

**Nepal Electricity Authority  
Engineering Services**

**Study of Monkey in Hetauda – Dhalkebar – Duhabi  
400 kV Transmission Line Project Area**



Submitted to:

**Hetauda- Dhalkebar- Duhabi 400 kV  
Transmission Line Project**

*Submitted By:*

**ENVIRONMENT AND SOCIAL STUDIES DEPARTMENT**

**Kharipati, Bhaktapur**

Telephone : +977 1 6611580; Fax: +977 1 6611590

E-mail: [neaessd@wlink.com.np](mailto:neaessd@wlink.com.np)

June, 2013

# **Nepal Electricity Authority Engineering Services**

**Darbar Marga, Kathmandu**

*Submitted By:*

**ENVIRONMENT AND SOCIAL STUDIES DEPARTMENT**

**Kharipati, Bhaktapur**

Telephone : +977 1 6611580; Fax: +977 1 6611590

E-mail:neaessd@wlink.com.np

**June, 2013**

**Acronyms / Abbreviation**

|                |   |
|----------------|---|
| ADB            | Asian Development Bank                                    |
| asl            | above the sea level                                       |
| BZCF           | Buffer Zone Community Forest                              |
| BZCFUG         | Buffer Zone Community Forest Users Group                  |
| CFUG           | Community Forest User Group                               |
| cm             | centimeter  |
| DBH            | Diameter in Breast Height                                 |
| EPR            | Environment Protection Regulation                         |
| ESSD           | Environment and Social Studies Department                 |
| FGD            | Focus Group Discussion                                    |
| GoN            | Government of Nepal                                       |
| GPS            | Geographical Positioning System                           |
| GTZ            | German Technical Assistance                               |
| IEE            | Initial Environmental Examination                         |
| Km             | Kilo meter  |
| KTWR           | Koshi Tappu Wildlife Reserve                              |
| kV             | Kilo Volt   |
| m              | meter   |
| M <sup>2</sup> | Square meter  |
| NEA            | Nepal Electricity Authority                               |
| NESS (P) Ltd.  | Nepal Environmental & Scientific Services Private Limited |
| NPC            | National Planning Commission                              |
| TL             | Transmission Line   |
| ToR            | Terms of Reference  |
| VDC            | Village Development Committee                             |
| WR             | Wildlife Reserve  |

## Table of Contents

### Acronyms / Abbreviation

|            |   |                                     |
|------------|---|-------------------------------------|
| <b>1.0</b> | <b>BACKGROUND</b> .....   | <b>1</b>                            |
| <b>2.0</b> | <b>PROJECT DESCRIPTION</b> .....                                      | <b>1</b>                            |
| <b>3.0</b> | <b>SCOPE OF SERVICES</b> .....  | <b>1</b>                            |
| <b>4.0</b> | <b>METHODOLOGY FOLLOWED DURING THE STUDY</b> .....                    | <b>2</b>                            |
| 4.1        | LITERATURE REVIEW.....  | 2                                   |
| 4.2        | QUESTIONNAIRE SURVEY .....  | 2                                   |
| 4.3        | DIRECT OBSERVATION.....   | 3                                   |
| 4.3.1      | Line transects .....  | 3                                   |
| 4.4        | HABITAT SURVEY .....  | 3                                   |
| 4.5        | MONKEY POPULATION AND BEHAVIOR WITH TRANSMISSION CABLES, TOWERS ..... | 3                                   |
| 4.6        | MATERIALS .....   | 4                                   |
| <b>5.0</b> | <b>RESULTS</b> .....  | <b>5</b>                            |
| 5.1        | HETAUDA BLOCK.....  | 6                                   |
| 5.1.1      | Habitat .....   | 6                                   |
| 5.1.2      | Primate Population .....  | 7                                   |
| 5.2        | Bardibash Block.....  | 9                                   |
| 5.2.1      | Habitat .....   | 9                                   |
| 5.2.2      | Primate Population .....  | 9                                   |
| 5.3        | Koshi Tappu Block.....  | 11                                  |
| 5.3.1      | Habitat .....   | 11                                  |
| 5.3.2      | Primate Population .....  | 12                                  |
| <b>6.0</b> | <b>CONCLUSION</b> .....   | <b>13</b>                           |
|            | RELEVANT REFERENCES:.....   | 14                                  |
| <b>7.0</b> | <b>TEAM COMPOSITION</b> .....   | <b>ERROR! BOOKMARK NOT DEFINED.</b> |

### Appendix

**Appendix I:** Survey Questionnaire (Individual)

**Appendix II:** A. Focus Group Discussion at Hetauda Block

B. Individual and Household Interviews at Hetauda Block

C. Focus Group Discussion at Bardibash Block

D. Individual and Household Interviews at Bardibas Block

E. Focus Group Discussion at Koshi Block

F. Individual and Household Interviews at Koshi Block

**Appendix III:** List of contacted Community Forest Users Group

**Appendix IV:** A. Forest sampling at Hetauda Block

B. Forest sampling at Bardibas Block

C. Forest sampling at Koshi Block

**Appendix V:** Photo plates of different activities in the field a. Hetauda, b.Bardibas c. Koshi

## 1.0 Background

Nepal Electricity Authority, Transmission Line and Substation Construction Department intend to construct Hetauda- Dhalkebar- Duhabi 400 kv Transmission Line Project. The IEE study of the proposed project was conducted by Environment and Social Studies Department (ESSD) as per the Environment Protection Rule (EPR) 1997 and World Bank Guideline. The IEE study document the presence of monkey at some of the localities in transmission line. Since transmission line passes about 40% forest area in its total length the impacts on monkey has been envisaged in IEE report but more specific and detail study on the monkey species found in the area is required to fulfill the World Bank requirement. This report has been prepared as per the requirements stipulated by the MOU between the Project and Environment and Social Studies Department (ESSD) of Nepal Electricity Authority (NEA) for conducting Study of monkey in Hetauda – Dhalkebar – Duhabi 400 kV Transmission Line (TL) Project. Nepal Environmental & Scientific Service (NESS) Pvt. Ltd is the Consultant involved in the study.

## 2.0 Project Description

The Transmission line passes through 4 zones (Narayani, Janakpur, Sagarmatha and Koshi), 10 districts, 77 Village Development Committees (VDCs) and two municipalities. It covers the area of Makwanpur, Bara, Rautahat, Sarlahi, Mohattari, Dhanusha, Saptari, Siraha, Sunsari and Morang districts. The proposed 400 kV transmission line is 285.2 km in length, commencing at the under construction new Hetauda substation (for Heatuda- Bharatpur 220 kV Project located at Hetauda Municipality Ward No 1 of Makwanpur district and terminating at the new Duhabi substation located at Ward no 7 Bhokraha tole (Hanif tole) of Bhokraha VDC in Sunsari district. The transmission line passes through 112.66 km of forest area which consists of 95.7 km of forest area, 8.2 km of shrub land and 8.76 km of grass land. The total forest land along the alignment ROW is 518.24 ha. The transmission line passes close to buffer zone of Koshi Tappu Wildlife Reserve. The minimum distance of the alignment from the Koshi Tappu Wildlife Reserve is 1.8 km.

## 3.0 Scope of Services

The scope of the work was to conduct specific study on monkeys along the transmission line route:

Two species of monkeys namely Rhesus Macaque (*Macacca mulatta*) and Tarai Langur (*Semnopithecus hector*) are identified in IEE study conducted for the project. The study shows that these species are common and widely distributed throughout the alignment. The monkey prefers both open and forest areas. The Scope of services includes but not limited to the following:

- Identification of the different species of monkey found in project area;
- Occurrence of monkey around the transmission line alignment, troop size and behavior;
- Climbing on existing 132 kV tower, jumping behavior, mortality with high voltage line and other necessary information;

- Review available literature and studies on the impact of transmission lines, towers and cables on monkey species to mitigate problem and minimize the adverse impacts identified.

## 4.0 Methodology followed during the study

In order to meet the given scope of services for the study, the consultant had used the following methodology for this study. However, for the long stretch of proposed transmission line areas were studied using three supposed blocks, namely: Hetauda block (Covering from Hetauda to Bagmati Bridge), Bardibash block (Covering from Bagmati Bridge to Lahan Bazar) and KoshiTappu block (From Lahan to New Duhabi area).

- Literature collection, review of previous documents and analysis of the available data.
- Interviews to the locals along the Hetauda-Dhalkebar-Duhabi 400 kV transmission line alignment (Questionnaire survey)
- Small group discussion with local people on monkey species, and their behavior.
- Transect Walk along the Forest trail in the project area followed by specific methodologies.

### 4.1 Literature Review

The literatures were reviewed from the published reports, journals, case studies and analysis of the secondary data and information relevant to this were done. The consultant reviewed all the available reports related to this Hetauda-Dhalkebar-Duhabi 400 kV transmission line project including IEE report with due emphasis on the flora and fauna information. The data, information reports related to monkey in the above corridor area were collected and reviewed.

### 4.2 Questionnaire Survey

A questionnaire was prepared by the monkey expert in close coordination with the coordinator and other study team members (Appendix-1). The questionnaire was filled up by the experts by asking questions and taking interviews with the local people along the proposed project corridor of 4 zones namely Narayani, Janakpur, Sagarmatha and Koshi. The questionnaire was administered in TL corridor starting from Hetauda municipality through Bara, Rautahat, Sarlahi, Mahottari, Dhanusa, Saptari, Siraha, Sunsari, and Morang districts. However, the focus was given to the areas and people which were near the forest or inside the forest. The, RoW and corridor stipulated in IEE report was strictly followed during questionnaire survey. Along with the questionnaire survey, an interview was conducted in nearby village settlements, forest offices, and community forest users' group, officials of Koshi Tappu Wildlife Reserve on the presence, behavior, and type of monkey. In addition, the local attitude towards monkey, threats and conservation issues was ascertained. During this stage, a key informant survey, Focus Group Discussion (FGD) was also conducted. The detail of FGD and contacted Community Forest Users Group is given in Appendix –II and Appendix III.

### **4.3 Direct Observation**

#### **4.3.1 Line transects**

A transect walk was performed to observe monkey status in each forest areas that belong to the impact or activity area of proposed Hetauda-Dhalkebar-Duhabi 400 kV transmission line alignment. Monkeys observed along the route were recorded, together with information on their activity habitat. This method of continuous recording (Martin & Batson, 1993, Chalise, 2003) was adopted for the collection of general information on species presence and absence. It revealed age and sex of a group as well as ultimately a population of that area by direct observation. This method is also known as Visual Encountered Sampling to reflect wildlife population and diversity (Mukherjee, 2007). Besides above, a ten minute scan sampling was followed in each transect route to collect the behavior of observed monkey species in forest areas and open land. This methodology was repeated several times during an observation session, shifting the observation site in each hour interval two sides of transmission line about a kilometer. Continuous ad libitum recording was also performed during the forest walk (Altmann, 1974) that was helpful to find the group of monkeys, their age and sex for the attachment or attraction or dependency to TL and towers.

#### **4.4 Habitat Survey**

Whenever the monkey species observed, habitat survey was conducted by using animal centered plots with ten tree methods relying the field based plant books (Howland, A.K. and Hawland, P. 1984, Polunin, O. and Stainton, A. 1984, Stainton, A. 1988, HMG, 1994). Both direct sighting of monkeys (using Scan Sampling: Altmann, 1974) and indirect evidence (pellets, trampling of trees, etc) was considered the sign and used for habitat survey purpose. Approximately 1 km of tracking along the both side of TL corridor transect, if monkey sign observed then the observed substrate was used as a plot center and monkey sign plot was measured. If no monkey sign observed, a random plot was selected using a random number table. During the course of monkey investigation, quadrates of size (10 x 10) m<sup>2</sup> or more was used to find the different plants species in the probable habitat (Appendix IV). Plants species was identified through the field guide book and unidentified plants was collected in herbarium sheet and submitted to Division of Plant Resource, Godawari, for scientific nomenclature. Broadly, the probable habitats types were categorized into grassland, shrub land and forested areas.

#### **4.5 Monkey Population and Behavior with Transmission Cables, Towers**

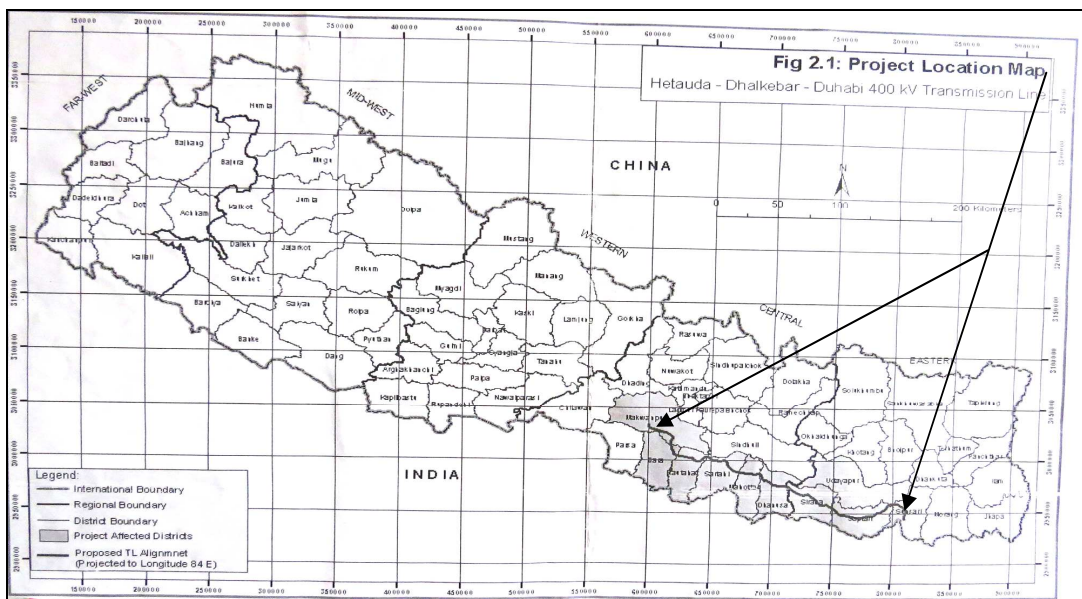
The study team collected all data from each forest area or major forest blocks along the TL and corridor for monkey species. The diverse monkey species possibly Rhesus and Hanuman Langur was adding up from small blocks of a large forest area and was called as two population of that

particular forest part. The monkey population residing near the TL alignment was identified and behavior of disturbance to transmission line was recorded. Any nuisance, jumping and climbing behavior was recorded event wise in a systematic way (Continues scanning). The possible cause of TL alignment climbing and doing nuisance was explored.

#### 4.6 Materials

Following equipment were utilized during the fieldwork: Olympus Camera with lens 18 X, Binoculars (10 x 40), GPS, Landsite compass, Map of the project area Map 1, 2), Measuring tape, herbarium press, field guide book for plants and animals, writing pads, papers, etc. The photographs taken during the field survey is given in Appendix –V.

**Map 1: Project location in the map of Nepal**



**Map 2. Proposed Transmission Line alignment along VDC**





#### 4.7 Team Composition

The study was conducted by multidisciplinary team headed by monkey expert. The following experts and support staff were involved in the study.

**Table 4.1: Team Composition and Task Assignments**

| SN | Name  | Position             | Task   |
|----|---|----------------------|--|
| 1  | Rabindra Chaudhary  | Project Coordinator  | Coordination of the work between consultant, project and WB  |
| 2  | Salil Devkota   | Team Coordinator     | Overall coordination with expert and NEA-ESSD  |
| 3  | Dr. Mukesh K. Chalise   | Monkey Expert        | Overall technical aspect of study, questionnaire development, field survey planning, field survey, data interpretation, analysis and reporting |
| 4  | Narayan P. Koju   | Supervisor           | Work in close coordination with coordinator, monkey expert, overall field level responsibility, field data collection                          |
| 5  | Narayan P. Koju and Shivesh Bhandari                                    | Field Assistants (2) | Work in close coordination with monkey expert, field level data collection   |
| 6  | 1. Indra B. Dulal<br>2. Shivesh Bhandari<br>3. Nirsingh Rai<br>4. Ambar | Assistants (4)       | Supporting for the questionnaire survey and forest walk  |

#### 5.0 Results

The project area covers 10 districts starting from Hetauda of Makawanpur district to New Dhabhi of Sunsari district of Nepal. For the convenient of study the transmission line stretch is divided into three blocks/sections, namely: Hetauda block (Covering from Hetauda to Bagmati Bridge), Bardibash block (Covering from Bagmati Bridge to Lahan Bazaar) and Koshi Tappu block (From Lahan to New Dhabhi area).

## 5.1 Hetauda Block

### 5.1.1 Habitat

The habitat study was started from AP 1 to AP 28 at the Hetauda block. It covers from Hetauda cement factory to north parts of Bagmati Bridge, Rautahat. It revealed the habitat dominated by *Shorea robusta* (sal) and *Accacia catechu* (Khair) forest. The typical *Semecarpus anarcadium* (Bhalayo), *Terminalia alata* (Asna), *Syzygium cumini* (Jamun) and *Cleistocalyx opperculatus* (Kyamuna) association in subtropical forest was also perceived. There was some other with scattered species along with typically northern influence of *Schima wallichii* (Chilaune) as scattered vegetation along the border of Bedkholchi Community Forest and Shikharpani Community Forest, 475masl (AP3 and AP4) area (Table 5.1). The ground vegetation was mostly covered by sapling of Sal, Thakal and other grass species.

The location of AP 1, AP 2 and AP 3 lies within the Hetauda municipality jurisdiction and includes Bedkholchhi Community Forest and Hariyali Madhyabarti Community Forest. Shikharpani community Forest is under the AP 4, AP 6 and AP 7 lies in Gorakchya Community Forest. Some of the area under this section do not had vegetation and no habitat of animals were found in this stretch. They are AP 8 in between Pawar Khola and Simar Khola 260 masl, AP 11 Karmchuli VDC in between Juina Khahare and Bakaiya Khola and AP 13A and 13B lies in Sundar Community Forest. AP 14 lies in Janjyoti Community Forest (Bhamara Pool). AP 21 lies in Bantole Community Forest, AP 19 lies in Janachahana Community Forest, AP 24 lies in Barambaba Community forest. AP 27 at the west bank of Bagmati River 138masl. The total quadrates laid to enumerate plants were 40 in in this stretch of transmission line (Appendix IV).

**Table 5.1: The combine list of flora in the quadrates along Hetauda Block (Appendix III)**

| Common Nepali Name/<br>Scientific name       | Number | Frequency % | Associated and<br>ground flora  |
|--|--------|-------------|---|
| 1. Sal, <i>Shorea robusta</i>                | 136    | 39.65       | Kayiyo, Thakal,<br>Banmara, Siru,<br>Chhinchhine,<br>Musuri, Dirgha<br>Lahara, Khasre,<br>Sanjeebani. Aule, |
| 2. Khayar, <i>Acacia catechu</i>             | 43     | 12.53       |   |
| 3. Bhalayo, <i>Semecarpus anarcadium</i>     | 33     | 9.62        |   |
| 4. Asna, <i>Terminalia alata</i>             | 30     | 8.74        |   |
| 5. Jamuna, <i>Syzygium wallichii</i>         | 26     | 7.58        |   |
| 6. Kyamuna, <i>Cleistocalyx opperculatus</i> | 19     | 5.53        |   |
| 7. Chamre                                    | 10     | 2.91        |   |
| 8. Chilaune, <i>Schima wallichii</i>         | 10     | 2.91        |   |
| 9. Bodhdhayaro, <i>L. parviflores</i>        | 6      | 1.74        |   |
| 10. Karam, <i>Adina cordifolia</i>           | 5      | 1.45        |   |
| 11. Simal, <i>Bombax ceiba</i>               | 5      | 1.45        |   |
| 12. Tik, <i>Tectona grandis</i>              | 4      | 1.16        |   |
| 13. Kusum, <i>Schleichera oleosa</i>         | 3      | 0.87        |   |

|   |            |              |
|---|------------|--------------|
| 14. Bel, <i>Aegle marmelos</i>          | 2          | 0.58         |
| 15. Bhaji                               | 2          | 0.58         |
| 16. Bhelar, <i>Trewia nudiflora</i>     | 2          | 0.58         |
| 17. Piyare, <i>Buchanania latifolia</i> | 2          | 0.58         |
| 18. Rajbirkchhe, <i>Cassia fistula</i>  | 2          | 0.58         |
| 19. Hade, <i>Bridelia pubescens</i>     | 1          | 0.29         |
| 20. Padke, <i>Albizia lucidior</i>      | 1          | 0.29         |
| 21. Sandan, <i>Desmodium oojeinense</i> | 1          | 0.29         |
| <b>Total</b>                            | <b>343</b> | <b>99.99</b> |

Along the proposed TL, currently in the open and agricultural areas, maize, paddy, millets, ginger, mustard, wheat, sugarcane, beans are commonly grown by local farmers.

### 5.1.2 Primate Population

This block includes some open land, cultivated land and mostly wilder forest area belonging to community forest of Churiya range. There was no record of any primate species from Bhorle to Chhatiwan area. It is due to the heavy consumption of its meat for various purposes previously. A total of 10 troops of rhesus monkey with 222 individuals were encountered during the field survey conducted at different time during the study period. The age and sex of one troop was not categorized but census was done. The detail of the rhesus monkey observed in this block is presented in table 5.2. The two troop of Hanuman Langurs recorded in this block consist 31 (11 adult male, 12 adult female and 8 immature) individuals of different age and sex. Local people were complaining on the crop depredation during the group discussion (n=19). Among them there was representation of 7 different community Forest User's Group with chairman and other members. 92 peoples were participated in group discussion and among them 67 were males and 25 females.

**Table 5.2: Rhesus monkeys observed along Hetauda block**

| Troop Number | GPS Location                       | Sex/Age |        |          | Total |
|--------------|------------------------------------|---------|--------|----------|-------|
|              |                                    | Male    | Female | Immature |       |
| 1            | -                                  | 3       | 8      | 6        | 17    |
| 2            | 27°06'53.4"<br>85°26'0.67" 101masl | 12      | 37     | 15       | 54    |
| 3            | 27°06'22.1"<br>85°23'52.8" 95masl  | 5       | 12     | 8        | 25    |
| 4            | 27°08'16.8"<br>85°19'04.8" 137masl | 6       | 10     | 6        | 22    |
| 5            | 27°09'05.6"<br>85°15'23.5" 135masl | 3       | 11     | 5        | 19    |
| 6            | 27°09'09.7"<br>85°14'31.0" 138masl | 9       | 14     | 2        | 25    |
| 7            | 27°09'06.7"<br>85°16'02.7" 142masl | 4       | 12     | 12       | 28    |
| 8            | 27°06'24.9"                        | 4       | 12     | 4        | 20    |

|              |                                    |           |            |           |                  |
|--------------|------------------------------------|-----------|------------|-----------|------------------|
|              | 85°24'26.3" 122masl                |           |            |           |                  |
| 9            | 27°06'52.0"<br>85°26'00.6" 135masl | 2         |            |           | 2                |
| 10           | 27°07'08.7"<br>85°26'47.9" 121masl |           |            |           | 10               |
| <b>Total</b> |                                    | <b>48</b> | <b>116</b> | <b>58</b> | <b>(212) 222</b> |

The primates conflict with local people was along the all the sector of alignment except Bhorle and Furke Chaur of Harnamadi VDC, and Chhatiwan, and Juina of Chhatiwan VDC. Ramite village of Harnamadi VDC, Puwale and Ghyampe village of Hatiya VDC have tuff competition with monkey species so as a lots of complain from the locals in group discussion. In the Ramite village people reported that they were usually stationed in the cropland with shotgun to protect their crops. Besides these there was individual contact and interview with 49 people of which 39 male and 10 females. The human primate conflict was perceived by 23 males and 8 females. They reported their crop loss due to primates during the interview (Table 5.3).

**Table 5.3 Crop loss record during the individual interview in Hetauda block.**

| S.N. | Particular | Total Loss (kg) | Loss per person (N=31) | Remarks                             |
|------|------------|-----------------|------------------------|-------------------------------------|
| 1    | Maize      | 3674            | 118.50                 |                                     |
| 2    | Potatoes   | 1825            | 58.87                  |                                     |
| 3    | Sugarcane  | 1605            | 51.78                  |                                     |
| 4    | Paddy      | 1584            | 51.10                  |                                     |
| 5    | Mustard    | 1335            | 43.07                  | Trampling                           |
| 6    | Millet     | 955             | 32.10                  |                                     |
| 7    | Soybean    | 60              | 1.94                   |                                     |
| 8    | Vegetables |                 |                        | Sparsely few each households suffer |

The rest participants (n=18) had no complain with monkeys. However, crop loss in the agricultural field was acute with other wild animals and birds. Among the notorious crop raider local people reported to parrot, wild boar and elephant.

The monkey behavior with the electric cable is still not known in the area, though they have electric supply with local grid. They said for their security reason sometime monkey might climb up to mid of electric pole but never noticed hanging in cable. Some of them had hunted monkeys to cure some disease while people from Bhorle to Chhatiwan usually hunt them for meat consumption.

The local people try to save their crop field by shouting and chasing with stick, dogs (100%), while they also practiced throwing stone with catapult, firecracker use, guarding, shotgun blowing etc.

They reported that after their effort monkeys generally shift the foraging ground at least pushed to nearby farm or forest. However, after a day or two they appear again. Therefore, conflict between monkey and local people is still continuing.

## 5.2 Bardibash Block

### 5.2.1 Habitat

The habitat study was started from AP 28 to AP 59 and AP 01 to AP 21 at Lahan of the Bardibash block. It covered from Bagmati Bridge to Lahan Bazaar. The habitat of this Block was determined by the 17 quadrates that contents following flora inside and adjoin parts (Table 5.4). It is almost *Shorea robusta* forest with ground vegetation scarce in outer Churiya range. The range is mostly degraded forest with less ground vegetation. The forest area was present at AP 28, AP 29 and AP 37 to AP 52 with thin forest patches dominated by Sal tree. The area between AP 30 to AP 37 lies in the Churiya range without forest patch. Rest of the proposed TL area from AP 53 to AP 59 and AP 01 to AP 16 was not forested but lies in barren land, riverside flood fangs and near the human settlement. The only noticeable forest and monkey habitat lies along Phuljore Khola area including Gauribas near the Bardibas market place (AP 38 - AP 53).

The forest area in this section consists of all belonging to government forest while two community forests named Maisthan Community Forest, Panchdhara Maistan Temple, Bardibas, Mahottari and Lal Gadh Community Forest Lalgadh, Dhanusha are present.

**Table 5.4: The combine list of flora in the quadrates along Bardibas Block**

| Name                              | Number     | Frequency %   | Adjoining flora                                     |
|-----------------------------------|------------|---------------|---|
| 1. Sal, <i>Shorea robusta</i>     | 160        | 90.91         | Khayer, kash,<br>Thakal, Siru,<br>Banmara, Besharma |
| 2. Karma, <i>Adina cardifolia</i> | 10         | 5.68          |   |
| 3. Unknown                        | 4          | 2.27          |   |
| 4. Simal, <i>Bombax ceiba</i>     | 1          | 0.57          |   |
| 5. Guava                          | 1          | 0.57          |   |
| <b>Total</b>                      | <b>176</b> | <b>100.00</b> |   |

### 5.2.2 Primate Population

The primate population in this section was observed both Langur and rhesus species in different five locations. Basically they were present from Fuljore forest, Sarlahi and east up to Ratu Khola forest of Gauribas area, Dhanusha (AP 41 to AP 55). Monkeys are seen along the highway and currently rhesus began to search human left over.

### Gauribas VDC

This VDC is rich for diversity of birds and mammals due to the one side is forests and another is open place of Ratu River. In this VDC monkey comes occasionally from Maisthan Community forest in few number (10/20).

### **Maisthan VDC**

Panchdhara Maisthan Temple (27°00'12.9"N 85°52'09.6" E 108masl) is famous in Mahottari district. It lies in 3 km west from Bardibas with 200 m. north from east – west highway. There is a dense forest of Sal and good distribution of mammals and birds. The periphery of the temple areas has bamboo and cane grooves that seem to be good habitat for the hiding of rhesus monkeys. In the time of field visit we have been counted 30 monkeys with 6 adult male, 11 adult female, 5 young and 8 were immature.

### **Gaushala Road**

This area lies in East – west highway (5 Km. west from Bardibash). Both sides of road have been covered by government forest. This is a small cross road and one way goes to Samsi, Gaushala through the government forest. There is some fruit shop, hotel therefore small group of monkey seems in this area. In the time of field visit we have counted 12 monkeys with 2 adult male, 3 adult female, 4 young and 3 were immature. There was encounter of rhesus monkeys along the 8 km west of Bardibash in an open wilder area and counted 18 monkeys with 2 adult male, 5 adult female, 7 young and 4 were immature.

### **Tuteshwor Chowk area**

This area also lies in forest and it is situated in east – west highway. There is a temple of god Tuteshwor Nath Mahadev. The temple lies in about 5 KM north from East –West highway. Only one adult rhesus male was seen in the area.

### **Maraha Bridge**

Maraha Khola and adjoin area consists of Government forest. The habitat is dominated by Sal (*Shorea robusta*) species. Some birds and mammalian species rather than primates were seen. However, a troop of Hanuman Langur was seen which was very shy and only counted totally was 11 individuals. About 3 km distance from the place totally sal forest lies where we observed rhesus monkey with 23 individuals including 3 adult male, 5 adult female, 11 young and 4 were immature.

### **Phuljor Village**

The surrounding areas of village are covered by Sal dominated forest. We encountered 6 individuals of Hanuman Langur in the forest. They were very shy and local people also said that they seldom come around the village field. A troop of rhesus monkeys were also observed with 11 individuals including 1 adult male, 4 adult female 4 young and 2 immature.

## Primates and animal species

In conclusion along the Bardibash block we observed bisexual Rhesus troops in six different spots of totaling to 120 individuals of different age. The rhesuses were found mostly around the highway and roadside searching the scattered food grains from the vehicle. In the forest area they were found mostly searching insects and some minerals. They were mostly wild in nature and were much more shy to the presence of researchers, however, roadside groups were either ignoring the vehicle and people or sometime scared if human were get off from the vehicle. At this moment they seem waiting for human contribution or vehicle thrown garbage. Hanuman Langur 21 counted in two troops and not very significantly recorded in this blocks.

There were two group discussions with 36 people including 3 females. 19 individuals were interviewed in the Bardibash area including one female. Questionnaire survey revealed that there were no casualties recorded till to date by the presence of existing transmission line to primate species. Crop damaged is occurred due to primates, wild boar and elephant basically. Among the individual interviewed only four people reported the monkey human conflict in their area. Total loss also recorded only 2 quintals maize and two man load bananas. The conflict seems to be in three wards of three VDC along the stretch of AP 28 to AP 59 (Dalkebar), new AP 01 to AP 21 (Lahan), Maisthan ward 3, Gauribas ward no 3 and Tulasi ward no 2. Up to now there were no any casualties along the old electric cable with monkeys. People never experienced the monkey climbing in electric poles.

The repelling mechanisms used by local people are common chasing and shouting as well as guarding the crop field. The crop field along the TL line and adjoining areas were paddy, wheat, maize, Bananas, mangoes, tomato and potato.

### 5.3 Koshi Tappu Block

#### 5.3.1 Habitat

The habitat study was started from AP 22 (Lahan) to AP 62 (New Duhabi) along this block. The area from AP 22 to AP 34 was without forest patches while AP 22- AP 29 is municipality area. The whole area and other remaining area lies at the base of Churiya foothills. There is alternate proposed transmission line at AP 41 which is going to East across the Koshi River direct to New Duhabi station. The area of AP 30-39 is along the previous transmission line and East-West Highway. The forest area and wildness lies in AP 35 to AP 41 and then proposed TL passage from Fattepur and Thoksila VDC of Udayapur District. This area at AP 46 to AP 50 (west of Koshi) lies in the Sal dominated dense forest. AP 55 to AP 57 lies in the forest of Syngiya VDC after crossing Koshi River. AP 51 and AP 52 lies in the main river course of Koshi River. Other areas of proposed line lie either in barren land or agricultural field and human settlements.

The quadrates laid were about 22 and revealed the majority of flora is Sal (*Shorea robusta*) with scattered population of badkaule, Aule, Khayer, Rajbrikchhya, Bhanti, Thakal, Khar, Siru, and sapling of Sal (Table 5.5).

**Table 5.5. The combine flora of quadrates along Koshi Tappu block (Appendix III)**

| Name of plants                            | Number     | Frequency %  | Associated flora  |
|---|------------|--------------|---|
| 1. Sal, <i>Shorea robusta</i>             | 154        | 78.57        | Badkaule, Aule, Khayer, Rajbrikchhya, Bhanti, Thakal, Khar, Siru, sapling of Sal. |
| 2. Mango, <i>Magnifera indica</i>         | 10         | 5.10         |   |
| 3. Rajbrichhe, <i>Cassia fistula</i>      | 10         | 5.10         |   |
| 4. Bodhdhayaro, <i>L. parviflorus</i>     | 7          | 3.57         |   |
| 5. Jamuna, <i>Syzygium cumini</i>         | 3          | 1.34         |   |
| 6. Sissio, <i>Dalbergia sissoo</i>        | 3          | 1.34         |   |
| 7. Mirchaya                               | 3          | 1.34         |   |
| 8. Barro, <i>Terminalia bellirica</i>     | 2          | 1            |   |
| 9. Bhalayo, <i>Semecarpus anarcardium</i> | 2          | 0.51         |   |
| 10. Taki, <i>Bauhinia purpurea</i>        | 1          | 0.51         |   |
| 11. Tilke                                 | 1          | 0.51         |   |
| <b>Total</b>                              | <b>196</b> | <b>99.96</b> |   |

### 5.3.2 Primate Population

The Koshi Tappu area does not reveal any primate species during first and second observation period. However, people were complaining about crop raiding by primates and mostly due to migratory elephant. During third observation, we observed two adult male and female with 5 juveniles in Ramdhuni temple area (26°41'25.0"N 87°07'53.2"E 75masl). A lot of Karam leaves were drop down by the monkeys after eating its buds.

There were 8 group discussion including ten CFUG participated by 49 people. The representative community forest users groups were Pathudaha Community Forest, Nikuri- Tikuri Community Forest, Barhakhari Community Forest, Bengri Community Forest, Khodar Devi Community Forest, Prakashpur Buffer Zone Community Forest, Ramdhuni Community Forest, Basantapur Community Forest, Galphadia Community Forest, Saptakoshi Belak Community Forest. Among them 44 males and 5 were females. Individual questionnaire were asked to 23 individuals including one female on primate problem and conflict along the proposed TL area. Among them, 15 had the conflicts before by the monkey species (Table 5.6).

**Table 5.6: Crop loss record during the individual interview in Koshi block.**

| S.N. | Particular | Total Loss (kg) | Loss per person (N=15) | Remarks                      |
|------|------------|-----------------|------------------------|------------------------------|
| 1.   | Paddy      | 3545            | 236.34                 |                              |
| 2.   | Maize      | 2124            | 141.60                 |                              |
| 3.   | Mango      | 1130            | 75.34                  |                              |
| 4.   | Sugarcane  | 900             | 60.00                  |                              |
| 5.   | Banana     | 605             | 40.34                  |                              |
| 6.   | Potatoes   | 200             | 13.34                  |                              |
| 7.   | Vegetables |                 |                        | Sparsely few each households |



The crops grown along the TL corridor are paddy, maize, potato, sugarcane, banana and mango. Monkeys are repelled from the field by shouting, chasing and with the help of dogs. They are much more problematic during the ripening of fruits and cereals. There is already high voltage electric line in the area, but till now there are no any experiences of locals to have casualties by climbing the monkey species. Due to lower population of existing monkey species people don't think would be any problem to monkey by new TL.

## 6.0 Conclusion

The proposed Hetauda – Dhalkebar – Duhabi 400 kV Transmission Line Project Area was studied for the possible impact by the monkeys to electric cable and for the monkey. Study of the area revealed that proposed project area lies basically along the Churiya forest, human settlement, agriculture land, river fan, flood plain, barren land, villages and city area. There are monkeys: Rhesus and Langur available in the proposed TL line along with other wild animals and birds. The primate population seems to be very thin due to the heavy human activities in government forest and also in community forests.

There was no any previous record of monkey casualties with existing high voltage transmission lines exist in the area since long time. Similarly, nuisance related to domestic electric cable was also not recorded. Some casualties were experienced by local villagers during encounter with monkeys especially to lower age groups and females. Monkey directed major incident and with human interaction zoonotic disease problems were not yet felt. However, crop raiding and during competition of food security human harassment was found directed by the local monkey species. Local were using measures against the monkeys by simple chasing, using dogs, catapult and shotgun too. Some areas people are found to hunt monkeys for meat and use it for medicinal purposes to cure septic and incurable disease.

The RoW area of existing 132 kV Line and other high voltage line are used by locals to grow agriculture product. This indicates the acceptance and utilization of such infrastructure for income generation. Proposed TL also seems to be accepted by locals with some local base development and incentives to their academic and health infrastructures.

## Relevant References:

- Altmann, J. (1974). Observational study of behavior: sampling methods. *Behaviour*, 49: 227-265.
- Chalise, M. K. (2003). Assamese Monkeys (*Macaca assamensis*) in Nepal. *Primate Conservation*. No. 19: 99-107. The Journal of the IUCN/SSC Primate Specialist Group, Conservation International, USA.
- Martin P. and Bateson, P. (1993). *Measuring behaviour*. Cambridge University Press, NY, USA.
- Mukherjee, D. (2007). Resource utilization pattern of reptiles in the tropical dry mixed deciduous forest of Anaikatty Hills, Western Ghats, India. PhD Thesis, Bharathiar University, Coimbatore, Pages: 146+18+14
- Sutherland, W.J. (1996). *Ecological Census Techniques*. Cambridge University Press.

## Appendix I: Survey Questionnaire (Individual)

Date \_\_\_\_\_

Q. No. (Problems associated with monkey/wildlife species)

1. a. Name \_\_\_\_\_ Sex \_\_\_\_ Age \_\_ Village/Tole \_\_\_\_\_ Ward \_\_\_\_\_  
 VDC \_\_\_\_\_ District \_\_\_\_\_ House Owner name \_\_\_\_\_

b. Total land holding: Bigha-Katha-Dhur \_\_\_\_\_ Distance from TL \_\_\_\_\_ km/m

2. Do you have any problem from wildlife ? Yes \_\_\_\_ No \_\_\_\_ If yes, what kind of problem do you have? a. Crop damage \_\_\_\_ b. Harassment \_\_\_\_ c. Livestock loss \_\_\_\_ d. others \_\_\_\_

3. What were the crops that you cultivated last year ? How much land was used for each crop ?

What was the yield of each crop ? How much crop was damaged by monkey / wildlife?.....

| SN | Crop Cultivated | Land used (Dhur / Katha / Bigha ) | Total yield when no damage (Quintal) | Area damaged (D/K/B) | Amount damaged (Kg/Q) | Specific Remarks |
|----|-----------------|-----------------------------------|--------------------------------------|----------------------|-----------------------|------------------|
| 1  | Paddy           |                                   |                                      |                      |                       |                  |
| 2  | Maize           |                                   |                                      |                      |                       |                  |
| 3  | Wheat           |                                   |                                      |                      |                       |                  |
| 4  | Mustard         |                                   |                                      |                      |                       |                  |
| 5  | Potato          |                                   |                                      |                      |                       |                  |
| 6  | Banana          |                                   |                                      |                      |                       |                  |
| 7  | Vegetables      |                                   |                                      |                      |                       |                  |
| 8  | Others.....     |                                   |                                      |                      |                       |                  |
| 9  |                 |                                   |                                      |                      |                       |                  |
| 10 |                 |                                   |                                      |                      |                       |                  |

4. How often wild animals/monkey enter your field ? Name, number and problem: \_\_\_\_\_

5. Time of wild animals approached: a. every day \_\_\_\_ b. every morning \_\_\_\_ c. Night \_\_\_\_ d. Once a week \_\_\_\_ d. occasionally \_\_\_\_ e. Specific time or season \_\_\_\_\_

6. Which species of monkeys cause problem ? \_\_\_\_\_ Number \_\_\_\_\_

7. During which month there is high intensity of crop depredation/harassment by monkey ? \_\_\_\_\_

8. Were monkeys selective on crop ? If yes, what type of crop do they prefer most ? \_\_\_\_\_

9. Do you chase monkey from your field ? Yes \_\_\_No\_\_\_, if yes, What kind of technique do you apply ? a. Shouting and following \_\_\_\_\_ b. Chasing with stick \_\_\_\_\_ c . Shouting \_\_\_\_\_ d. hitting tin boxes \_\_\_\_\_ e . others \_\_\_\_\_

10. Where they settled or go after your chase ? \_\_\_\_\_

11. Do you think same group appear again or different ? \_\_\_\_\_ Number \_\_\_\_\_

12. Have you seen any animal (reptile, birds, mammals) climbing, touching/ sitting on electric cable / pole, describe how they do ? \_\_\_\_\_

13. Have you seen or heard about electrocution of animals in your area, when, which animal? \_\_\_\_\_

14. Do you know why monkey use TL or electric cable, how? \_\_\_\_\_

15. What kind of vegetation are there around previos TL and proposed one? \_\_\_\_\_

16. What applications in and around TL or Tower will be avoided by monkeys? \_\_\_\_\_

17. How the Wildlife/monkey casualties with electric cable can be minimized? \_\_\_\_\_

18. What are the traditional practices to use animal parts against human disease? \_\_\_\_\_

19. Do you think possibility of monkey usage for economic incentive in your area? \_\_\_\_\_

20. Any other idea on primates and wildlife conservation or sustainable use, income generation? \_\_\_\_\_

21. Your remarks / expectance passing of electric cable from your area? \_\_\_\_\_

**(At last: On behalf of our team I appreciate your cooperation and Thank you for your time!)**

## Appendix II:

A

**Study of Monkey in Hetauda – Dhalkebar – Duhabi  
400 kV Transmission Line Project Area**

**Focus Group Discussion at Hetauda Block**

| S.N. | Name of Person consulted    | Name of place/VDC/ward                      | Signature |
|------|-----------------------------|---|-----------|
| 1.   | Lalmaya Majhi               | Juina                                       | Group 1   |
| 2.   | Keikai Majhi                | Juina                                       |           |
| 3.   | Asmini Majhi                | Juina                                       |           |
| 4.   | Krishna Bahadur Majhi       | Juina (Helper of NEA)                       |           |
| 5.   | Kaman Singh Waiba           | Chhatiwan -6                                |           |
| 6.   | Dhuni Ram Majhi             | Chhatiwan -6                                |           |
| 7.   | Mangal Bahadur Majhi        | Chhatiwan -6                                |           |
| 8.   | Krishna Ghatani             | Karmachuli -8 Chhatiwan                     | Group 2   |
| 9.   | Motilal Singara             | Karmachuli -8 Chhatiwan                     |           |
| 10.  | Bir Bahadur Ghalan          | Karmachuli -8 Chhatiwan                     |           |
| 11.  | Gopal Silwal                | Karmachuli -8 Chhatiwan                     |           |
| 12.  | Bishwa Raj Bikal            | Karmachuli -8 Chhatiwan                     |           |
| 13.  | Tank Prasad Chaulagain      | Pawas -8 Chhatiwan                          | Group 3   |
| 14.  | Padam Bahadur Bikal         | Karmachuli -8 Chhatiwan                     |           |
| 15.  | Dinesh Timilsina            | Pawas – 4 Chhatiwan                         |           |
| 16.  | Basu Lama                   | Katle Dovan                                 | Group 4   |
| 17.  | Rikesh Lama                 | Katle Dovan                                 |           |
| 18.  | Bisnu Nepali                | Katle Dovan                                 |           |
| 19.  | Purna Bhakta Chaulagain     | Sikharpani, Churiyamai                      | Group 5   |
| 20.  | Krishna Prasad Adhikari     | Sikharpani, Churiyamai                      |           |
| 21.  | Surya Lama (Tea shop)       | Sikharpani, Churiyamai                      |           |
| 22.  | Man Bahadur Tamang          | Hariyali Buffer zone community Forest Group | Group 6   |
| 23.  | Ashok Lama                  | Hariyali BZCFG                              |           |
| 24.  | Baburam Rimdong             | Hetauda Municipality                        |           |
| 25.  | Tej Kumar Lo                | Hetauda Municipality                        |           |
| 26.  | Gyanimaya Thokar (Tea shop) | Hetauda Municipality                        |           |
| 27.  | Min Bahadur Ghalan          | Secretary, CFUG                             |           |
| 28.  | Mansingh Syabo              | Ramite -9                                   | Group -7  |
| 29.  | Sajib Biswokarma            | Ramite -9                                   |           |

**Study of Monkey in Hetauda – Dhalkebar – Duhabi  
400 kV Transmission Line Project Area**

**Focus Group Discussion at Hetauda Block**

| <b>S.N.</b> | <b>Name of Person consulted</b> | <b>Name of place/VDC/ward</b> | <b>Signature</b> |
|-------------|---------------------------------|-------------------------------|------------------|
| 30.         | Madhav Raj Karki                | Furke Chaur, Harnamadi        | Group -8         |
| 31.         | Indra Bahadur Dulal             | Gorakchhya CF                 |                  |
| 32.         | Sapta Bahadur Ghising           | Forest Guard, Gorakchhya CF   |                  |
| 33.         | Palten Lama                     | Khadkule                      |                  |
| 34.         | Indra bahadur Ghalan            | Badkule -8                    | Group -9         |
| 35.         | Ajit Ghalan                     | Badkule                       |                  |
| 36.         | Shisal Bogati                   | Badkule                       |                  |
| 37.         | Anil Kumar Shyangtang           | Badkule                       |                  |
| 38.         | Indra Bahadur Dahal             | Bhorle -9 Hatiya              | Group -10        |
| 39.         | Rom Prasad Dangal               | Bhorle -9 Hatiya              |                  |
| 40.         | Ratnamaya Magar                 | Ghyampe -5 Hatiya             | Group -11        |
| 41.         | Kabita Magar                    | Ghyampe -5 Hatiya             |                  |
| 42.         | Dipa Magar                      | Ghyampe -5 Hatiya             |                  |
| 43.         | Ram Bahadur Raut, Forest Guard  | Sundar CF, Purbi Tole Nijgadh | Group -12        |
| 44.         | Madhav Gautam                   | Sundar CF                     |                  |
| 45.         | Indra Prasad Kuinkel            | Sundar CF                     |                  |
| 46.         | Malati Kuinkel                  | Sundar CF                     |                  |
| 47.         | Gobind Prasad Bajgain           | Janjyoti CF, Judibela         | Group -12        |
| 48.         | Binod Chaulagain                | Janjyoti CF                   |                  |
| 49.         | Hari Bartaula                   | Janjyoti CF                   |                  |
| 50.         | Durga Bahadur Magar             | Janjyoti CF                   |                  |
| 51.         | Amar Bahadur Nepali             | Purbi Tole Nijgadh            | Group -13        |
| 52.         | Chandra Kant Banjara            | Purbi Tole Nijgadh            |                  |
| 53.         | Shanta Banjara                  | Purbi Tole Nijgadh            |                  |
| 54.         | Hukum Bahadur Rumba             | Shikharpani – 9 Churiyamai    | Group - 14       |
| 55.         | Gyan Bahadur Pakhrin            | Shikharpani – 9 Churiyamai    |                  |
| 56.         | Krishna Bahadur Pakhrin         | Shikharpani – 9 Churiyamai    |                  |
| 57.         | Tej Bahadur Dindum              | Shikharpani – 9 Churiyamai    |                  |
| 58.         | Tek Bahadur Moktan              | Shikharpani – 9 Churiyamai    |                  |
| 59.         | Bhanu Prasad Bidari             | Shikharpani – 9 Churiyamai    |                  |

**Study of Monkey in Hetauda – Dhalkebar – Duhabi  
400 kV Transmission Line Project Area**

**Focus Group Discussion at Hetauda Block**

| <b>S.N.</b> | <b>Name of Person consulted</b> | <b>Name of place/VDC/ward</b>  | <b>Signature</b> |
|-------------|---------------------------------|--------------------------------|------------------|
| 60.         | Nav Raj Ghimire                 | Puwale -3 Hatiya               | Group -15        |
| 61.         | Kedar Prasad Dahal              | Puwale -3 Hatiya               |                  |
| 62.         | Rita Dahal                      | Puwale -3 Hatiya               |                  |
| 63.         | Sarswoti Ghimire                | Puwale -3 Hatiya               |                  |
| 64.         | Krishna Prasad Kuikel           | Sundar CF, Nijgadh - 3         | Group -16        |
| 65.         | Tula Kumari Jaisi               | Sundar CF, Nijgadh - 3         |                  |
| 66.         | Nirmala Moktan                  | Sundar CF, Nijgadh - 3         |                  |
| 67.         | Maiya Kumari Waiba              | Sundar CF, Nijgadh - 3         |                  |
| 68.         | Narayan Adhikari                | Sundar CF, Nijgadh - 3         |                  |
| 69.         | Parbati Kandel                  | Sundar CF, Nijgadh - 3         |                  |
| 70.         | Malati Yonjan                   | Sundar CF, Nijgadh - 3         |                  |
| 71.         | Min Kumar Sapkota               | Sundar CF, Nijgadh - 3         |                  |
| 72.         | Bir Bahadur Thing               | Sundar CF, Nijgadh - 3         |                  |
| 73.         | Nirmala Pandey                  | Sundar CF, Nijgadh - 3         |                  |
| 74.         | Manmaya Magar                   | Sundar CF, Nijgadh - 3         |                  |
| 75.         | Meena Rana Magar                | Ghyampe -5, Hatiya Srinagar CF | Group -17        |
| 76.         | Bishnu Garanja Magar            | Ghyampe -5, Hatiya Srinagar CF |                  |
| 77.         | Nanimaya Ale Magar              | Ghyampe -5, Hatiya Srinagar CF |                  |
| 78.         | Shanti Thapa Magar              | Ghyampe -5, Hatiya Srinagar CF |                  |
| 79.         | Nirmala Thapa Magar             | Ghyampe -5, Hatiya Srinagar CF |                  |
| 80.         | Fulmaya Thapa Magar             | Ghyampe -5, Hatiya Srinagar CF |                  |
| 81.         | Krishna Bahadur Rana Magar      | Paurai -2                      | Group -18        |
| 82.         | Krishna Bahadur Ismaili         | Paurai                         |                  |
| 83.         | Ganga Giri                      | Paurai                         |                  |
| 84.         | Bishnu Bahadur Giri             | Paurai                         |                  |
| 85.         | Dil Bahadur Rana                | Jana Seba CF                   |                  |
| 86.         | Kiran Prasad Paudel             | Paurai -2                      |                  |
| 87.         | Sanu Kanchha Syangba            | Paurai near AP 24              | Group -19        |
| 88.         | Hari Kushuwar                   | Paurai near AP 24              |                  |
| 89.         | Bhim Bahadur Bamjan             | Paurai near AP 24              |                  |
| 90.         | Mahendra Pakhrin                | Paurai near AP 24              |                  |
| 91.         | Radhika Kafley                  | Baramba CF Vice President      |                  |
| 92.         | Laxman Neupane                  | Paurai near AP 24              |                  |

**B**

**Study of Monkey in Hetauda – Dhalkebar – Duhabi  
400 kV Transmission Line Project Area  
Individual and Household Interviews at Hetauda Block**

| S.N. | Name of Person and age      | Distance to TL (m) | Name of place/ ward/ VDC/District      |
|------|-----------------------------|--------------------|--|
| 1.   | Min Bahadur Ghalan, 32      | 50                 | Hariyali BZCF, Hetauda Municipality- 3 |
| 2.   | Man Bahadur Tamang, 38      |                    | Hetauda Municipality- 3, Makawanpur    |
| 3.   | Ashok Lama, 52              | 200                | Hetauda Municipality- 3, Makawanpur    |
| 4.   | Navaraj Ghimire, 47         | 200                | Puwale- 3, Hatiya, Makwanpur           |
| 5.   | Kedar Prasad Dahal, 52      | 200                | Puwale- 3, Hatiya, Makwanpur           |
| 6.   | Gopal Adhikari              | 500                | Puwale- 3, Hatiya, Makwanpur           |
| 7.   | Sarswoti Ghimire, 32        |                    | Puwale- 3, Hatiya, Makawanpur          |
| 8.   | Nanimaya Ale Magar, 52      |                    | Ghyampe- 3, Hatiya, Makawanpur         |
| 9.   | Gita Rana Magar, 53         | 200                | Ghyampe- 5, Hatiya, Makawanpur         |
| 10.  | Bishnu Garanja Magar, 48    | 200                | Ghyampe- 5, Hatiya, Makawanpur         |
| 11.  | Ratnamaya Garanja Magar,    | 200                | Ghyampe- 5, Hatiya, Makawanpur         |
| 12.  | Jeevan Lama, 42             | 250                | Katle Dovan- 7, Chhatiwani, Makawanpur |
| 13.  | Surta Lama, 49              |                    | Sikharpani- 3, Churiyamai, Makawanpur  |
| 14.  | Purna Bhakta Chaulagain, 57 | 500                | Sikharpani- 4, Churiyamai, Makawanpur  |
| 15.  | Hukum Bahadur Rumba, 45     | 200                | Sikharpani- 9, Churiyamai, Makawanpur  |
| 16.  | Thok Bahadur Muktan,        | 50                 | Sikharpani- 9, Churiyamai, Makawanpur  |
| 17.  | Tej Bahadur Dindam          | 200                | Sikharpani- 9, Churiyamai, Makawanpur  |
| 18.  | Durga Bahadur Magar         | 200                | Bhamarapul- 2, Judibela, Makawanpur    |
| 19.  | Santa Bahadur Ghising, 62   | 200                | Khadkule- 5, Harnamadhi, Makawanpur    |
| 20.  | Prem Lama                   | 100                | Bulan tole- 6, Harnamadhi, Makawanpur  |
| 21.  | Indra Bahhadur Ghalan, 37   | 100                | Bhorle- 9, Harnamadhi, Makawanpur      |
| 22.  | Rom Prasad Dangal           | 500                | Bhorle- 9, Harnamadhi, Makawanpur      |
| 23.  | Indra Bahadur Dahal, 33     | 300                | Bhorle- 9, Harnamadhi, Makawanpur      |
| 24.  | Lakhan Bahadur Syangbo, 60  | 200                | Ramite-9, Harnamadhi, Makawanpur       |



**Study of Monkey in Hetauda – Dhalkebar – Duhabi  
400 kV Transmission Line Project Area**

**Individual and Household Interviews at Hetauda Block**

| <b>S.N.</b> | <b>Name of Person and age</b> | <b>Distance to TL (m)</b> | <b>Name of place/ ward/ VDC/District</b> |
|-------------|-------------------------------|---------------------------|--|
| 25.         | Ganesh BiswoKarma, 48         | 800                       | Ramite-9, Harnamadhi, Makawanpur         |
| 26.         | Ramesh Tamang, 35             | 500                       | Gothdamar-7, Harnamadhi, Makawanpur      |
| 27.         | Dil Bahadur Rana, 54          | 250                       | Furkechaur-2, Harnamadhi, Makawanpur     |
| 28.         | Indra Bahadur Dulal, 56       | 1500                      | Furkechaur-5, Harnamadhi, Makawanpur     |
| 29.         | Kekai Majhi, 35               | 50                        | Juina- 9 Chhatiwan, Makawanpur           |
| 30.         | Lalmaya Majhi, 51             | 50                        | Juina- 9, Chhatiwan, Makawanpur          |
| 31.         | Chet Bahadur Tamang, 47       | 100                       | Mirmukha- 4 Chhatiwan, Makawanpur        |
| 32.         | Dinesh Timilsina, 32          | 200                       | Pawar-4, Chhatiwan, Makawanpur           |
| 33.         | Kamansingh Waiba, 62          | 200                       | Pawar-4, Chhatiwan, Makawanpur           |
| 34.         | Jeetsingh Blon, 42            | 100                       | Karmachuri- 8, Chhatiwan, Makawanpur     |
| 35.         | Madhav Gautam, 53             | 300                       | Purbatole- 2, Nijgadh, Bara              |
| 36.         | Krishna Bahadur Pakhrin, 43   | 200                       | Purbatole- 2, Nijgadh, Bara              |
| 37.         | Amar Bahadur Nepali, 26       | 800                       | Purbatole- 2, Nijgadh, Bara              |
| 38.         | Chandra Kant Banjara, 58      | 200                       | Purbatole- 2, Nijgadh, Bara              |
| 39.         | Ram Bahadur Raut, 51 F.Guard  | 200                       | Purba Tole- 3, Nijgadh, Bara             |
| 40.         | Birbahadur Blon, 51           | 200                       | Kaptan Tole- 1, Chapur, Rautahat         |
| 41.         | Gunj Man Lama, 53             | 200                       | Kaptan Tole- 1, Chapur, Rautahat         |
| 42.         | Shyamlal Dulal, 42            | 200                       | Kaptan Tole- 9, Chapur Janchahana CF     |
| 43.         | Upendra Sah, 36               | 200                       | Judibela- 9, Rautahat                    |
| 44.         | Meera Tamang, 37              | 200                       | Judibela- 9, Rautahat, Krishak Pr.School |
| 45.         | Hari Bartaula, 32             | 300                       | Bantole- 2 Judibela, Rautahat            |
| 46.         | Krishna Bahadur Ranamagar,49  | 50                        | Gairigaun- 2, Paurahi, Rautahat          |
| 47.         | Lila Bahadur Rai, 49          |                           | Paurahi- 7, Rautahat Janjagriti CF       |
| 48.         | Kuldhoj Bamjan, 53            | 100                       | Paurahi- 8, Rautahat                     |
| 49.         | Sukumaya Tamang, 43           | 100                       | Paurai- 8, Paurahi, Rautahat             |

**C**

**Study of Monkey in Hetauda – Dhalkebar – Duhabi  
400 kV Transmission Line Project Area**

**Focus Group Discussion at Bardibash Block**

| <b>S.N.</b> | <b>Name of Person consulted</b> | <b>Name of place/VDC/ward</b> | <b>Signature</b> |
|-------------|---------------------------------|-------------------------------|------------------|
| 1.          | Maithane Majhi                  | Tulasi- 2, Dhanusha           | Group 1          |
| 2.          | Kumar Thapa Magar               | Vabsi- 3, Gauribas, Mahottari |                  |
| 3.          | Bishnu Biswokarma               | Vabsi- 3, Gauribas, Mahottari |                  |
| 4.          | Rima Bhandari                   | Tulasi- 2, Dhanusha           |                  |
| 5.          | Krishna Karki                   | Gauribas- 3, Mahottari        |                  |
| 6.          | Surya Karki                     | Gauribas- 3, Mahottari        |                  |
| 7.          | Deepak Ojha                     | Bardibas- 7, Mahottari        |                  |
| 8.          | Surya Neupane                   | Bardibas- 4, Mahottari        |                  |
| 9.          | Deepak Karki                    | Bardibas- 6, Mahottari        |                  |
| 10.         | Shiv Bhandari                   | Bardibas- 9, Mahottari        |                  |
| 11.         | Santosh Subedi                  | Bardibas- 3, Mahottari        |                  |
| 12.         | Suman Koirala                   | Bardibas- 7, Mahottari        |                  |
| 13.         | Shailendra Singh                | Bardibas- 7, Mahottari        |                  |
| 14.         | Anil Dahal                      | Gauribas- 2, Mahottari        |                  |
| 15.         | Durga Upadhya                   | Gauribas- 3, Mahottari        |                  |
| 16.         | Ashol Dahal                     | Gauribas- 5, Mahottari        |                  |
| 17.         | Kamal Dhungel                   | Gauribas- 3, Mahottari        |                  |
| 18.         | Suman Ghimire                   | Bardibas- 4, Mahottari        |                  |
| 19.         | Ananda Pokharel                 | Maisthan- 3, Mahottari        | Group 2          |
| 20.         | Purushottam Pokharel            | Maisthan- 3, Mahottari        |                  |
| 21.         | Gopal Pokharel                  | Maisthan- 3, Mahottari        |                  |
| 22.         | Navraj Giri                     | Maisthan- 3, Mahottari        |                  |
| 23.         | Kumar Giri                      | Cheru- 8, Mahottari           |                  |
| 24.         | Prakash Bhatta                  | Lalbandi- 8, Sarlahi          |                  |
| 25.         | Mahadev Yadav                   | Lalbandi- 7, Sarlahi          |                  |
| 26.         | Krishna Subedi                  | Lalbandi- 2, Sarlahi          |                  |
| 27.         | Kailash Bhandari                | Hariwan- 3, Sarlahi           |                  |
| 28.         | Binod Karki                     | Hariwan- 3, Sarlahi           |                  |
| 29.         | Bhuvan Karki                    | Hariwan- 3, Sarlahi           |                  |
| 30.         | Kul Prasad Paudel               | Patharkot- 9, Sarlahi         |                  |
| 31.         | Narayan Paudel                  | Patharkot- 9, Sarlahi         |                  |
| 32.         | Hari Krishna Bohara             | Nayaroad- 3, Sarlahi          |                  |
| 33.         | Sudarshan Bohara                | Nayaroad- 5, Sarlahi          |                  |
| 34.         | Sushma Karki                    | Milan Chowk- 2, Sarlahi       |                  |
| 35.         | Amit Lama                       | Karmaiya- 7, Sarlahi          |                  |
| 36.         | Nabin Lama                      | Karmaiya- 7, Sarlahi          |                  |

**D**

**Study of Monkey in Hetauda – Dhalkebar – Duhabi  
400 kV Transmission Line Project Area**

**Individual and Household Interviews at Bardibas Block**

| <b>S.N.</b> | <b>Name of Person and age</b> | <b>Distance to TL (m)</b> | <b>Name of place/ ward/ VDC/District</b> |
|-------------|-------------------------------|---------------------------|--|
| 1.          | Dhan Bahadur Ale, 44          | 3000                      | Karmaiya- 7, Sarlahi                     |
| 2.          | Amit Lama, 19                 | 1000                      | Karmaiya- 7, Sarlahi                     |
| 3.          | Kul Prasad Poudel, 70         | 2000                      | Patharkot- 7, Sarlahi                    |
| 4.          | Binod Karki, 36               | 5000                      | Hariwan- 3, Sarlahi                      |
| 5.          | Prakash Bhatta, 52            | 5000                      | Lalbandi- 8, Sarlahi                     |
| 6.          | Hari Krishna Bohara, 40       | 2000                      | Tarahara- 3, Nayaroad, Sarlahi           |
| 7.          | Nirajan Karki, 35             | 1000                      | Basatole- 6, Hariwan, Sarlahi            |
| 8.          | Kumar Thapa Magar, 45         | 3000                      | Vabsi- 3, Gauribas, Mahottari            |
| 9.          | Kumar Biswokarma, 40          | 20                        | Vabsi- 3, Gauribas, Mahottari            |
| 10.         | Surya Karki, 58               | 4000                      | Gauribas- 3, Mahottari                   |
| 11.         | Ashok Dahal, 35               | 3000                      | Gauribas- 5, Mahottari                   |
| 12.         | Kumar Giri, 40                | 7000                      | Cheru- 8, Mahottari                      |
| 13.         | Ananda Pokharel, 25           |                           | Maisthan- 3, Mahottari                   |
| 14.         | Nava Raj Giri, 40             | 2000                      | Maisthan- 5, Mahottari                   |
| 15.         | Madhav Dahal, 52              | 500                       | Bardibas- 3, Mahottari                   |
| 16.         | Binda Subedi, 41              | 500                       | Bardibas- 3, Mahottari                   |
| 17.         | Deepak Ojha, 30               |                           | Bardibas- 7, Mahottari                   |
| 18.         | Maithane Majhi, 78            | 300                       | Tulasi- 2, Dhanusha                      |
| 19.         | Maithane Kami. 74             | 2000                      | Tulasi- 2, Dhanusha                      |

E

**Study of Monkey in Hetauda – Dhalkebar – Duhabi  
400 kV Transmission Line Project Area**

**Focus Group Discussion at Koshi Block**

| S.N. | Name of Person consulted | Name of place/VDC/ward            | Signature |
|------|--------------------------|-----------------------------------|-----------|
| 1.   | Indra Shrestha           | Tapeswori, Udayapur               | Group 1   |
| 2.   | Milan Rai                | Tapeswori, Udayapur               |           |
| 3.   | Krishna Rai              | Tapeswori, Udayapur               |           |
| 4.   | Om Krishna Sharma        | Tapeswori, Udayapur               |           |
| 5.   | Kumar Magar              | Tapeswori, Udayapur               |           |
| 6.   | Surya Magar              | Tapeswori, Udayapur               |           |
| 7.   | Barshu Chaudhari         | Tapeswori- 6, Balahi, Udayapur    | Group 2   |
| 8.   | Giriraj Basnet           | Tapeswori- 6, Balahi, Udayapur    |           |
| 9.   | Parsu Ram Karki          | Tapeswori- 6, Balahi, Udayapur    |           |
| 10.  | Sharad Prasad Ghimire    | Tapeswori- 6, Balahi, Udayapur    |           |
| 11.  | Bimal Adhikari           | Tapeswori- 1, Galphadia, Udayapur |           |
| 12.  | Kishor Rai               | Tapeswori- 1, Galphadia, Udayapur |           |
| 13.  | Narayan Shrestha         | Tapeswori- 1, Galphadia, Udayapur | Group 3   |
| 14.  | Krishna Chaudhari        | Tapeswori- 1, Galphadia, Udayapur |           |
| 15.  | Saroj Chaudhari          | Shivchowk, Thelia, Sunsari        |           |
| 16.  | Sunil Chaudhari          | Shivchowk, Thelia, Sunsari        |           |
| 17.  | Aanand Chaudhari         | Shivchowk, Thelia, Sunsari        |           |
| 18.  | Prem Sagar Chaudhari     | Shivchowk, Thelia, Sunsari        |           |
| 19.  | Hira Lal Chaudhari       | Shivchowk, Thelia, Sunsari        | Group 4   |
| 20.  | Naresh Kumar Chaudhari   | Shivchowk, Thelia, Sunsari        |           |
| 21.  | Ram Kumar Chaudhari      | Bengri Community Forest           |           |
| 22.  | Mohammad Sadiq           | Theria, Simara                    |           |
| 23.  | Rafiq Mohammad           | Theria, Simara                    |           |
| 24.  | Sarrul Mohammad          | Theria, Simara                    |           |
| 25.  | Salman Mohammad          | Theria, Simara                    | Group 5   |
| 26.  | Sunita Biswokarma        | Dharmapur- 8, Saptari             |           |
| 27.  | Ran Bahadur Biswokarma   | Dharmapur- 8, Saptari             |           |
| 28.  | Man Bahadur Tamang       | Dharmapur- 8, Saptari             |           |
| 29.  | Nav raj Dahal            | Dharmapur- 8, Saptari             |           |
| 30.  | Pawan Kumar Sah          | Dharmapur- 8, Saptari             |           |
| 31.  | Kedar Bishta             | Dharmapur- 8, Saptari             |           |

**Study of Monkey in Hetauda – Dhalkebar – Duhabi  
400 kV Transmission Line Project Area**

**Focus Group Discussion at Koshi Block**

| <b>S.N.</b> | <b>Name of Person consulted</b>  | <b>Name of place/VDC/ward</b> | <b>Signature</b> |
|-------------|----------------------------------|-------------------------------|------------------|
| 32.         | HariCharan Gautam                | Bakdhuwa, Saptari             | Group 6          |
| 33.         | Chudamani Aryal                  | Bakdhuwa, Saptari             |                  |
| 34.         | Bhabani Pandey                   | Bakdhuwa, Saptari             |                  |
| 35.         | Lal Bahadur Bhujel               | Bakdhuwa, Saptari             |                  |
| 36.         | Kirti Tiwari, Basantpur CF Chair | Bakdhuwa, Saptari             |                  |
| 37.         | Bhagat Rana Magar                | Bakdhuwa, Saptari             |                  |
| 38.         | Prem Rai                         | Bakdhuwa, Saptari             |                  |
| 39.         | Yamu Rai                         | Bakdhuwa VDC, Saptari         |                  |
|             |                                  |                               |                  |
| 40.         | Mani Lal Chaudhari               | Sitapur Colony, Saptari       | Group 7          |
| 41.         | Kami Singh Tamang                | Sitapur Colony, Saptari       |                  |
| 42.         | Govinda Chaudhari, Pathudah CF   | Sitapur Colony, Saptari       |                  |
| 43.         | Bina Tamang                      | Sitapur Colony, Saptari       |                  |
|             |                                  |                               |                  |
| 44.         | Shiv Prasad Pokharel             | Daulatpur, Rupnagar, Saptari  | Group 8          |
| 45.         | Bishnu Pokharel                  | Daulatpur, Rupnagar, Saptari  |                  |
| 46.         | Gyan Bahadur Nepali              | Daulatpur, Rupnagar, Saptari  |                  |
| 47.         | Shambhu Prasad Pokharel          | Daulatpur, Rupnagar, Saptari  |                  |
| 48.         | Bikash Biswokarma                | Daulatpur, Rupnagar, Saptari  |                  |
| 49.         | Pradip Pokharel                  | Daulatpur, Rupnagar, Saptari  |                  |
|             |                                  |                               |                  |
| 50.         | Ambar Gurung, BZCFG Chair        | Prakashpur, KTWR, Saptari     | Individual       |
| 51.         | Chanu Bayum Rai                  | Artajhara, Saptari            |                  |
| 52.         | Jha, Chief of CSUM               | CSUM, KTWR, Saptari           |                  |
| 53.         | Pathak Ranger                    | Prakashpur, KTWR, Saptari     |                  |

|          |
|----------|
| <b>F</b> |
|----------|

**Study of Monkey in Hetauda – Dhalkebar – Duhabi  
400 kV Transmission Line Project Area**

**Individual and Household Interviews at Koshi Block**

| S.N. | Name of Person and age    | Distance to TL (m) | Name of place/ ward/ VDC/District            |
|------|---------------------------|--------------------|--|
| 1.   | Mani Lal Chaudhari, 42    | 200                | Colony Bazar- 5, Sitapur Prashawani, Saptari |
| 2.   | Govinda Chaudhari, 57     |                    | Colony Bazar- 5, Sitapur Prashawani, Saptari |
| 3.   | Kami Singh Tamang, 52     | 150                | Colony Bazar- 5, Sitapur Prashawani, Saptari |
| 4.   | Pulkit Chaudhari, 60      | 150                | Benga- 3, Prashawani, Saptari                |
| 5.   | Yamu Rai                  | 300                | Magar Mode- 8, Bakdhuwa, Saptari             |
| 6.   | Champi Chaudhari, 38      | 200                | Basantpur- 8, Bakdhuwa, Saptari              |
| 7.   | Kirti Tiwari, 55          |                    | Basantpur- 8, Bakdhuwa, Saptari              |
| 8.   | Hari Charan Gautam, 62    | 300                | Basantpur- 8, Bakdhuwa, Saptari              |
| 9.   | Jagat Rana Magar, 50      |                    | Khaniyadamar- 8, Bakdhuwa, Saptari           |
| 10.  | Saroj Chaudhari, 26       | 200                | ShivChowk- 9, Thelia, Saptari                |
| 11.  | Hira lal Chaudhari, 18    | 300                | ShivChowk- 9, Thelia, Saptari                |
| 12.  | Sunita Biswokarma, 32     |                    | Baksaha- 2, Thelia, Saptari                  |
| 13.  | Prem sagar Chaudhari, 30  | 100                | Baksaha- 2, Thelia, Saptari                  |
| 14.  | Tribhuvan Thapa, 47       | 350                | Baksaha- 2, Thelia, Saptari                  |
| 15.  | Mohammad Sadiq, 52        |                    | Theria, Simara                               |
| 16.  | Indra Shrestha, 68        | 200                | Bhagalpur-9, Tapeswori, Udayapur             |
| 17.  | Krishna Chaudhari, 67     |                    | Balahi- 6, Tapeswori, Udayapur               |
| 18.  | Chaturananda Singh, 45    |                    | Danuwar Tole- 2, Rupnagar, Saptari           |
| 19.  | Udhab Prasad Pokharel, 42 |                    | Rupnagar, Saptari                            |
| 20.  | Kishun Dev Mahato, 50     |                    | Daulatpur- 1, Rupnagar, Saptari              |
| 21.  | Dambar Rai, 53            | 300                | Daulatpur- 1, Rupnagar, Saptari              |
| 22.  | Pundari Karuwal, 51       | 200                | Daulatpur- 1, Rupnagar, Saptari              |
| 23.  | Purnahari katuwal, 48     |                    | Daulatpur- 1, Rupnagar, Saptari              |
| 24.  | Pawan Kumar Sah, 75       | 500                | Chakhya- 8, Dharmapur, Saptari               |

**Appendix III**  
**Study of Monkey in Hetauda – Dhalkebar – Duhabi**  
**400 kV Transmission Line Project Area**

**List of contacted Community Forest Users Group**

| S.N.                     | Name of CF                              | Location                                       |
|--------------------------|---|--|
| <b>A. Hetauda Block</b>  |   |  |
| 1.                       | Hariyali Buffer Zone Community Forest   | Hetauda Municipality, 9                        |
| 2.                       | ShreeNagar Community Forest             | Ghyampe- 5, Hatiya, Makawanpur                 |
| 3.                       | Gorakchhya Community Forest             | Furkechaur, Harnamadi VDC                      |
| 4.                       | Sundar Community Forest                 | Majhi Tole, Nijgadh -3, Bara                   |
| 5.                       | New Janjagriti Community Forest         | Purba Tole, Nijgadha- 2, Bara                  |
| 6.                       | Jana Seba Community Forest              | Paurahi- 2, Rautahat                           |
| 7.                       | Barmbaba Community Forest               | Paurahi, near AP 24                            |
| <b>B. Bardibas Block</b> |   |  |
| 8.                       | Maisthan Community Forest               | Panchdhara Maistan Temple, Bardibas, Mahottari |
| 9.                       | Lal Gadh Community Forest               | Lalgadh, Dhanusha                              |
| 10.                      | Government Forest                       | All area belong to government forest           |
| <b>C. Koshi Block</b>    |   |  |
| 11.                      | Pathudaha Community Forest              | Sitapur- 5 Saptari                             |
| 12.                      | Nikuri – Tikuri Community Forest        | Daulatpur- 1, Rupnagar, Saptari                |
| 13.                      | Barhakhari Community Forest             | Rupnagar- 1, Saptari                           |
| 14.                      | Bengri Community Forest                 | ShivChowk- 1, Thelia, Saptari                  |
| 15.                      | Khodar Devi Community Forest            | Buksaha- 2, Thelia, Saptari                    |
| 16.                      | Prakashpur Buffer Zone Community Forest | Prakashpur, KTWR, Sunsari                      |
| 17.                      | Ramdhuni Community Forest               | Syngiya, Sunsari                               |
| 18.                      | Basantapur Community Forest             | Bukdhuwa, Saptari                              |
| 19.                      | Galphadia Community Forest              | Galphadiya, Tapeswori, Udayapur                |
| 20.                      | Saptakoshi Belak Community Forest       | BishariyaGhat Thoksila, Udayapur               |

**Appendix IV**  
**Study of Monkey in Hetauda – Dhalkebar – Duhabi**  
**400 kV Transmission Line Project Area**

**A. Forest sampling at Hetauda Block**

Forest enumeration by the quadrat sampling and monkey status

| SN | Quadrat        | Location               | Appr. Dist to TL | Latitude    | Longitude   | Elevation | VEGETATION in 20mX20m  | Highest DBH | REMARK   | Monkey Status             |
|----|----------------|------------------------|------------------|-------------|-------------|-----------|--|-------------|--|---------------------------|
| 1  | Q 1 Near AP 11 | Juina                  | 50m              | 27°18'13.6" | 85°12'06.2" | 303m      | Khayar= 3, Teak= 4, Sal sapling= 3   | Khayar-23cm | Newly planted vegetation in river bank         |                           |
| 2  | Q 2 Near AP 9  | Chhatiwan              | 100m             | 27°19'27.5" | 85°12'03.4" | 259m      | Khayar= 4, Sal sapling= 3  | Khayar-24cm | about 1 km South west from Jungle              |                           |
| 3  | Q 3 AP8        | Chhatiwan              | 50m              | 27°20'03.4" | 85°11'40.6" | 260m      | Simal= 2, Sal =2 Khayar sapling= 5   | Simal-28cm  | Near confluence of Pawar and Simar Khola       |                           |
| 4  | Q 4 AP7        | way to Chhatiwan       | 50m              | 27°20'59.0" | 85°10'34.5" | 365m      | Sal=1, Khayar= 3, Asana= 3, Asare=1<br>Sal sapling=6 asana sapling= 4                  | Sal-25cm    | Inside Jungle on the way to Chhatiwan          |                           |
| 5  | Q 5 AP 6       | Phurkechaur            | 50m              | 27°21'23.8" | 85°09'43.9" | 570m      | Sal= 3, Sal sapling= 32, Piyari sapling= 2<br>Jamun sapling= 3,                        | Sal-32cm    | In Gorakchhya Community Forest                 |                           |
| 6  | Q 6 AP 5       | Sallaghari picnic spot | 75m              | 27°21'29.5" | 85°08'40.6" | 538m      | Sal= 3, Jamun= 3, Sal sapling= 6, Jamun sapling= 4                                     | Sal-29cm    | Near Murtikala workshop                        |                           |
| 7  | Q 7            | South East Ramete      | 100m             | 27°21'51.2" | 85°07'55.8" | 542m      | Sal= 3, sal Sapling= 17, Chilaune= 2,<br>Jamun=2, Kyamuna sapling= 3, Kaiyo sapling= 2 | Sal = 60cm  |  |                           |
| 8  | Q8             | SW Bhorle              | 50m              | 27°21'40.7" | 85°07'24.7" | 607m      | Chilaune= 1, Sal= 2, Sal Sapling= 14,<br>Kaiyo sapling= 2                              | Sal= 28cm   |  |                           |
| 9  | Q9             | SW Puwale              | 100m             | 27°21'50.0" | 85°07'09.6" | 556m      | Sal=4, Jamun= 2, Chilaune= 3 Sal sapling = 6, Chilaune sapling= 2                      | Sal=26cm    | A man with gun to chase monkey was encountered | Male=3,<br>Fem=8<br>Juv=6 |
| 10 | Q10            | South of Ghampe        | 50m              | 27°21'49.5" | 85°05'43.1" | 561m      | Sal= 5, Sal sapling= 2, Jamun= 2,<br>Chilaune= 2, Asana= 1, Jamun sapling = 2          |             |  | Locals claim of 300+      |
| 11 | Q11/AP 4       | Shikharpani            | 50m              | 27°22'46.8" | 85°04'04.4" | 473m      | Paddy field  |             | Jungle is about 800m west                      |                           |
| 12 | Q12            | Near EW highway        | 50m              | 27°23'0.3"  | 85°23'23.5" | 412m      | sal= 12  | Sal= 14cm   | inside the jungle with trail                   |                           |
| 13 | Q13 near AP 3  | Near forest office     | 20m              | 27°23'29.4" | 85°01'27.7" | 402m      | Sal= 5, Chilaune= 2, Masala= 1, Asana= 1,<br>Botdhayaro= 2, Kyamuna=1                  | Sal=90cm    | Bedhkhol CF                                    |                           |



| SN | Quadrat         | Location            | Appr. Dist to TL | Latitude    | Longitude    | Elevation | VEGETATION in 20mX20m  | Highest DBH            | REMARK                               | Monkey Status                  |
|----|-----------------|---------------------|------------------|-------------|--------------|-----------|--|------------------------|--------------------------------------|--------------------------------|
| 14 | Q14/ AP 2       | near cement Factory | 50m              | 27°23'45.0" | 85°00'56.2"  | 385m      | Sal= 6, Kyamuna= 2, Chilaune= 1, Botdhayaro=1                  | Sal=34cm               | near river                           |                                |
| 15 | Q15/AP 13 A     | Purba tole          | 50m              | 27°13'03.8" | 85°11'51.1"  | 169m      | Khayar= 4, Asana= 2, Jamun= 3, Bel =4, Khayar sapling= 6       | Khayar=32 cm           | Near community forest office         |                                |
| 16 | Q 16            | Majhi tole          | 150m             | 27°13'24.4" | 85°11.07.4"  | 179m      | Sal= 4,Asana= 1,Jamun= 3, Khayar sapling= 2, Simal sapling = 2 | Sal-51                 | In Churiya above School              | Local claim                    |
| 17 | Q 17/ Near 13 B | Bhaga tole          | 500m             | 27°11'34.4" | 85°12'10.3"  | 148m      | Farming land   |                        |                                      |                                |
| 18 | Q 18/ Ap 14     | Near Bhamar Bridge  | 200m             | 27°10'18.8" | 85°12'06.8"  | 143m      | Sal=5, Jamun= 2, Kyamuna= 3, Padke= 1, Asana= 2                | Sal=31cm               | Near Highway                         | presence conflict              |
| 19 | Q 19/AP 27      | Bagmati             | 50m              | 27°08'32.6" | 85°29'06.5"  | 138m      | Sal= 2, Khayar=15, Bhelar=2, Chamre=1 Rajbrikchhya= 2,         | Sal 35cm, khayar=55 cm | Near Bagmati and Jogi khola          | presence conflict              |
| 20 | Q 20/ AP 26     | Paurahi 2           | 150m             | 27°08'27.6" | 85°28' 17.6" | 115m      | Chamre= 7, kusum= 3, Khayar= 4, Bel= 2, Hade= 1                | Khayar=25 cm           | Janasewa CF                          |                                |
| 21 | Q21/ Ap 24      | Samarbaba CF        | 200m             | 27°07'06.8" | 85°26'39.9"  | 99m       | Simal= 3, Chamre= 2, Sati Sal= 2, Karam= 3 Jamun= 2            | Simal- 37cm            | Parallel to Old TL                   |                                |
| 22 | Q22/            | Near paurahi Bridge | 150m             | 27°07'21.3" | 85°26'29.3"  | 107m      | Sal=2, Jamun= 3,Chamre= 2, Karam= 2                            | Sal-53cm               |                                      |                                |
| 23 | Q23             | Near Highway        | 200m             | 27°06'53.4" | 85°26'06.7"  | 101m      | Sal= 2, Bhalyo= 4, Asare= 4                                    | Sal-4 3cm              | near old TL                          | Rhesus Male=12, Fem=37, Juv=15 |
| 24 | Q24/ AP 23      | Near Asana Tole     | 50m              | 27°06'38.7" | 85°25'02.4"  | 92m       | Sal= 5, Bhalayo= 6, Asare= 3, Lampate= 1                       | Sal-62cm               |                                      | Rhesus Male=5, Fem=12, Juv= 8  |
| 25 | Q25             | near Chandri River  | 75m              | 27°06'22.1" | 85°23'53.8"  | 95m       | Sal=3, Bhalayo=2, jamuna-1, Asare= 2                           | Sal-32cm               |                                      |                                |
| 26 | Q 26/ AP 22     | Inside forest       | 200m             | 27°06'25.2" | 85°23'46.1"  | 96m       | Sindure= 9, Sal= 3, Asana= 1, Harro-3, Asare= 5                | Sal=63                 |                                      |                                |
| 27 | Q27/ Ap21       | Judibela            | 50m              | 27°06'55.3" | 85°22'40.2"  |           | Sal= 4, Asana= 2, Jamuna= 1, Asare= 1, Bhajhi= 2               | Sal 52cm               | no conflict with monkey but Elephant |                                |
| 28 | Q 28            | Kaptan tole         | 100m             | 27°07'58.9" | 85°21'40.7"  | 128m      | Khayar= 5, Sajh= 3   | Khayar= 17cm           | Jana Chahana CF                      |                                |

| SN | Quadrate | Location          | Appr. Dist to TL | Latitude    | Longitude   | Elevation | VEGETATION in 20mX20m  | Highest DBH | REMARK                        | Monkey Status                 |
|----|----------|-------------------|------------------|-------------|-------------|-----------|--|-------------|-------------------------------|-------------------------------|
| 29 | Q 29     | AP 28             | 50m              | 27°08'02.7" | 85°20'35.1" | 137m      | Sal= 9, Bhalayo= 5, Kyamuna= 5, asana= 3, Rajbrikchhya= 3                | Asana= 70   | Dense forest                  |                               |
| 30 | Q30      | west of AP 18     | 50m              | 27°08'15.9" | 85°19'51.3" | 139m      | Bhalayo= 5, Sal= 8, Asana =12, Kyamuna= 5                                | Sal=47cm    | Near bridge                   |                               |
| 31 | Q 31     | Along Highway     | 100m             | 27°08'16.8" | 85°19'48.1" | 138m      | -  | -           |                               | Rhesus Male=6, Fem=10, Juv 6  |
| 32 | Q32      | Along Highway     | 50m              | 27°08'43.7" | 85°18'36.7" | 135m      | Sal= 5, Asare= 4, Bhalayo= 3   | Sal=110 cm  | Monkey observed               | Rhesus Male=3, Fem=11, Juv=5  |
| 33 | Q33      | Along Highway     | 10m              | 27°09'05.6" | 85°15'23.5" | 135m      | Sal=2, Asana=1, Kyamuna=1, Bhalayo= 4, Asare= 5, Botdhayaro= 1, Sandan=1 | Sal=29cm    | inside dense forest           |                               |
| 34 | Q34      | Near Lamaha river | 50m              | 27°09'35.5" | 85°13'56.3" | 134m      | Sal=6, Asare= 5, Botdhayaro= 2, Bhalayo= 3                               | Sal=73cm    |                               |                               |
| 35 | Q35      | near AP 35        | 10m              | 27°09'50.2" | 85°13'12.4" | 136m      | Sal (Small) =22, Asare 4, Bhalayo= 3                                     | Sal=30      | Some stump cuts were observed |                               |
| 36 | Q 36     | Near AP 14        | 10m              | 27°10'17.9" | 85°12'32.6" | 135m      | Asare= 4, Sal= 5, Sandan= 1, Satisal= 2, Kyamuna= 3                      | Sal 80cm    | on the way to Sigol           |                               |
| 37 | Q 37     | on the Highway    | 100m             | 27°10'08.0" | 85°12'24.7" | 140m      | -  | -           | on the Highway                | Langur Male=9, Fem=12, Juv=8  |
| 38 | Q 38     | on the Highway    | 100m             | 27°09'09.7" | 85°14'31.0" | 138m      | -  | -           | on the Highway                | Rhesus Male=9, Fem=14, Juv=2  |
| 38 | Q 39     | on the Highway    | 100m             | 27°09'06.7" | 85°16'02.7" | 142m      | -  | -           | on the Highway                | Rhesus Male=4, Fem=12, Juv=12 |

**Appendix IV**  
**Study of Monkey in Hetauda – Dhalkebar – Duhabi**  
**400 kV Transmission Line Project Area**

**B. Forest sampling at Bardibas Block**

Forest enumeration by the quadrat sampling (20x20m) and monkey status.

| S.N. | Quadrat | Major Plant species | Highest DBH (inch) | Highest Ht (ft) | Other Flora   | Monkey status Observed |
|------|---------|---------------------|--------------------|-----------------|---|------------------------|
| 1.   | Q 1     | Sal, Simal          | 48                 | 60              | Khayer, Karma, Sapling of Sal and a few herbs       | Rhesus, 20 and Langurs |
| 2.   | Q 2     | Sal                 | 40                 | 50              | Sapling of Sal and Ground herbs scarce              | Rhesus and Langurs     |
| 3.   | Q 3     | Sal, Karma          | 40                 | 50              | Sapling of Sal and Ground herbs scarce              | No primates            |
| 4.   | Q 4     | Sal                 | 44                 | 45              | Saj, Sapling of Sal and Ground herbs scarce         | No primates            |
| 5.   | Q 5     | Sal                 | 45                 | 50              | Jamun, Sapling of Sal and Ground herbs scarce       | Rhesus, 20             |
| 6.   | Q 6     | Sal, Karma          | 46                 | 50              | Dhayaro, Sapling of Sal and Ground herbs scarce     | No primates            |
| 7.   | Q 7     | Sal, Karma          | 48                 | 50              | Jamun, Sapling of Sal and Ground herbs scarce       | No primates            |
| 8.   | Q 8     | Sal                 | 38                 | 45              | Sapling of Sal and Ground herbs scarce              | No primates            |
| 9.   | Q 9     | Sal                 | 41                 | 45              | Jamun, Dhayaro, Sapling of Sal, Ground herbs        | Langur, 15             |
| 10.  | Q 10    | Sal, Karma          | 48                 | 60              | Dhayaro, Sapling of Sal and Ground herbs scarce     | Rhesus, 20             |
| 11.  | Q 11    | Sal                 | 40                 | 55              | Some unknown flora and Sapling of Sal, herbs scarce | No primates            |
| 12.  | Q 12    | Sal                 | 10                 | 30              | Jamun, Sapling of Sal and Ground herbs scarce       | Rhesus, 20             |
| 13.  | Q 13    | Sal                 | 40                 | 50              | Sapling of Sal and Ground herbs scarce              | No primates            |
| 14.  | Q 14    | Sal, Karma          | 30                 | 35              | Guava with top DBH, Sal saplings, Dhayaro, herbs    | Rhesus, 20             |
| 15.  | Q 15    | Sal                 | 30                 | 40              | Sapling of Sal and Ground herbs scarce              | No primate             |
| 16.  | Q 16    | Sal                 | 26                 | 30              | Some unknown flora and Sal saplings                 | No primates            |
| 17.  | Q 17    | Sal                 | 28                 | 30              | Jamun, Sapling of Sal and Ground herbs              | Rhesus and Langurs     |
| 18.  | Q 18    | Sal                 | 35                 | 35              | A few unknown large tree presence, Ground herbs     | Rhesus and Langurs     |

**Appendix IV**  
**Study of Monkey in Hetauda – Dhalkebar – Duhabi**  
**400 kV Transmission Line Project Area**

**C. Forest sampling at Koshi Block**

Forest enumeration by the quadrate sampling and monkey status.

| SN | Quadrate      | LOCATION           | LATITUDE    | LONGITUDE   | ELEVATION | VEGETATION in 20mX20m  | Highest DBH         | Approx. Dist. to TL | REMARK                             | Monkey Status               |
|----|---------------|--------------------|-------------|-------------|-----------|--|---------------------|---------------------|------------------------------------|-----------------------------|
| 1  | Near AP 35    | Sitapur Colony     | 26°37'58.2" | 86°46'47.5" | 116m      | Sal=3, mango plant=9 Sal sapling= 3  | Sal= 23cm           | 50m                 | Pathudaha CF                       | Heavy conflict              |
| 2  | Near AP 36    |                    | 26°38'41.8" | 86°48'15.0" | 120m      | People's farm  |                     | 50m                 | Forest is about 1 Km far           | Presence of Monkey conflict |
| 3  | East of AP 37 | Khaiyadamar        | 26°38'58.8" | 86°50'04.7" | 111m      | Botdhayaro= 6, taki= 2, Barro= 3,tilke= 1, Jamun= 1 Sal sapling= 3, Rajbrikchhya sapling=2 | Barro=22.5          | 100m                |                                    |                             |
| 4  | Q4            | Bagdhuwa           | 26°38'53.6" | 86°50'39.5" | 120m      | Simal= 2 , Sal=4, Barro= 2   | Simal=28cm          | 50m                 | Scatter forest                     |                             |
| 5  | Q5            | AP 38              | 26°38'42.7" | 86°51'17.3" | 112m      | Rajbrichhya= 5,Michaiyaa= 7, Sisso= 2, Khayar= 4   | Khayar=33cm         | 100m                | SarukThumki CF                     |                             |
| 6  | Q6            | Near Ap 39         | 26°38'52.4" | 86°51'44.2" | 104m      | Sisso, Bamboo patches, Mirchaya  |                     | 100m                | Scatter tress only with small pond |                             |
| 7  | Q7/ Bakshaha  | Khoder devi CF     | 26°38'50.1" | 86°51'32.3" | 102m      | Mango, Khayar,Ssiss o  |                     | 150m                | Scatter tress only                 |                             |
| 8  | Q8            | Near Sundari Khola | 26°39'37.0" | 86°52'07.6" | 120m      | Rajbrikchhye= 7, Mirchaiya= 2  | All are small trees | 200m                | South of Sundari khola             |                             |
| 9  | Q9            | Near Sundari Khola | 26°39'41.7" | 86°52'06.8" | 98m       | Sal= 4, Barro= 1, Botdhayaro= 1  | Bodhdharo = 40cm    |                     | NE of Sundari khola                |                             |
| 10 | Q 10          | NE Sundari Khola   | 26°40'38.7" | 86°54'18.2" | 96m       | Sal (100%)= 14   | Sa l36cm            | 50m                 |                                    |                             |

| SN | Quadrant    | LOCATION          | LATITUDE     | LONGITUDE   | ELEVATION | VEGETATION in 20mX20m         | Highest DBH | Approx. Dist. to TL | REMARK                    | Monkey Status   |
|----|-------------|-------------------|--------------|-------------|-----------|-------------------------------|-------------|---------------------|---------------------------|-----------------|
| 11 | Q11         | Near Ap 40        | 26°40'36.5"  | 86°54'27.6" | 100m      | Sal= 15, Jamun= 2             |             | 50m                 | Sal Forest                |                 |
| 12 | Q 12        | AP 40#b           | 26°40'34.4"  | 86°54'37.5" | 118m      | Sal= 1 8, Bhalayo= 2, Taki= 2 | Sal= 56cm   | 100m                | Crossing river            |                 |
| 13 | Q 13        | AP41              | 26°40'26.3"  | 86°54'44.0" | 100m      | Sal=10,                       | Sal= 50m    | 100m                | near confluence of rivers |                 |
| 14 | Q14         | AP50              | 26°45'25.9"  | 86°02'09.5" | 94m       | Sal= 7, Sis sio= 12           | Sal= 32cm   | 150m                | near Koshi river          |                 |
| 15 | Q 15        | Between AP 49 &50 | 26°45'03.7"  | 86°01'50.1" | 111m      | Sal= 15,                      | Sal= 5 5cm  | 50m                 | In Sal dominant forest    |                 |
| 16 | Q 16/ AP 46 | Balahi/ Tapeswori | 26°44'15.7"  | 86°58'38.6" | 99m       | Sal= 22, Aule= 2              | Sal= 6 7    | 100m                | Sal dominant Forest       |                 |
| 17 | Q 17        |                   | 26°44'17.4"  | 86°58'31.8" | 94m       | Sal=13                        | Sal= 33c m  | 100m                | Sal dominant Forest       |                 |
| 18 | Q 18        |                   | 26°44'17.1"  | 86°58'21.0" | 94m       | Sal= 12                       | Sal= 34 cm  | 100m                | Sal dominant Forest       |                 |
| 19 | Q 19        |                   | 26°44'25.8"  | 86°57'54.6" | 94m       | Sal= 14                       | Sal= 33 cm  | 100m                | Sal dominant Forest       |                 |
| 21 | Q 20        | Kanakapatti       | 26°38' 22.8" | 86°40'27.5" | 99m       | People's private field        |             |                     |                           |                 |
| 22 | Q 21        | Kalinjhora        | 26°40' 56.4" | 87°08'23.7" | 74        | Sal = 83                      | Sal = 15    | 100m                | Sal Dominant              | Rhesus presence |

**Appendix V**  
**PHOTOGRAPHS DURING FIELD OBSERVATION**

**a. Photo plates of different activities in the field (Hetauda Block)**



The activities during the field work includes, forest walk, individual meeting, group discussion and photography of the proposed TL area.

b. Photo plates of different activities in the field (Bardibas Block)



The activities during the field work includes, forest walk, individual meeting, group discussion and photography of the proposed TL area.

c. Photo plates of different activities in the field (Koshi Tappu Block)



The activities during the field work includes, forest walk, individual meeting, group discussion and photography of the proposed TL area.