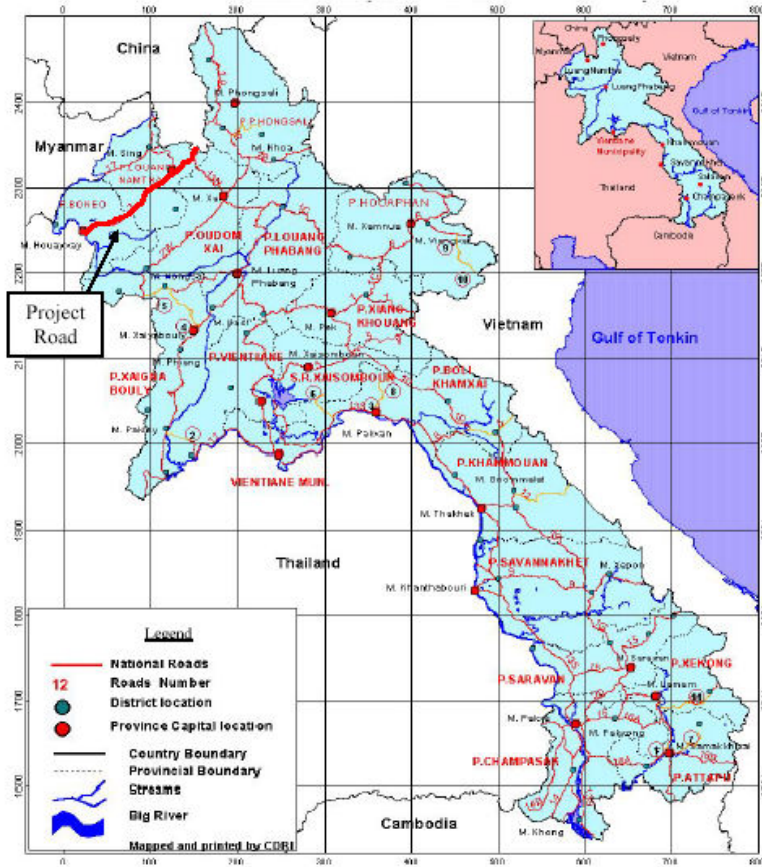
# **MONITORING OF INFRASTRUCTURE IMPACTS ON BIODIVERSITY OF NAM HA NATIONAL PROTECTED AREA**

## **1 BACKGROUND**

Transport in the People's Democratic Republic of Lao (Lao PDR) is almost exclusively road-based, with the road network supporting 90% of the freight and 85% of passenger traffic. The public road network in Lao is divided into several different classes of roads, covering about 26,000km, of which only 18% is paved. The Ministry of Communication, Transport, Post and Construction (MCTPC) is the main authority responsible for the development of national and provincial roads in Lao. The Department of Roads (DoR) within MCTPC is charged with the administration, planning, construction and maintenance of national and provincial roads. The Environment and Social Division (ESD), a division of DoR, has the prime responsibility for ensuring that all DoR projects meet social and environmental requirements.

The Northern Economic Corridor Project (R3) aims to improve the existing road linking the two remote provinces of Lao PDR with the Yunnan province of the Peoples' Republic of China (PRC) and Chiang Rai in Thailand. It is expected that the road will facilitate trade and investment in the entire region and will contribute to enhancing incomes and employment generating activities (Anonymous, 2005).

The project road is currently an unpaved seasonal road known as National Route 3, in the northern provinces of Louang Namtha and Bokeo. It connects Houayxay on the Mekong River with Boten on the border with PRC (Figure 1.1). The area of influence is potentially large and covers a population of about 42-million in the immediate provinces. The components of the R3 Project include the Thai funded section from 0km to 84km, the Asian Development Bank (ADB) funded section from 84km to 158km, and the PRC funded section from 158km to 228km. The Project road passes through 94 villages and towns with an overall population of about 56,000. Of these villages, 71 have more than 37% of households classified as poor. The average incidence of poverty in the project area (on a population basis) is 46.6%, which is significantly higher than the national average. The primary impact zone under the Project influence covers Namtha and Viangphoukha Districts in Louang Namtha Province, and Houayxay District in Bokeo Province. Nearly 2% of the country's poor and 17% of the Northern Region's poor reside in these three districts.



**Figure 1.1: The Project Road (R3) in Northern Lao PDR.**

The road project area includes Nam Ha, one of the country’s 20 National Protected Areas (NPAs), Bokeo’s Nam Kan Provincial Protected Area, several district level protected areas and village level conservation forests. Nam Ha NPA was officially gazetted to include extensions of Nam Ha West, the former Nam Kong Provincial protected area to the existing Nam Ha East NPA (officially since 1993), making it a contiguous protected area with an adjoining reserve in Yunnan Province of PRC (see Figure 1.2). The road has been in existence for a long time, but with these extensions it now passes through Nam Ha NPA. While the area under protection is substantial and covers nearly 222,400ha, all NPAs including Nam Ha NPA are in reality multiple use areas that are being utilised for agriculture, fishing, hydropower, commercial non-timber forest product harvesting, and sometimes timber harvesting. None are strictly protected national parks as found in some other countries (Anonymous, 2005).



funding. The project was carried out in 2005 and completed successfully in November, and this final report highlights the activities and outputs of the project.

## **2 OBJECTIVES OF THE PROJECT**

The training designed by IUCN was intended to achieve the following objectives:

- Build capacity for natural resources planning and management at the central and local government level and site level.
- Train protected area staff and local officials in methods for designing monitoring plans, analysing data and reporting findings.
- Provide participants with the knowledge necessary to prepare and implement a plan for monitoring the impacts of roads on nature and wildlife (biodiversity) during the construction period, as well as during the operation period.
- Familiarise the participants with the main aspects of monitoring the impacts of road use on nature and wildlife (biodiversity).
- Train trainers from central level STEA and Ministry of Agriculture (MAF) staff so that in future they can carry out similar training programmes in natural resource planning and management.

## **3 APPROACHES AND METHODS USED TO CONDUCT THE TRAINING**

The training programme was planned and designed to achieve the above objectives, subsequent to a discussion with ERI officials on specific training needs. A four-day training was conducted in Louang Namtha, within the Nam Ha NPA (see Appendix 1 for training schedule). The training was conducted by Dr Channa Bambaradeniya (Ecologist/Biodiversity Specialist) and Mr Asheem Srivastav (Protected Area Management and Wildlife Conservation Specialist) with assistance from Mr Phaivanh Phiapalath (Ecologist/Natural Resource Management Specialist). A resource manual was prepared with relevant information, including monitoring checklists and guidelines, to facilitate the training (see Appendix 2 for resource manual). The technical information presented in the training manual was based on personnel experience of the resource personnel, supplemented with published sources (including Rajvanshi *et al.*, 2001 and Sherwood *et al.*, 2002). The training focused on the following components:

- Background and context – significance of protected areas:
  - planning, location and design of roads in protected areas;
  - ecologically sensitive habitats;
  - threatened species; and
  - impacts of road development on biodiversity (direct, indirect and cumulative impacts).
- Monitoring of impacts – monitoring principles and framework; selecting priority areas; impact observations in the field; baselines, standards and indicators; monitoring procedures; data analysis and reporting.
- Mitigation measures (at planning, construction and operation stages).

The four-day training programme included interactive lectures, participatory discussions to share lessons learned, field demonstrations and observations in Nam Ha NPA, and group exercises. Apart from the training manual, the supplementary resource material provided included the following documents:

- Report on the biodiversity of Nam-Ha NPA (including checklists of species).
- List of globally endangered plants and animals in Lao PDR (extracted from IUCN Global Redlist of 2004).
- IUCN protected area management categories.
- Monitoring checklists/datasheets.

## 4 OUTPUTS AND RESULTS

The workshop was attended by 13 participants representing the Central and Provincial Government Departments (see Appendix 3 for list of participants). The specific outputs of the training programme are highlighted below:

- Upgraded Resource Manual on *Implications of roads on protected areas and wildlife management* (see Appendix 2 for details).
- Upgraded checklists/monitoring plans to facilitate the proper design of roads and document environmental issues related to construction of roads in and around protected areas (See Appendix 4 'checklists' for details).

As a result of the training programme protected area staff and local officials are able to monitor the biodiversity impacts of road development projects in and around Nam Ha Protected Area. In particular, the training provided:

- Enhanced knowledge among participants on the biodiversity (habitats, vegetation types, species etc.) of Nam Ha NPA.
- Data recording and reporting techniques and formats for biodiversity monitoring.
- An assessment, by the participants, of potential impacts on Nam Ha NPA from road related infrastructure development (Table 4.1).
- Field tested checklists and monitoring plans.
- Lists of mitigation measures, baselines and monitoring indicators for Nam Ha NPA, which were evaluated and prepared by participants.

In addition, key partners from the Central level (STEA/ERI; MAF) are now able to conduct future training programmes for officials of provincial authorities.

**Table 4.1. List of potential road related impacts on Nam Ha NPA, identified by training workshop participants, with a proposed actions for mitigation of impacts**

Impact	Proposed actions for mitigation
(A) Direct Impacts	
Habitat degradation	Educate the contractors and labourers to avoid unnecessary clearing of forest
Direct loss of vegetation	Replant native vegetation in excessively degraded sites
Soil erosion/land slides	Create terraces in steep slopes, and plant suitable vegetation to avoid erosion
	Incorporate retaining walls, gabions, and the

Impact	Proposed actions for mitigation
<p>Sedimentation/situation of aquatic habitats</p> <p>Injury/animal mortality (due to road accidents)</p> <p>Deliberate killing of wildlife by labourers (for consumption)</p> <p>Disturbance to wildlife (due to noise and movement of people/traffic)</p>	<p>like as needed</p> <p>Avoid construction of major earthworks such as culverts and other drainage structures during the rainy season</p> <p>Rehabilitate soil dumps via terracing and re-vegetation with indigenous species</p> <p>Create sediment traps near aquatic habitats</p> <p>Avoid tipping soil directly into gullies or water courses or over the edge of the road</p> <p>Place warning signs in locations where animals cross frequently (including migratory pathways)</p> <p>Create tunnels at appropriate locations under the road to facilitate the movement of ground dwelling reptiles and small mammals</p> <p>Instruct the contractors and labourers to avoid hunting/trapping of wildlife during the construction phase</p> <p>During construction avoid intrusive noise generation at sensitive locations and during the night (8.00pm – 5am); regulate the movement of traffic during night</p>
<p>(B) Indirect impacts</p> <p>Micro-climatic changes (drying of habitat on either side of road)</p> <p>Barrier affects (hinder/prevent/reduce movement of wildlife, especially the less mobile forms)</p> <p>Spread of invasive alien species (IAS)</p> <p>Increased grazing by domestic livestock</p> <p>Emigration of people into buffer zone/illegal encroachers</p> <p>Expansion of shifting cultivation</p> <p>Increased logging activities, wildlife trade, over-exploitation of non-timber forest products</p> <p><b>Discharge of road wash containing oil/grease</b></p>	<p>Restore degraded areas</p> <p>Create suitable habitat links (culverts, canopy rope bridges etc.)</p> <p>Regular monitoring of IAS through road transects, and early eradication of newly established IAS</p> <p>Regulate the movement of livestock within the NPA; identify suitable grazing areas outside the core area</p> <p>Villagers should be advised to keep their livestock under managed/captive conditions</p> <p>Establish boundaries of the NPA, according to a clear zoning plan; carry out regular patrols and enforce legislation if necessary</p> <p>As above</p> <p>As above</p> <p>Construct appropriate engineering structures to avoid road wash entering directly into aquatic habitats</p>

## **5 CONCLUSIONS AND THE WAY FORWARD**

Training exercises such as carried out under this project are an essential tool in building the knowledge base and capacity of national staff involved in Environmental Impact Assessments (EIAs). This training course enhanced understanding of how infrastructure projects affect biodiversity and ways that these impacts can be identified and managed.

Application of the techniques learned in this training course will be applied by provincial officials under the third party monitoring for the Northern Economic Corridor Project. The protected area staff will use the checklists prepared under the training to monitor road related conservation issues in Nam Ha NPA, with the assistance and support of IUCN. The key central level officials from STEA and MAF will closely follow up on the monitoring activities implemented by provincial officials. They will also use the upgraded training curriculum to conduct future training programmes.

The resource manual and the checklists developed for the training programme could be replicated elsewhere in the region, to develop the capacity of relevant personnel and help monitor road related impacts on protected areas and wildlife.

The main knowledge gap identified during this exercise was the inadequate understanding of many participants on theoretical aspects of biodiversity (species richness, ecosystems, habitats etc). Some also lacked a general understanding of EIA. It was also observed that many participants lacked educational backgrounds related to these areas. This gap helped highlight the most important issues that needed to be addressed over the four days including: explaining the interconnected nature of ecosystems; the value of biodiversity; and how to integrate biodiversity conservation concerns into road development activities at the planning, implementation and post monitoring stages.

While the training exercise sought to address these issues, this gap in basic knowledge was viewed as a key constraint and beyond the scope of this project's training programme. It highlights the importance of viewing such exercises within the wider in-country capacity building context and the need to ensure long-term benefits and continuity by encouraging institutions to send the participants to successive training events so that the skills learned can be practiced and built upon. Future training sessions will also help facilitate continued strengthening of relationships and collaborative planning amongst involved institutions.

The limited time available for the training under this project was identified as a constraint by the participants and can also be linked to the biology knowledge gap. It is suggested that future training programmes consider 1-2 additional days to provide the participants with some theoretical aspects of biodiversity and conservation. Extra time would also allow a greater emphasis on field based training which would be beneficial to both decision making and technical level staff.

IUCN Lao plans to encourage and assist the participants in practicing the skills they learned during the Nam Ha training in future quarterly monitoring missions for the Northern Economic Corridor Project.

## 6 REFERENCES

Anonymous (2005). *Northern Economic Corridor Project (R3) Environmental Monitoring Inception Report*. IUCN Lao and the Environment Research Institute of the Science, Technology and Environment Agency of Government of Lao PDR. (Unpublished Report).

Rajvanshi, A. Mathur, V. B., Teleki, G. C. and Mukherjee, S. K. (2001) *Roads, Sensitive Habitats and Wildlife : Environmental Guideline for India and South Asia*. Wildlife Institute India.

Sherwood, B. Cutler, D. and Burton, J. (2002) *Wildlife and Roads: The Ecological Impact*. Imperial College Press, London.

## APPENDIX 1: TRAINING SCHEDULE

Date/Time	Topic/Activity
<p><b>13<sup>th</sup> November</b> Morning 9.00am – 10.30am</p> <p>11.00-12.30noon</p> <p>Afternoon 2.00-4.00pm</p>	<ul style="list-style-type: none"> <li>• General introductions</li> <li>• Brief Introduction to the training course (objective etc.)</li> <li>• Expectations of participants</li> </ul> <p><b>Classroom Lectures</b> Protected areas and their significance <i>(Asheem Srivastav)</i></p> <p><b>Classroom Lectures</b> Planning, location and design of roads in protected areas <i>(Asheem Srivastav)</i> Ecologically sensitive habitats (<b>Channa Bambaradeniya</b>)</p> <p>Field reconnaissance survey on newly constructed road through Nam Ha NPA</p>
<p>4.00-7.00pm</p> <p><b>14<sup>th</sup> November</b> Morning (9.00am – 12.30pm)</p> <p>Afternoon (2.00-5.00pm)</p>	<p><b>Classroom Lectures</b> Impact of roads in protected areas (Channa Bambaradeniya) Monitoring of road related impacts (<b>Channa Bambaradeniya</b>)</p> <p><b>Group Exercise</b> Impact of road construction on the biodiversity of Nam Ha NPA (based on observations made during field reconnaissance visit to Nam Ha NPA)</p> <p><b>Classroom Lectures</b> Mitigation of road related impacts (<b>Channa Bambaradeniya</b>)</p> <p>Environmental checklists to monitor road related impacts on Nam Ha NPA <i>(Asheem Srivastav)</i></p>
<p><b>15<sup>th</sup> November</b> (7.00am-5.00pm)</p> <p>16<sup>th</sup> November (8.30am-1.00pm)</p>	<p>Field visit to Nam Ha NPA (Field Practical on use of checklists for monitoring)</p> <p>Group presentations on field exercise carried out in Nam Ha NPA</p> <p><b>Classroom Lecture</b> EIA of road projects <i>(Asheem Srivastav)</i></p>

## APPENDIX 2: UPGRADED RESOURCE MANUAL

The upgraded resource manual includes the following information and is available in hardcopy or on CD:

### Presentations:

- *Impact of Roads on Protected Areas and Wildlife* - Dr Channa Bambaradeniya (IUCN) at Workshop on Implications of Roads on Protected Areas and Wildlife Management, Luang Nam Tha, Lao PDR (Nov, 2005).
- *Ecologically Sensitive Habitats* - Dr Channa Bambaradeniya (IUCN) at Workshop on Implications of Roads on Protected Areas and Wildlife Management, Luang Nam Tha, Lao PDR (Nov, 2005).
- *Methods to Monitor Road-related Conservation Issues* - Dr Channa Bambaradeniya (IUCN) at Workshop on Implications of Roads on Protected Areas and Wildlife Management, Luang Nam Tha, Lao PDR (Nov, 2005).
- *Mitigation of Road-Related Impacts on PA's and Wildlife* - Dr Channa Bambaradeniya (IUCN) at Workshop on Implications of Roads on Protected Areas and Wildlife Management, Luang Nam Tha, Lao PDR (Nov, 2005).
- *What is a Protected Area?* – Mr Asheem Srivastav (IUCN), at Workshop on Implications of Roads on Protected Areas and Wildlife Management, Luang Nam Tha, Lao PDR (Nov, 2005).
- *What is Environmental Assessment* – Mr Asheem Srivastav (IUCN), at Workshop on Implications of Roads on Protected Areas and Wildlife Management, Luang Nam Tha, Lao PDR (Nov, 2005).
- *Planning, location and design of roads in PAs* - Mr Asheem Srivastav (IUCN), at Workshop on Implications of Roads on Protected Areas and Wildlife Management, Luang Nam Tha, Lao PDR (Nov, 2005).

### Publications:

- *Training manual for the workshop on implications of roads on protected areas and wildlife management* - Asheem Srivastav and Dr Channa Bambaradeniya.
- Hedemark, M. & Vongsak, U. (2002), *Wildlife Survey of the Nam Ha National Protected Areas Luang Namtha Province Lao PDR*. A Report for the Luang Namtha Provincial Agriculture and Forestry Office and the Wildlife Conservation Society. WCS-Lao Program Lao PDR. (Lao version).

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\* To obtain the resource manual please contact the IUCN Lao PDR office via email: [info@iucnlao.org](mailto:info@iucnlao.org) or phone: +856 21 216401

### APPENDIX 3: LIST OF TRAINING WORKSHOP PARTICIPANTS

Name	Position	Institution	Contacts
Mr. Phaivanh Phiapalath	Pro. Officer	IUCN Lao	216401/216127
Dr. Channa Bambaradeniya	Coordinator-Species Prog.	IUCN ARO	216401/216128
Mr. Virasith Phomsouvanh	Staff	ERI/STEA	5679426
Mr. Lixoun Seuangkinkeo	Staff	SET	5195388
Mr. Douangphet Selitham	Head of STEO	STEO Bokeo	5883189
Mr. Somvanh Nabounpheng	Deputy head	STEO of Louangnamtha	9890058/ 086 211593
Ms. Sonenathy Phakhounlouang	Technical officer	MCTPC/DOR	5649947
Mr. Saleumsack Xayamonh	Technical officer	ERI/STEA	5685286
Mr. Phetdalone Souphaly	Technical officer	ERI/STEA	5696084
Mr. Khanthong Xayxomphou	Engineer	DCTPC/Namtha	5786495
Mr. Somme	Staff	LNT Protected area	5488776
Mr. Chanhay Huangphuya	Engineer	IED	5886097
Mr. Somkou Sinlormany	Staff	LNT Forestry	086 211050
Mr. Somsai Thippavanh	Technical officer	Bokeo PAFD	5684023/084 211510
Mr. Thavone Vongphosy	Head of TPM	ERI/STEA	2400289
<b>Mr. Asheem Srivastav</b>	Program Co-ordinator (ELG2)	IUCN ARO	216401/216127

## **APPENDIX 4: CHECKLISTS**

The following checklists are provided in a separate annex to this report

- Appendix 4(a): Checklist for selection of the best road development option (during pre-development phase).
- Appendix 4(b): Status of existing threats within the area selected for road development.
- Appendix 4(c): Status of ecosystems/habitats within the area selected for road development.
- Appendix 4(d): Monitoring of relevant aspects to facilitate planning and location of roads (fill only the blank rows).
- Appendix 4(e): Disturbance matrix for a proposed road.
- Appendix 4(f): Monitoring of potential environmental impacts related to road development, during different phases.
- Appendix 4(g): Monitoring of potential impacts related to road development on wildlife, during different phases.
- Appendix 4(h): Evaluation of mitigation measures taken to avoid and/or reduce environmental impacts.

## **APPENDIX 5: ERI THIRD PARTY MONITORING**

ERI's responsibilities include:

- Organizing field monitoring missions.
- Coordinating with all project partners (before and during the mission) for smooth operation of monitoring missions.
- Ensuring a conducive work and learning environment for all partners.
- Undertaking the monitoring missions while maintaining professional standards as agreed upon between all parties.
- Maintaining objectivity and neutrality in assessments in line with its role as a Third Party Monitor (TPM).
- Preparing monitoring mission reports in collaboration with IUCN.
- Submitting outputs as per an agreed schedule.

## **APPENDIX 6: LIST OF ACRONYMS**

ADB	Asian Development Bank
CBBIA	Capacity Building on Biodiversity Impact Assessment
DoR	Department of Roads
ERI	Environmental Research Institute
ESD	Environmental and Social Division
GoL	Government of Lao
IAIA	International Association for Impact Assessment
IAS	Invasive Alliance Species
IUCN	The World Conservation Union
Lao PDR	Lao People's Democratic Republic
LNT	Luang Namtha (province)
MAF	Ministry of Agriculture and Forestry
MCTPC	Ministry of Communication and Transportation, Post and Construction.
MCTPC	Ministry of Communication, Transport, Post and Construction
NBCA	National Biodiversity Conservation Area
NECP	Northern Economic Corridor Project
NPA	National Protected Area
PAFO	Provincial Agriculture and Forestry Office
PRC	People's Republic of China
PSTEA	Provincial Science, Technology and Environment Agency
STEA	Science, Technology and Environment Agency