Project update: September 2018
Project title: Habitat Suitability Assessment for Tiger in Trijuga Forest, East Nepal
Project Location: Udayapur and Saptari district, East Nepal

Introduction:

As a part of the project **Habitat Suitability Assessment for Tiger in Trijuga Forest, East Nepal** funded by WildCats Conservation Alliance, a one month long field work was carried in Trijuga Forest in Eastern Nepal. The field works started from 26 May to 24 June of 2018. A research team comprising of four biologists (3 zoologists and 1 botanist) was led by Professor Karan Bahadur Shah. The team of biologists was joined by three local assistants in the field.

Objectives:

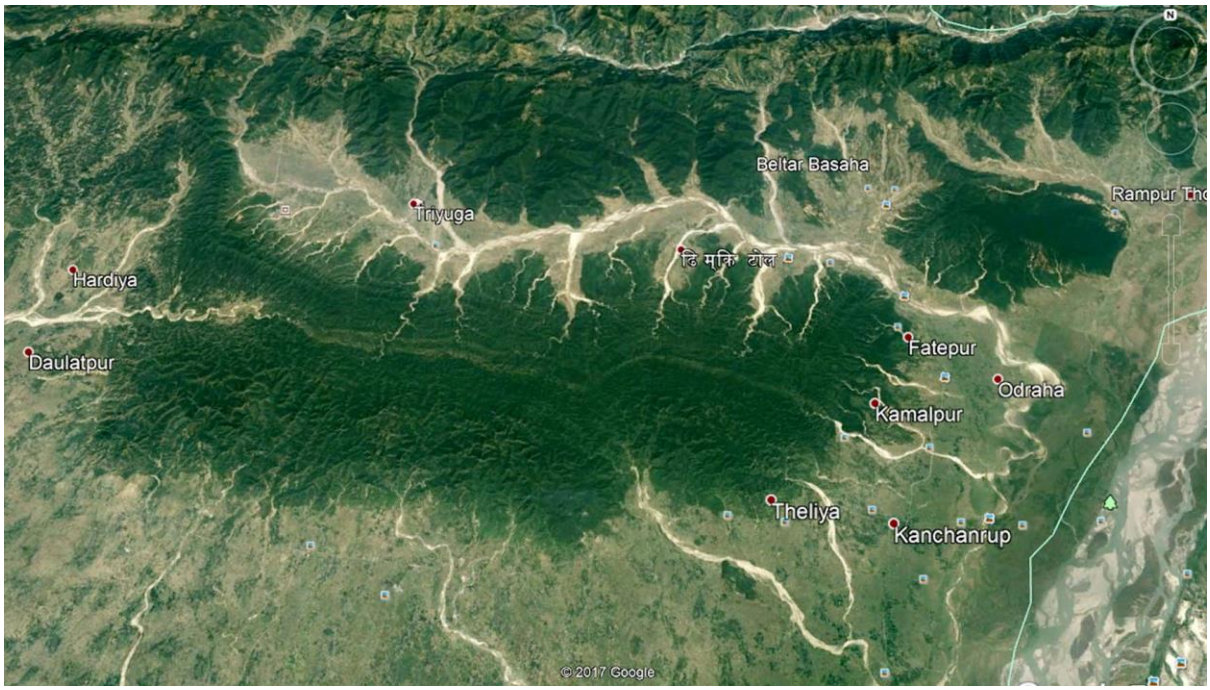
The major objective of this project is to carry out habitat assessment of Trijuga Forest, a key biodiversity area for potential tiger habitat. Specific objectives were to:

- Conduct vegetation survey; vegetation type, cover, status, etc.
- Conduct tiger prey base survey; species diversity and abundance.
- Determine threats to local biodiversity.
- Study drainage or water; source type and distance.
- Assess local people's dependency on the forest.
- Study the topography; aspect, slope, elevation, etc., of the area.
- Identify critical areas of improvement and recommend for future actions.

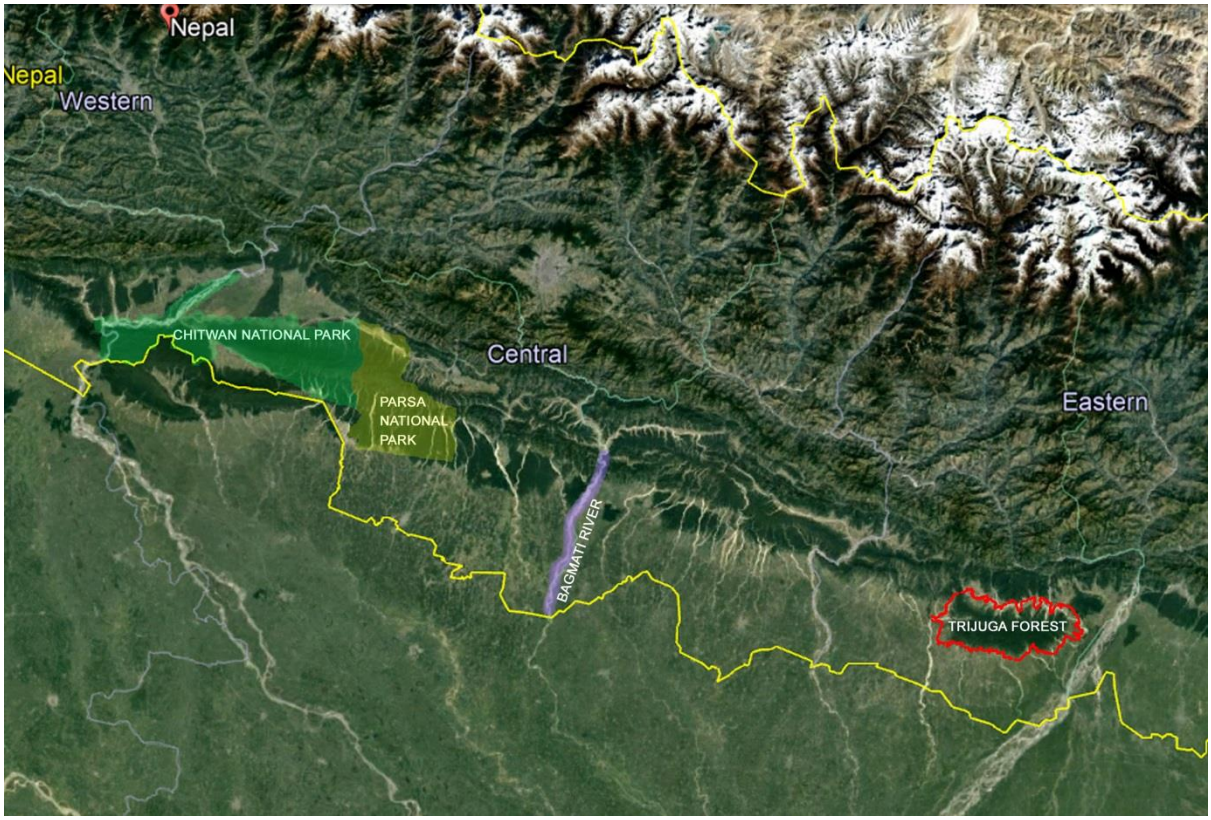
Recommend Government of Nepal to designate Trijuga forest as protected area to accommodate the growing tiger population in Nepal.

Study area:

Trijuga forest, the project area lies in Udayapur and Saptari districts (26.694760 N 086.736963 E), north-west of Koshi Tappu Wildlife Reserve (KTWR) in East Nepal. This forest falls within Eastern Chure-Terai Complex, one of three new landscapes proposed by Government of Nepal, Ministry of Forest and Soil Conservation. Trijuga forest is the largest forest patch in Eastern Nepal with an area of about 444 km^2 touching four VDCs/municipalities of Udayapur and nine VDCs/municipalities of Saptari district and is part of the Sivalik hills with thick forested vegetation.



Map 1. Trijuga forest



Map 2. Position of Trijuga forest in relation to existing tiger population

Methods:

Literature Review and Informal Interactions

Species Occupancy Survey

Opportunistic Survey

Interaction/Questionnaire Survey

Activities:

Based on aforementioned methods, following activities were carried out:

Obtaining permissions:

Before going to the field, necessary permissions were acquired from the related government authorities. Written project approval was obtained from Nepal Government's Social Welfare Council and research permission was obtained from Department of Forest. Copies of research permission letter obtained from Department of Forest were submitted to District Forest Office of Udaypur and Saptari and copies of project approval letter obtained from Social Welfare Council were submitted to District Coordination Committee of Udaypur and Saptari. Department of National Parks and Wildlife Conservation agreed to liaise throughout the project period.

Literature Review and Interaction:

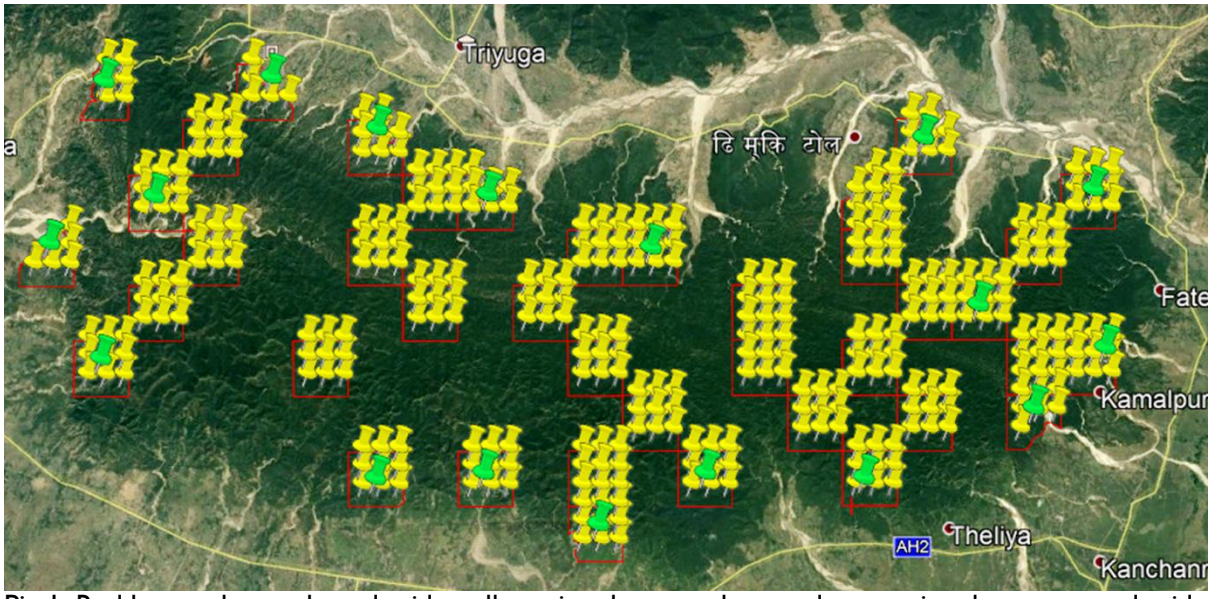
Prior to moving to the field, thorough review of published and unpublished literature and informal interactions with knowledgeable persons were carried out in Kathmandu.

Field preparation:

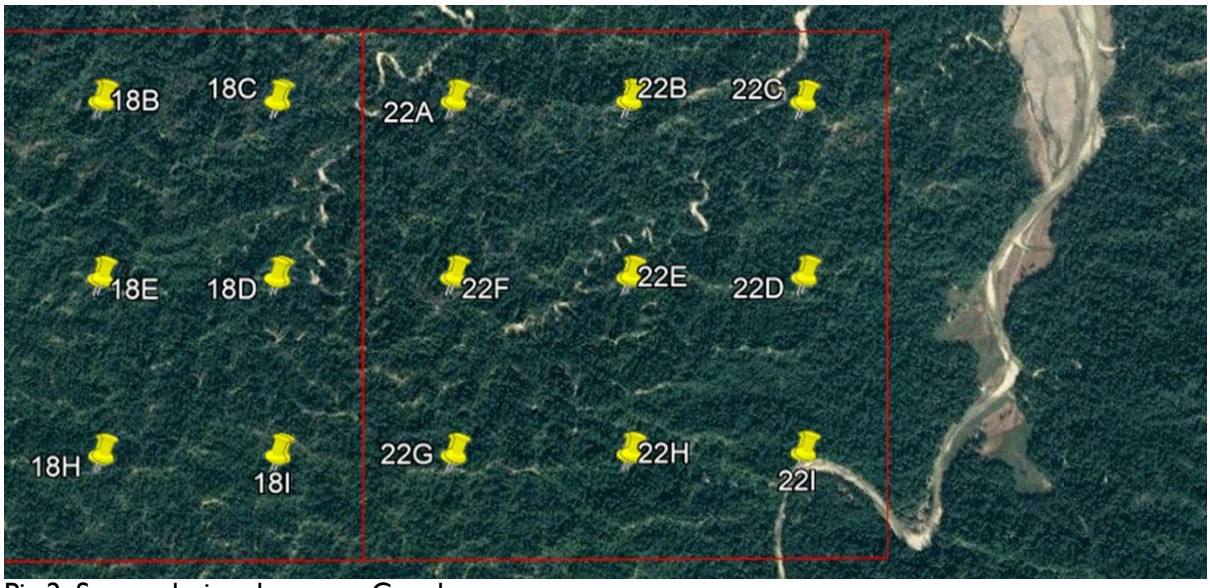
Datasheets and questionnaire were prepared in order to record various parameters essential for the project. All equipment and other logistics were arranged.

Species Occupancy Survey:

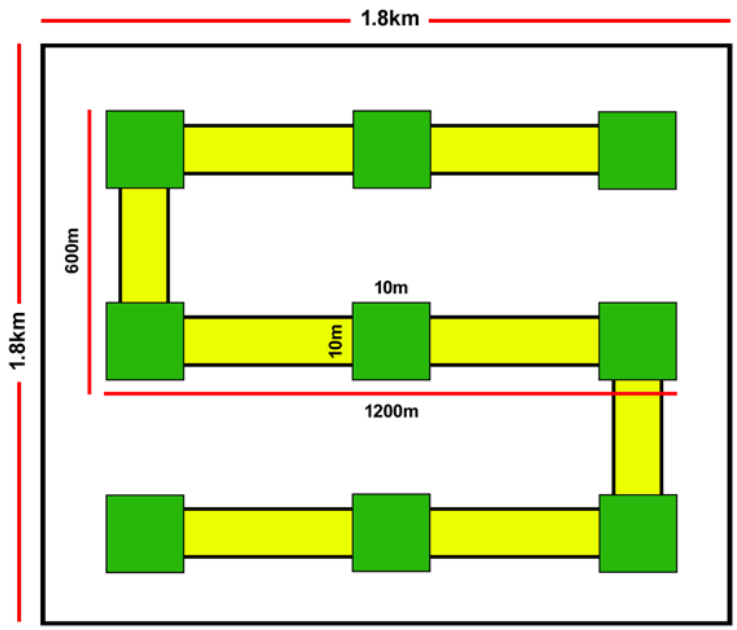
Realizing the proposed Distance Sampling Method was unsuitable due to undulating terrain, high human disturbance, low prey abundance and poor visibility due to monsoonal weather condition and dense forest after our preliminary survey, we switched the method to Species Occupancy Survey. The total study area of 444km^2 was divided into 137 grids of 1.8km x 1.8km, of which 32 were omitted due to more than 50% of area lying outside the forest area. Out of remaining 105 grids, 40 random grids were initially targeted for the survey, however inaccessibility due to difficult terrain and challenging climatic condition, and potential threats from poachers and wild animals like Wild Elephant and Sloth Bear, despite our best efforts we were able to cover only 18 grids. A total of eight line transects of 600m each were laid in '2' or 'S' shape (see pic. 3) and at least three line transects were covered during the survey to demonstrate spatial replication for species occupancy survey. Quadrats of 10m x 10m were fixed at starting point and after each 600m, making nine quadrats in total. Direct observation of prey species, their foot prints, faecal matters, calls and other indirect signs were recorded walking through the line transects. Vegetation type, canopy cover, ground cover, and human disturbances seen within the quadrats were documented. The survey was carried out from 26 May to 24 June of 2018 on foot for having no road networks inside the forest.



Pic 1. Red boxes show selected grids, yellow pins show quadrats and green pins show surveyed grids



Pic 2. Survey design shown on Google map



Pic 3. Pictorial representation of the survey design within a grid

Opportunistic Survey: Opportunistic surveys were carried out randomly, to record different prey species and other essential parameters.

Interaction/Questionnaire Survey: More than two dozens of informal interactions and questionnaire survey in 100 households were conducted in surrounding communities to collect information on basic demographics, socioeconomic conditions, natural resource use, wildlife sighting, poaching, people's perception on returning of tiger to the area, etc. In order to capture local people's perception on returning of tiger to the area in future which is vital as they are the pivot in conserving tiger, we prepared a series of questions related to human-wildlife conflict, its status and type, effectiveness of government's compensation scheme, local livelihood benefit due to presence of tiger, tiger's religious and cultural values in the area, potential tiger tourism, etc. Additionally, informal interactions made them feel easy to come up with their opinion on tiger returning. Informal interactions were also carried out with district forest officials and members of community forest user's group.

On-going activities:

Data entry and analysis, modelling, and detailed write-up are on-going.

Annex I:

Datasheet: Human Disturbance Survey

Observer's name:						**Location name:**				**Date:**	
Start time:		**Grid ID:**	**Start GPS location**			**End GPS location**					
			Easting:			Easting:					
End time:			Northing:			Northing:					
Quadrate ID	Wood cutting (No. of trees cut)	Lopping (No. of trees lopped)	Tree felling (Stump count)	Presence of temporary construction (Y/N) No.	Presence of human/livestock /tractor trails (Y/N)	People seen	Livestock seen/grazing (No.)	Presence of permanent construction (Y/N) No.	Others	Remarks	

Note:

Temporary construction (huts, poacher's camp, hunting machan, illegal settlers, logging camps, picnic camps)

Other: Gun shot heard, snares found, fishing, poisoning

Datasheet: Species Occupancy Survey

Observer's Name:_____ Location Name:_____ Date:_____

Start time:_____ End time:_____ Grid ID:_____

Start GPS location

Easting:_____

Northing:_____

End GPS location

Easting:_____

Northing:_____

Transect ID	GPS location	Species	Sign type/Direct sighting (No.)	Habitat type	Canopy cover	Ground cover	Terrain type	Slope	Aspect	Remarks
	E: N:									
	E: N:									
	E: N:									
	E: N:									
	E: N:									
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	E: N:									

Note:

Carnivore species: Tiger, Leopard, Sloth Bear, Hyena, Wild Dog, Jackals, Wild Cat, Civets, Mongoose, Other cat species

Ungulates species: Chittal, Hog Deer, Swamp Deer, Gaur, Sambar, Wild Boar, Barking Deer, Hare, Four-horned Antelope, Rhesus Macaque, Langur, Porcupine, Elephant, Cattle, Unid

Sign types: Scats/Faecal matter, Dung, Pellet, Pugmark/Footprint, Scrape marks, Kills, Body parts

Forest types: Sal Forest/Mixed Forest/Riverine Forest/Grassland (short/tall)

Terrain types: Flat terrain/Foot hills/Churia/River bed

Datasheet: Line Transect Survey

Observer's Name:_____ Grid ID:_____ Transect No.:_____

Location Name:_____ Weather:_____ Habitat Type:_____

Start GPS: E:_____ N:_____

End GPS E:_____ N:_____

Date:_____ Start time:_____ End time:_____

SN	Time	Species	M	F	Y	Unid	Total No.	Animal Bearing	Angular Sighting Distance	Habitat Type* (Two major species)	GPS location
1											N: E:
2											N: E:
3											N: E:
4											N: E:
5											N: E:
6											N: E:
7											N: E:
8											N: E:
9											N: E:
10											N: E:
11											N: E:
12											N: E:
13											N: E:
14											N: E:
15											N: E:

***Habitat Type:** SF - Sal Forest, MF - Mixed Forest, RF - Riverine Forest, TG - Tall Grassland, SG - Short Grassland, W - Wetland, S - Streamed

Habitat Suitability Assessment for Tiger in Trijuga Forest, East Nepal

Questionnaire Form

Respondent's Information Box **Date:**_____

Name:_____ **Age:**_____ **Sex:**_____

Address:_____ **Occupation:**_____

Associated Community Forest:_____

General questions:

1. Do you know what wild animals stand for?

   Yes No

2. How much are you fascinated by wild animals?

   Very much Good Not at all

3. Are there any wild animals seen in Trijuga Forest?

   Yes No

4. If yes, how often are they seen?

   Very often Occasional Rare

5. Name the types of wild animals seen in Trijuga Forest.

   i._____ ii._____ iii._____ iv. _____

   v._____ vi._____ vii._____ Viii._____

6. Which part/s of the forest do they dwell the most?

   Deep forest Forest edge Everywhere Don't know

7. What is your observation, are the number of wild animals increasing or declining than the past?

   Increasing Declining Stable Don't know

8. Give the name of wild animals which are declining based on you observation?

   i._____ ii._____ iii._____ iv. _____

   v._____ vi._____ vii._____ Viii._____

9. Give the name of wild animals which are increasing based on you observation?

   i._____ ii._____ iii._____ iv. _____

v._____ vi._____ vii._____ Viii._____

Conflict:

10. Is there any conflict between wild animals and villagers around Trijuga forest?

    a) Yes b) No c) Don't know

11. If yes, what type of conflict is there?

    a) Crop raiding b) Livestock depredation c) Injuring people d) Killing people

    e) Deterring people

12. What is the extent of conflict in the area?

    a) Extreme b) Moderate c) Minimum

13. Which wild animals are responsible for the conflict?

    i)_____ ii)_____ iii)_____ iv)_____

    v)_____ vi)_____ vii)_____ viii)_____

14. Has the prevalence of conflict led to negative perception towards wild animals among local people?

    a) Yes b) No c) Don't know

15. Has any initiation been made to resolve/reduce the conflict?

    a) Yes b) No c) Don't know

16. If yes, who and what type of initiation has been made?

    i)_____ ii)_____

    iii)_____ iv)_____

17. Have you locally adopted any measures to reduce the conflict with wild animals?

    a) Yes b) No c) Planning to adopt

18. If yes, give the measures you have adopted or planning to adopt.

    i)_____ ii)_____

    iii)_____ iv)_____

19. What are conflicts instigated by local villagers against the wildlife?

    a) Killing b) Mauling c) General disturbances

    d) Food scarcity e) Habitat degradation f) Others

Threats:

20. Is there poaching of wild animals in Trijuga Forest?

    a) Yes b) No

21. If yes, what are the wild animals mostly poached and who are involved in it?

i)_____ ii)_____

iii)_____ iv)_____

v)_____ vi)_____

22. Are animals poached for consumption or trade?

a) Consumption b) Trade c) Both d) Don't know

23. What do you think the causes of wild animals decline in Trijuga forest? Mention orderly, top cause first.

a) Habitat destruction b) Poaching c) Wild fire d) Human disturbances

24. How wild animals are disturbed in Trijuga forest?

a) Vehicles b) Firewood/fodder collection c) NTFP/timber collection d) Livestock grazing

e) Extraction of natural resources like stones, sand, soil, drainage of water, collection of thatch grass, leaves, tree felling, picnic etc.

Perception:

25. What is your opinion about wild animal's presence in Trijuga forest?

a) Positive b) Negative c) Neutral

26. Do you know that Trijuga forest is a historical habitat of Bengal Tiger?

a) Yes b) No

27. If yes, from where did you come to know?

i)_____ ii)_____

iii)_____ iv)_____

28. Are you aware of tiger's contribution in the nature? If yes, please mention.

i)_____ ii)_____

iii)_____ iv)_____

29. Is there any cultural/religious significance of tiger in your area? If yes, mention its importance.

a) Yes, _____

b) No

30. What is your view on returning of the tiger in Trijuga forest?

a) Positive b) Negative c) Neutral

Annex 2:
Pictures of Trijuga Forest from different locations

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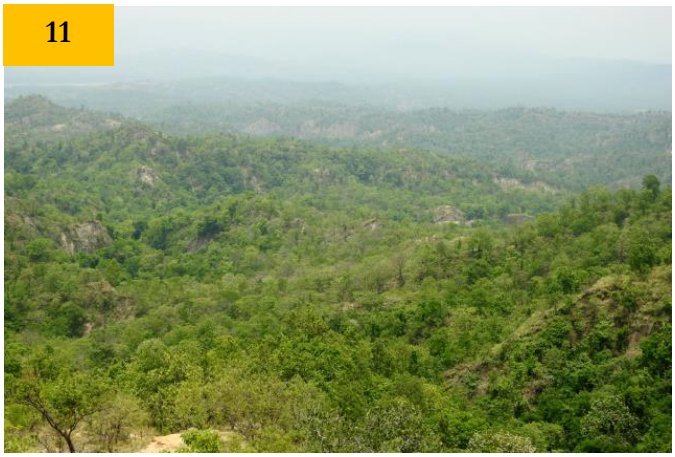

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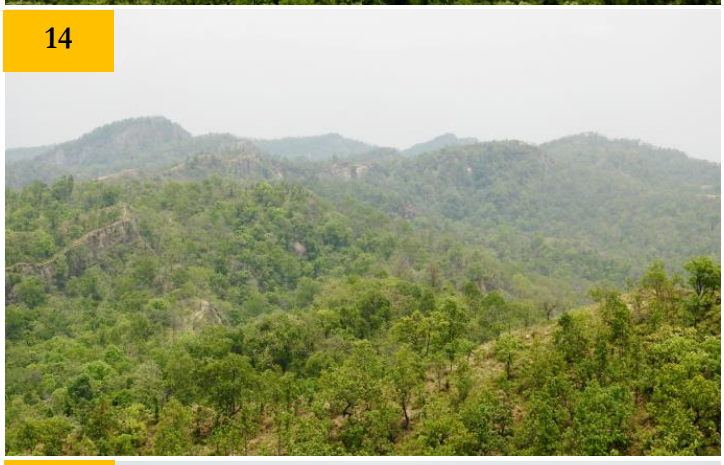

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Small Grasslands within the forest

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Glimpses of landslides and soil erosion

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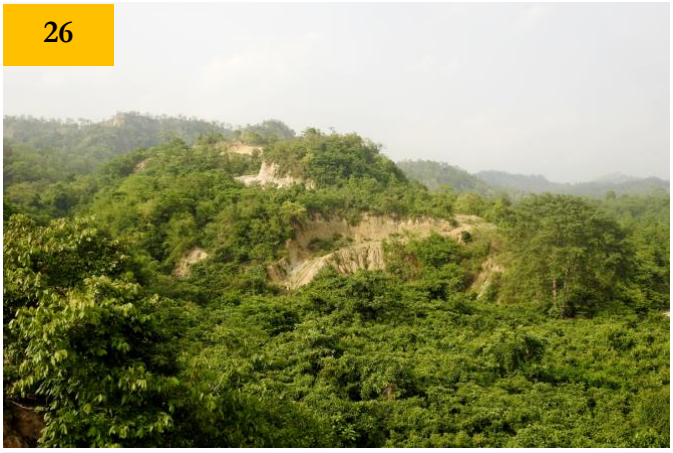

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Some sources of water

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Tree felling and signs of forest fire

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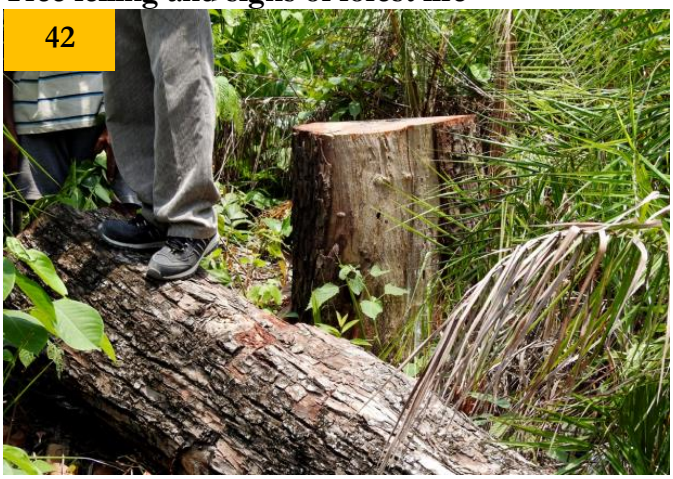

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Group pictures of research team and glimpses of researchers collecting field data at different places

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Informal interactions with local people and questionnaire survey

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Glimpses forest resources exploitation


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Fig 72, 73, 74, 75, 79. Firewood collection, Fig 76 & 77. Transportation of soil and eroded land, Fig 78. Logs collected by the forest user committee to distribute among the members

Fig 80. Sand mining, Fig 81. Fodder collection, Fig 82-85, Firewood collection

Fig 86. Firewood collection, Fig 87 & 93. Sand mining and transportation, Fig 88, 89, 90. Fodder, leaves and bamboo shoot collection, Fig 91. Stones and fodder transportation by a tractor, Fig 92.Cemented tank built for draining drinking water to nearby villages, Fig 94. Local women making mat from leaves of Thakal

Fig 95, 97, 98, 99. Fire wood collection by locals, Fig 96. Remnants of bamboo shoot, Fig 100 & 101. Tractors transporting sand, Fig 102. Physical infrastructures constructed for ascetics 'Baba or Sanyasi' inside the forest

Fig 103. Wild Boar captured and domesticated, Fig 105. Scrotal sac of a male Barking Deer used to cover the tip of Khukuri (Nepali knife), Fig 104. Cemented tank for draining drinking water to nearby village, Fig 106-109. Cattle left for grazing

Glimpses of wildlife (direct observation and wildlife signs)

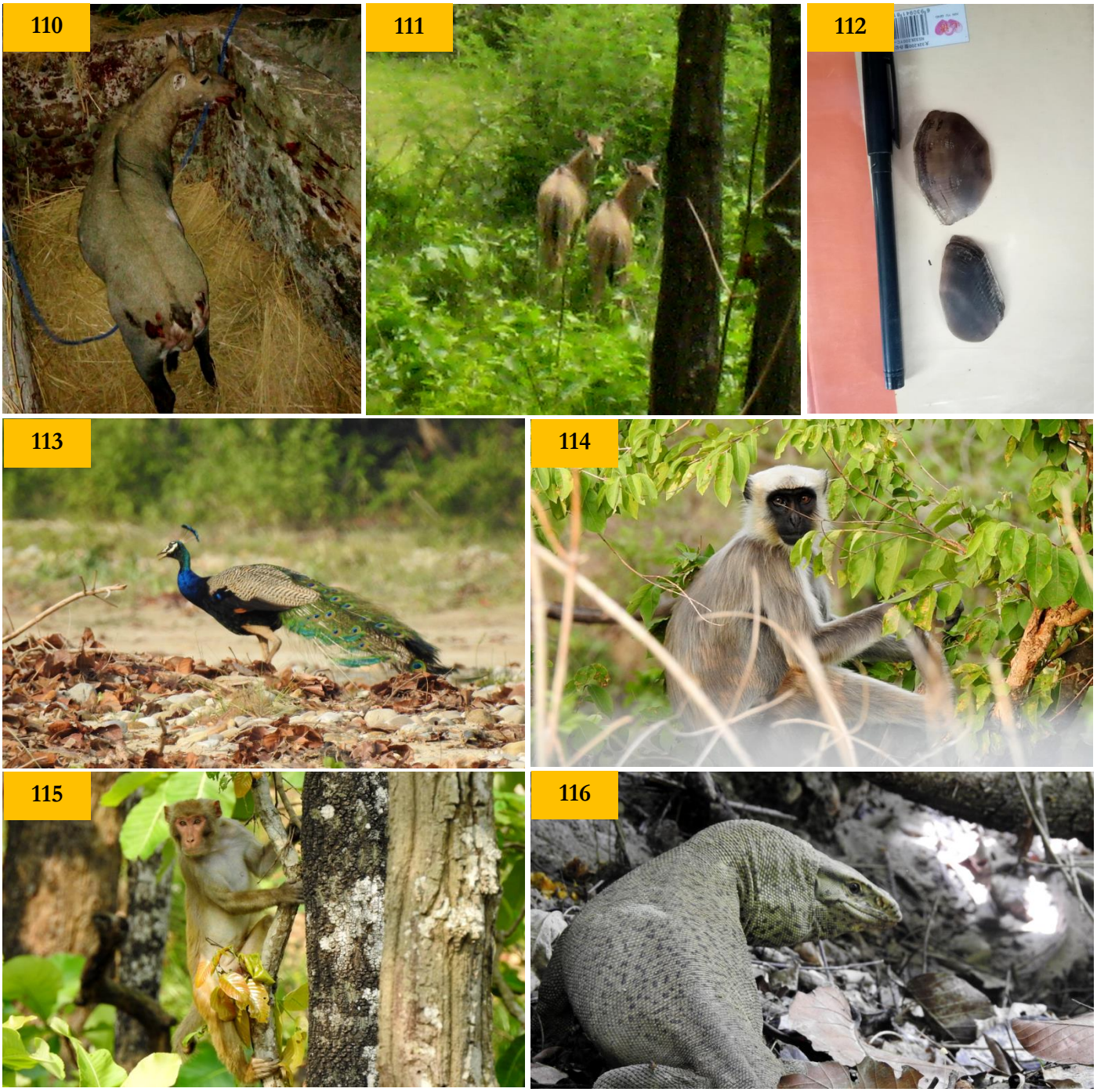

Fig 110. Male Blue Bull waiting for the rescue, Fig 111. A pair of female Blue Bull, Fig 112. Scales of a Chinese Pangolin, Fig 113. Indian Peafowl, Fig 114. Terai Grey Langur, Fig 115. Rhesus Macaque, Fig 116. Bengal Monitor Lizard

Fig 117. Pugmark of a Leopard, Fig 118 & 119. Foot prints of a Sloth Bear and an Asian Wild Elephant, Fig 120. Pellets of Barking Deer, Fig 121. Foot print of a Gaur, Fig 122. Rootling of Wild Boars, Fig 123. Pellets of Blue Bull, Fig 124. Foot prints of a Blue Bull

Fig 125 & 127. Pellets of Barking Deer, Fig 126. Foot print of a Barking Deer