

# WWF-MoEF-NNRMS RESEARCH PROJECT

*Develop a Protected Area Management Information System  
in Uttarakhand Pradesh using Remote sensing and GIS Technology*

## RESOURCE ATLAS 2009 - 2011

संरक्षित क्षेत्रों में  
संरक्षण।

Environment and Forests  
of India  
Dehradun, CGO Complex



Indira Gandhi Conservation Monitoring

172-B Lodi Estate

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**Number and Date of sanction letter**

F.No. 13-22/2007-RE dated 22<sup>nd</sup> July, 2009

**Duration of the Project**

Two (2) years

**Total outlay of the Project**

Rs. 31,22,112 (Rupees Thirty one lakh Twenty two thousand One hundred twelve)

**Date of start of Project**

1<sup>st</sup> October, 2009

**Date of Completion of Project**

30<sup>th</sup> September, 2011

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This opportunity to thank Mr. Ravi Singh, SG and CEO, WWF-India and Dr. Sejal Worah, PR, WWF-India for giving us the encouragement to carry out this study and for their able guidance. We also thank Mr. Naresh Kapila, Director HR and Mr. Lovkesh Wadhwa, Director Finance, WWF-India for their support to the study.

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We express our sincere gratitude towards Dr. G.V. Subramaniam, Advisor, Ministry of Environment, Forest and Climate Change (MoEF), Government of India (GoI); Dr. Jag Ram, Director and Dr. Harendra Kharkwal, Deputy Director, MoEF, GoI. This study would not have been possible without their able guidance and support.

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We also thank to the anonymous people who have directly and indirectly helped us in completing the project work within the sanctioned timeline.

is one of the twelve mega biodiversity countries in the world. Increasing human  
ation of natural resources and climate changes have put this biodiversity under  
his has necessitated use of appropriate technologies to formulate effective and su  
management and conservation practices. In this regard remote sensing and geograph  
mation system (GIS) has come to play an important role in the field of conserva  
state of Arunachal Pradesh is extremely rich in biodiversity and forms a part o  
ity hotspots in the Eastern Himalayas. The biodiversity is under threat due to a  
rs such as planned infrastructure development, changing socio-economic patter  
ernal pressures. It is therefore crucial to map the current biodiversity of the stat  
tial threats, which can contribute to the conservation of its unique natural resou  
created detailed databases.

research project is an attempt to develop spatial database for selected Protected a  
chal Pradesh, namely **Namdapha National Park, Mouling National Park,**  
**Sanctuary and D'Ering Memorial Wildlife Sanctuary.** These databases wo  
tivities pertaining to environmental mangement in the field of biodiversity cons  
ural resource management. Satellite images can be used to survey large regions  
to access on the ground and to monitor changes in the distribution of natural re  
tegration with GIS would also enhance the analytical capabilities of the databas

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Research objectives of this study can be outlined as below:

Provide and disseminate digital information on two National Parks and two sanctuaries (Namdapha NP, Mouling NP, Mehao WLS and D'Ering WLS), the data for developing comprehensive Protected Area (PA) management plans.

Provide and interpret spatial databases (consisting of extent, status and composition of various vegetation types in the reserves) through maps in GIS using remote sensing.

Provide periodic updating of databases that helps in determining the extent of forest and analyzes the impacts leading to better management of PAs.

Prepare comprehensive resource atlas of each PA.

# ARUNACHAL PRADESH NATIONAL PARKS AND WILDLIFE SANCTUARIES



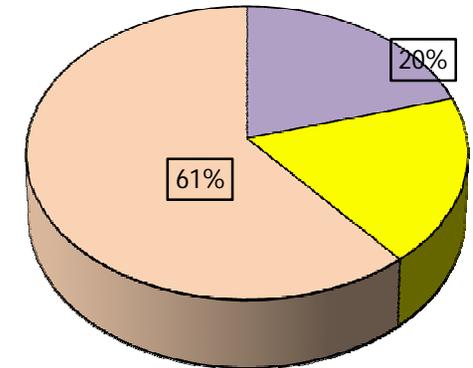
Area (G.A.): 83,743 sq km

Forest Area (2007): 51,540 sq km (61.55% of G.A.)

Forest (2007): 67,353 sq km (80.43% of G.A.)

rhinoceros (Bos Frontails)

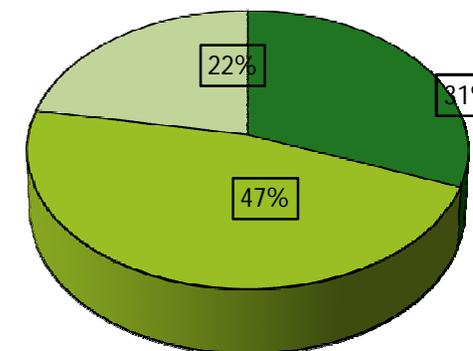
Recorded Forest Area



Reserved Forests Protected Forests

Source: FSI, 2009. India State of Forest R

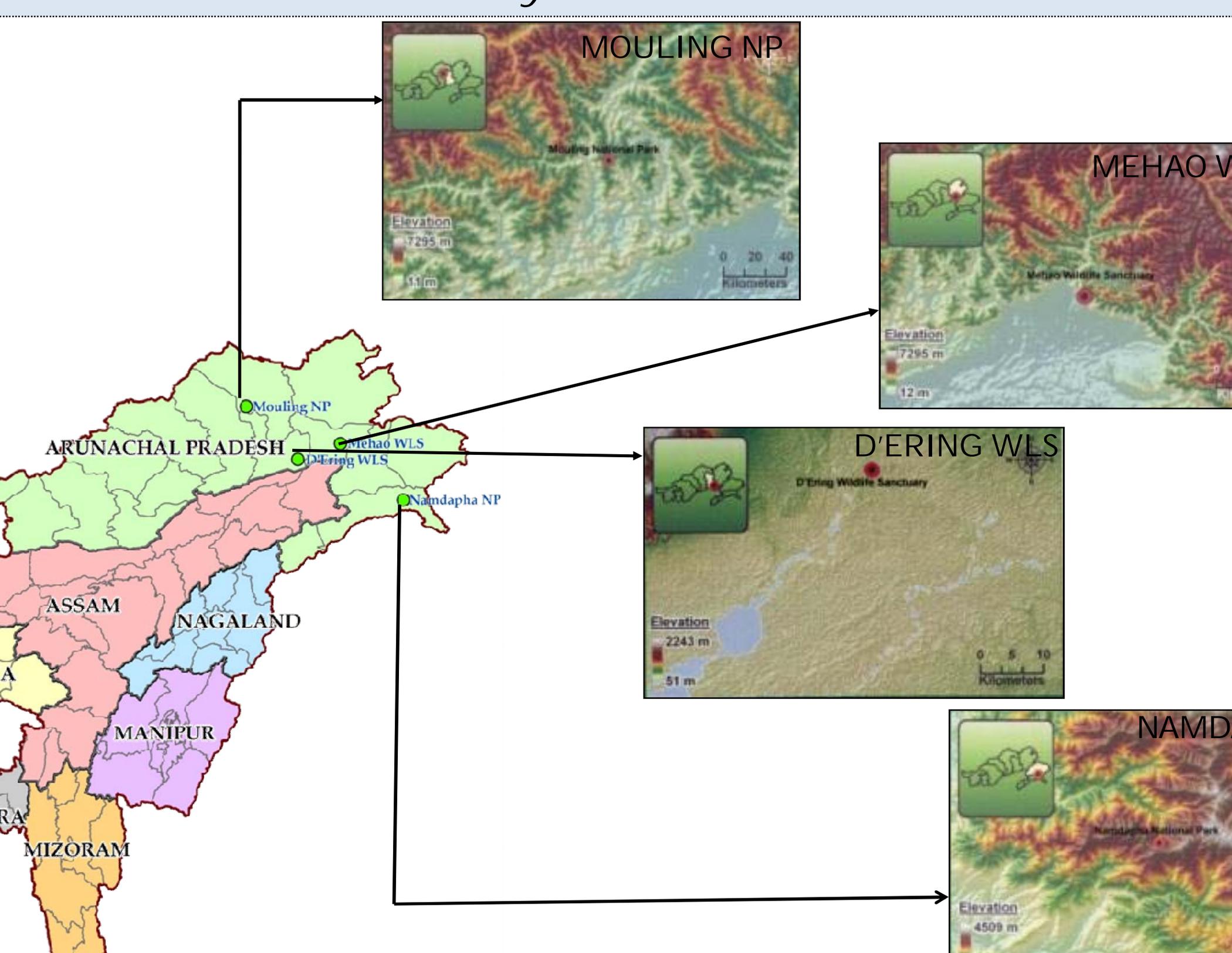
Forest Cover



Very Dense Forest Moderate Density Forest  
Open Forest

Source: FSI, 2009. India State of Forest R

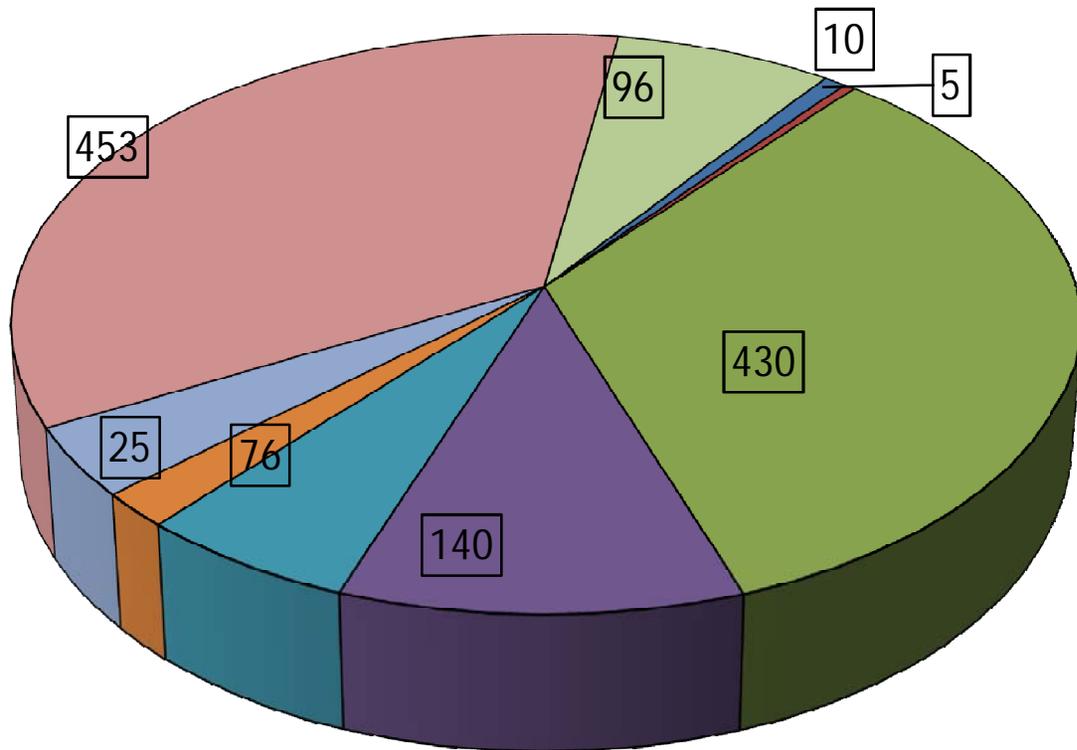
In the north-eastern tip of the country, the state of Arunachal Pradesh is a part of the Eastern Himalayan Range (one of the 18 "biodiversity hotspots" in the world), located between 26°28' to 28°20' N latitude and 91°30' to 97°30' E longitude. The diversity of topographical and climatic condition has





*NAMDAPHA NATIONAL PARK*

Number of Faunal group inhabiting ground, litter, under stone, decaying woods and grasslands in Namdapha



Invertebrates  
Insects  
Molluscs  
Arachnids

- Leeches
- Butterflies and Moths
- Amphibians
- Birds

Declared a **National Park** in 1983. Sa was declared a **Tiger Reserve** under Tiger scheme of Government of India.

Changlang District, Arunachal Pradesh

sq km

27°23'30" - 27°39'40" N

96°15'2" - 96°58'33" E

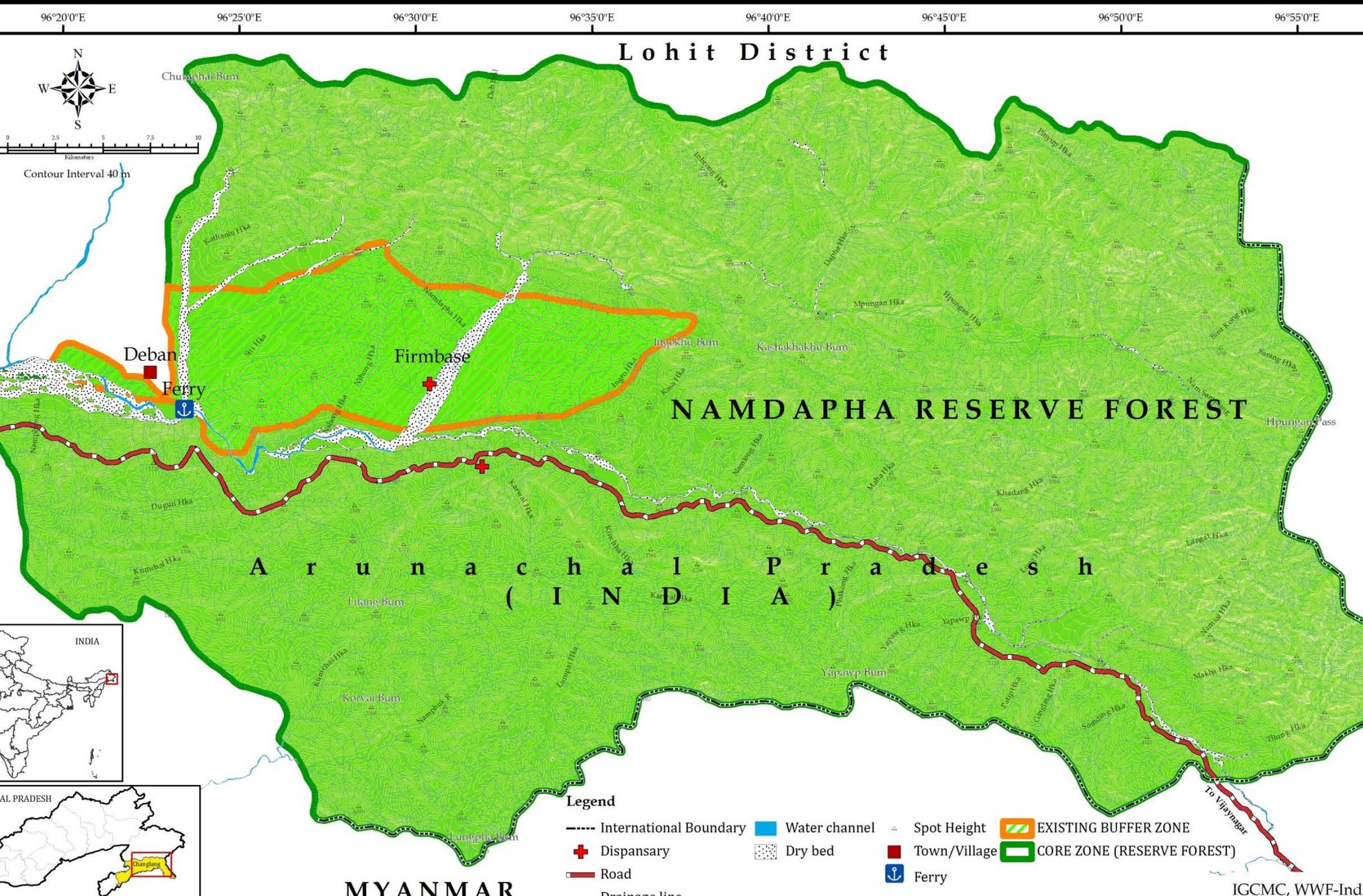
**Mean Annual Temperature:** 21°C

**Precipitation:** 1400mm – 2500mm

**Vegetation:** Extensive *dipterocarp* forests (the northernmost lowland tropical rainforests)

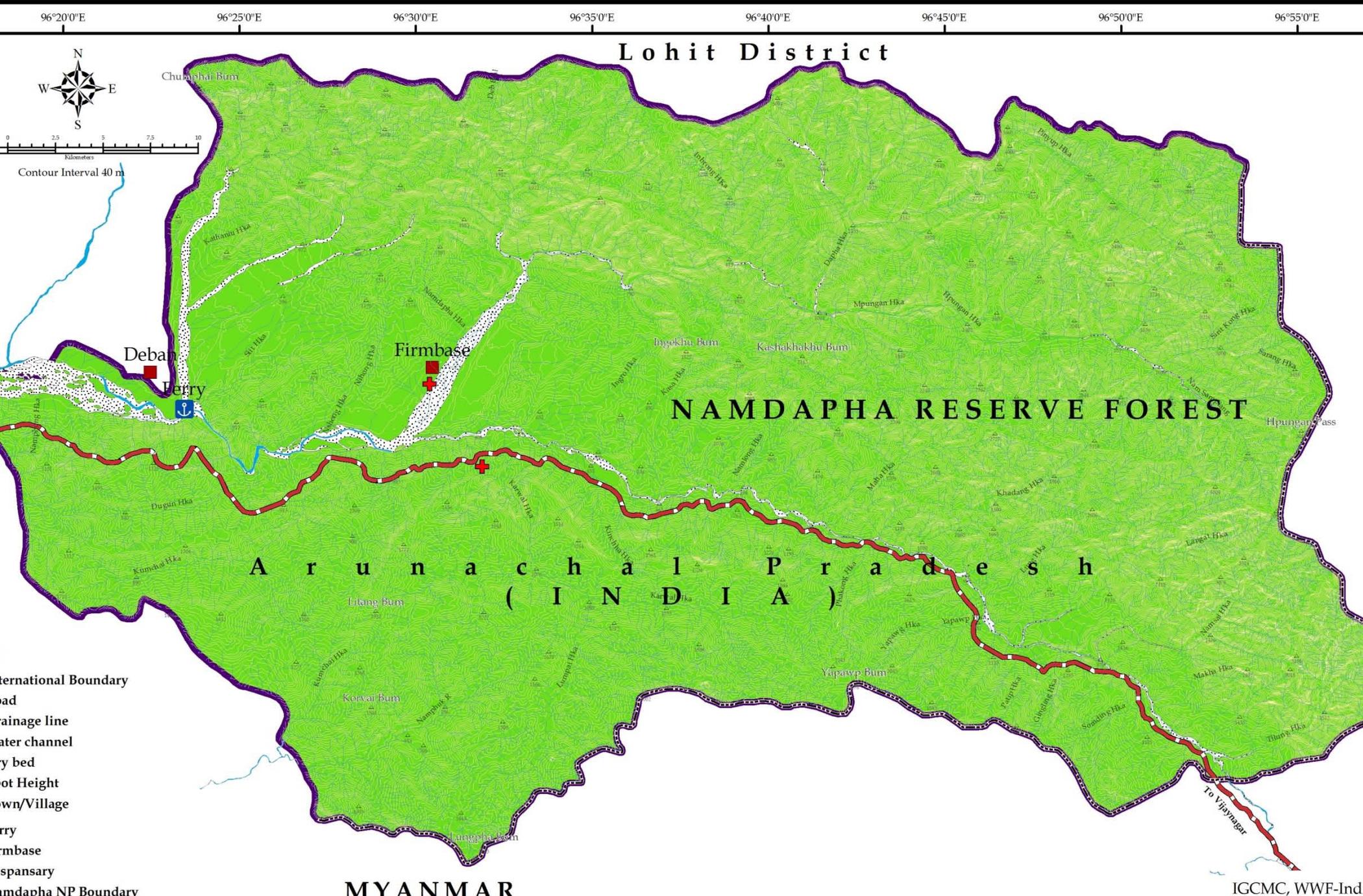
# NAMDAPHA NATIONAL PARK, ARUNACHAL PRADESH

## Location Map



feature map depicts the boundary of the National Park, drainage network, road distribution of villages and towns, also provide information on the elevation distribution and spot height. Namdapha is flanked on the south and east by the Patkai hills, and the Malaya.

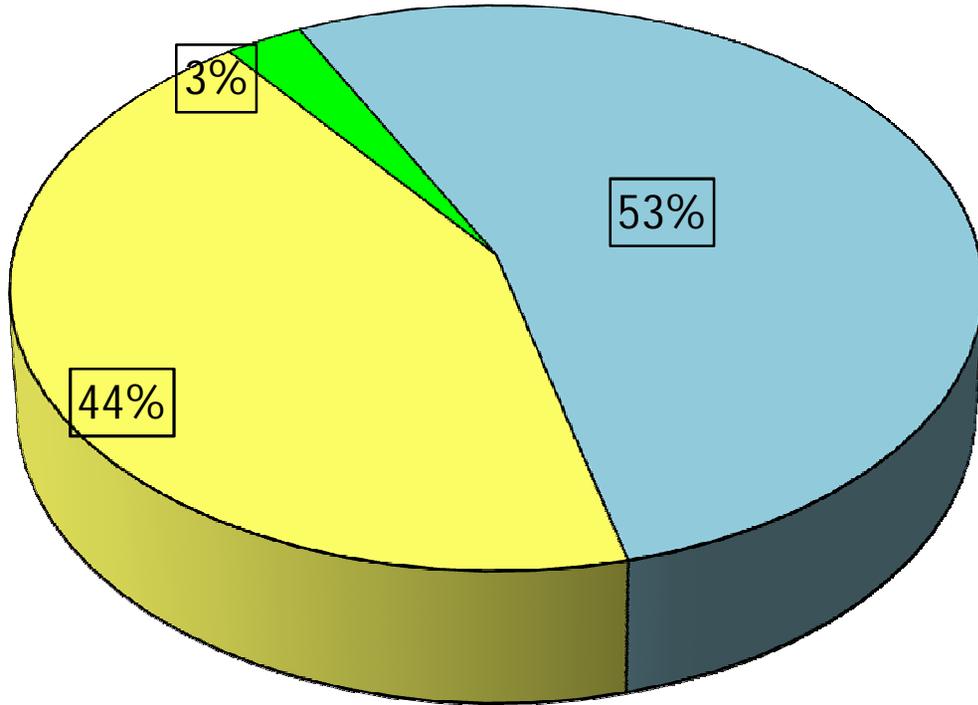
# NAMDAPHA NATIONAL PARK, ARUNACHAL PRADESH Physical Feature Map



network map basically maps the drainage system of the Namdapha National Park. Rivers flowing across Namdapha National Park include Noa-Dihing, Deban, Namdapha. From these there are innumerable seasonal rain-fed streams and streamlets which drench



# Population pressure in the northwestern and southeastern periphery of Namdapha nature reserve



Northwestern periphery

Core Zone

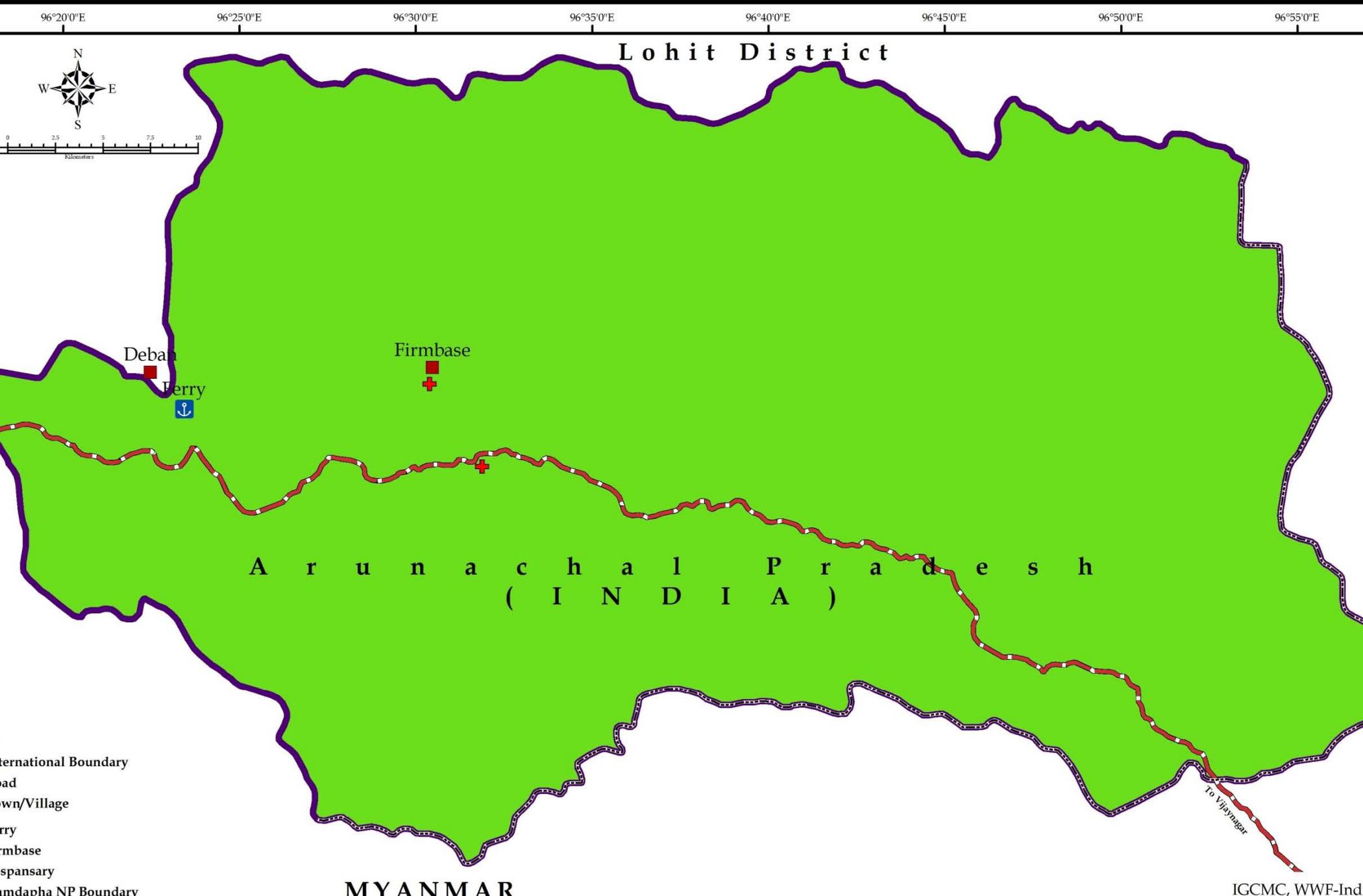
Southeastern periphery

Chalam *et al.*, 2004

Road network map depicts the network connectivity within the park area. The Vijaynagar road cuts through the National Park and plays a very important role. Human settlements residing within peripheral areas of the park, fully dependent on the nature reserve for their day-to-day life.

# NAMDAPHA NATIONAL PARK, ARUNACHAL PRADESH

## Road and Village/Town Location Map



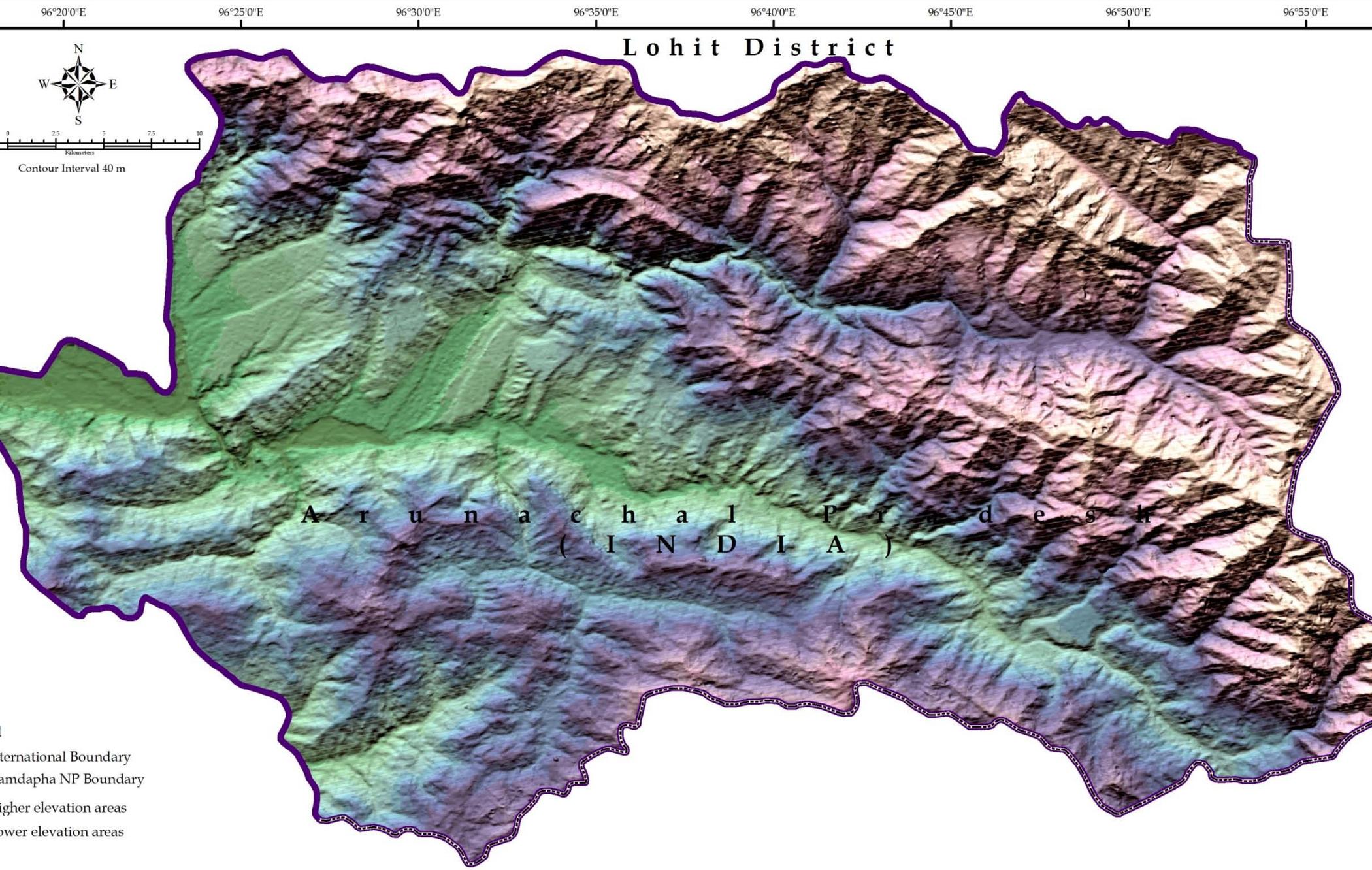
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ography of Namdapha National Park is rugged with numerous steep hills and narrow valleys, crisscrossed by several rivers. Its elevation ranges from 150 m to 4500 m above sea level (asl). The region is composed of loose, poorly consolidated ferruginous, bluish grey sand and grey clay with layers of pebbles.

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# NAMDAPHA NATIONAL PARK, ARUNACHAL PRADESH

## Relief Distribution Map

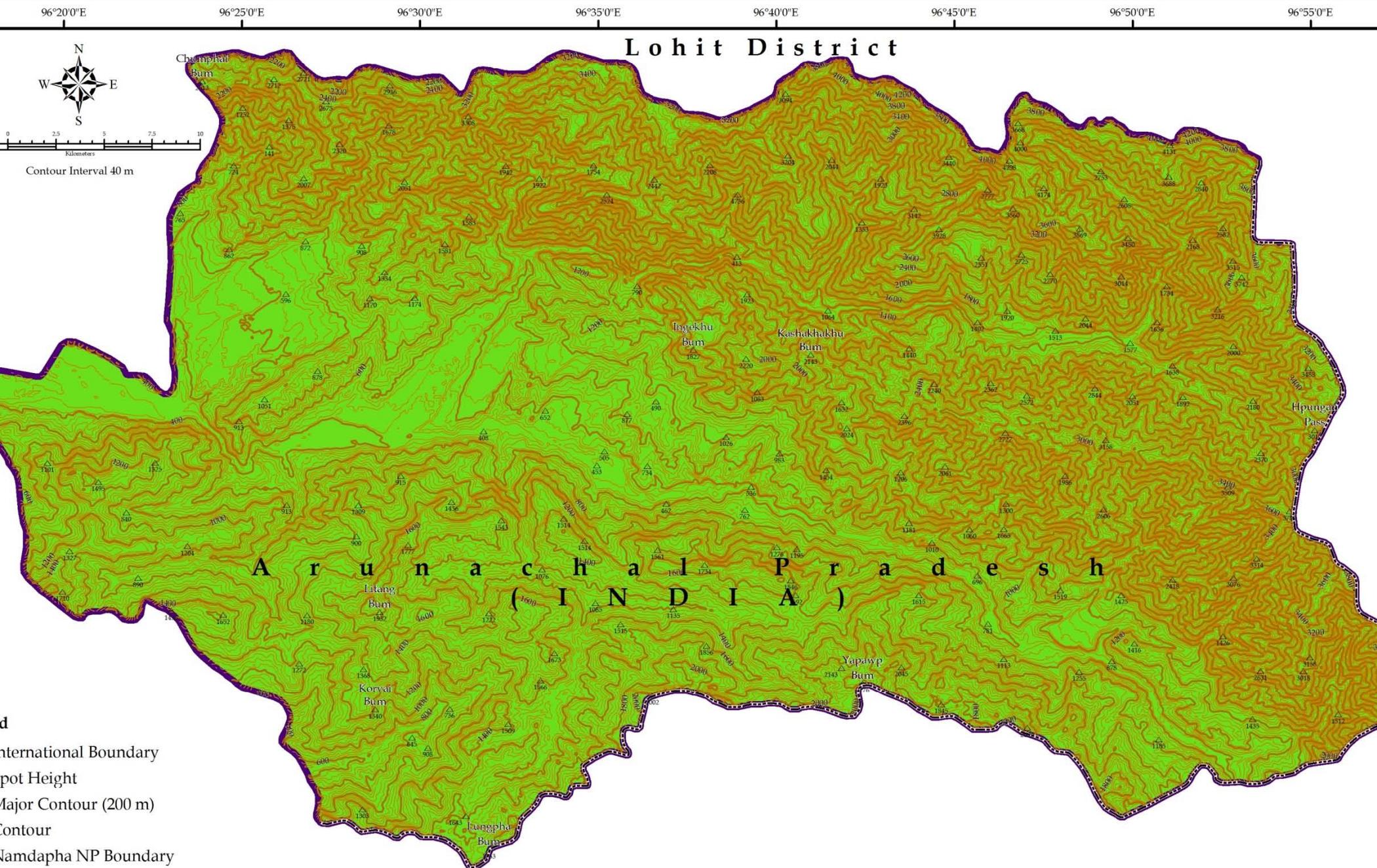


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shows the distribution of '*contour*' lines at an interval of 40 m within the Namdapha Nat  
inal variations can easily be seen in the contour map. '*Digital Elevation Model*' (DEM) was  
igitised contour lines at an interval of 40 m.

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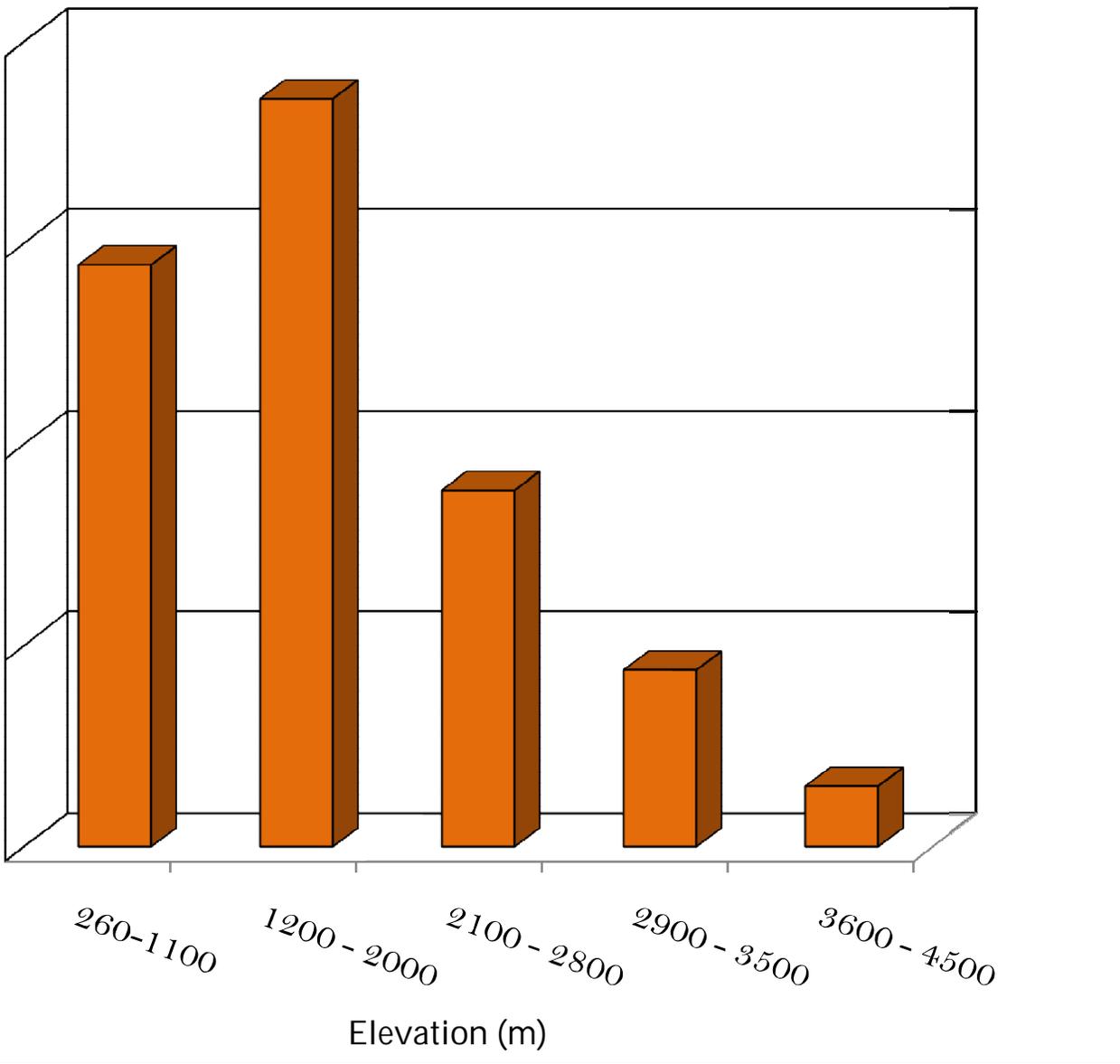
# NAMDAPHA NATIONAL PARK, ARUNACHAL PRADESH Elevation Map



shows the distribution of '*contour*' lines at an interval of 200 m within the Namdapha Nat  
e lines joining places of equal elevation. Spot height shows elevation at a particular locatio

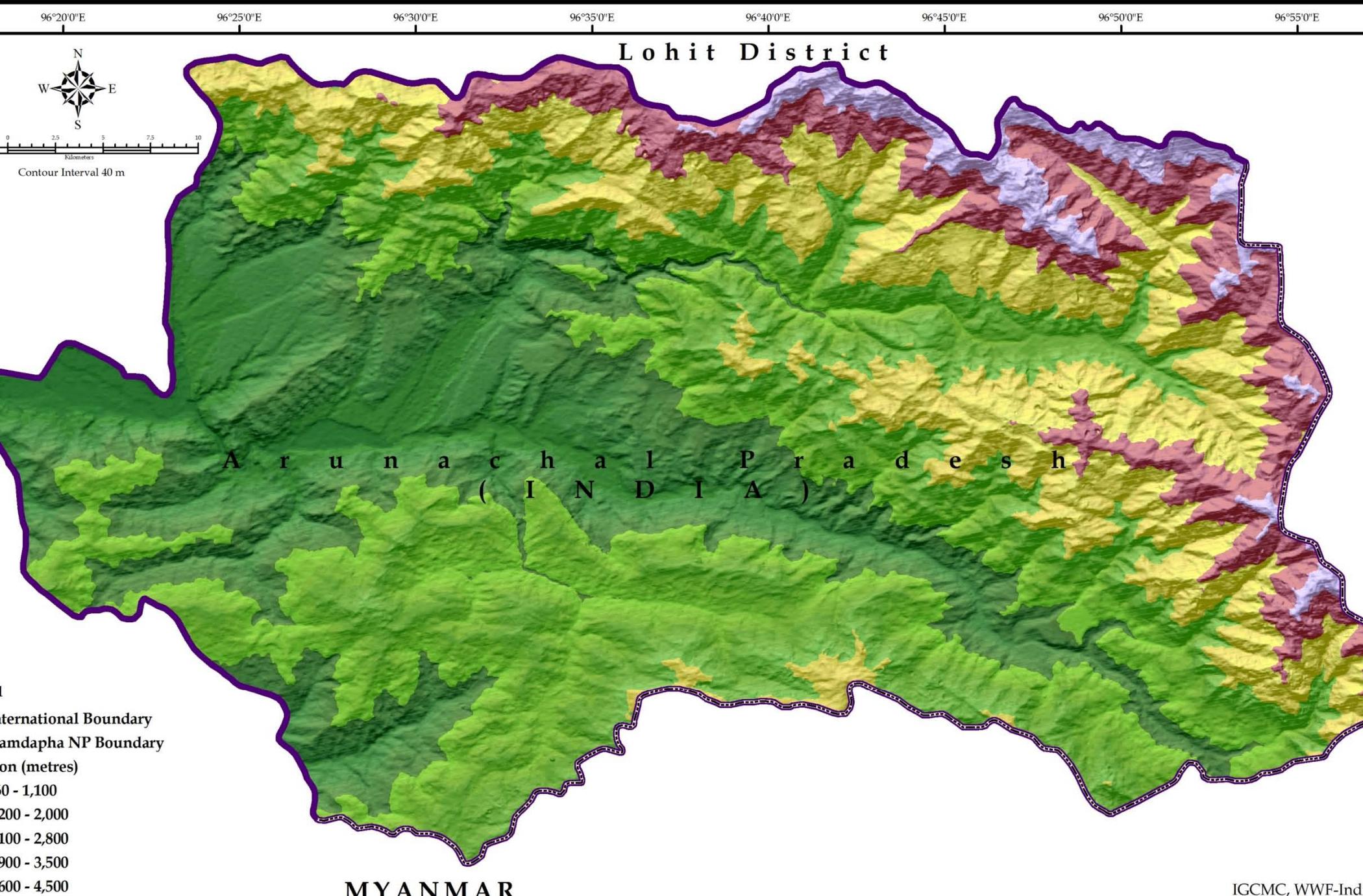


## Area Distribution of Elevation in Namdapha National Park

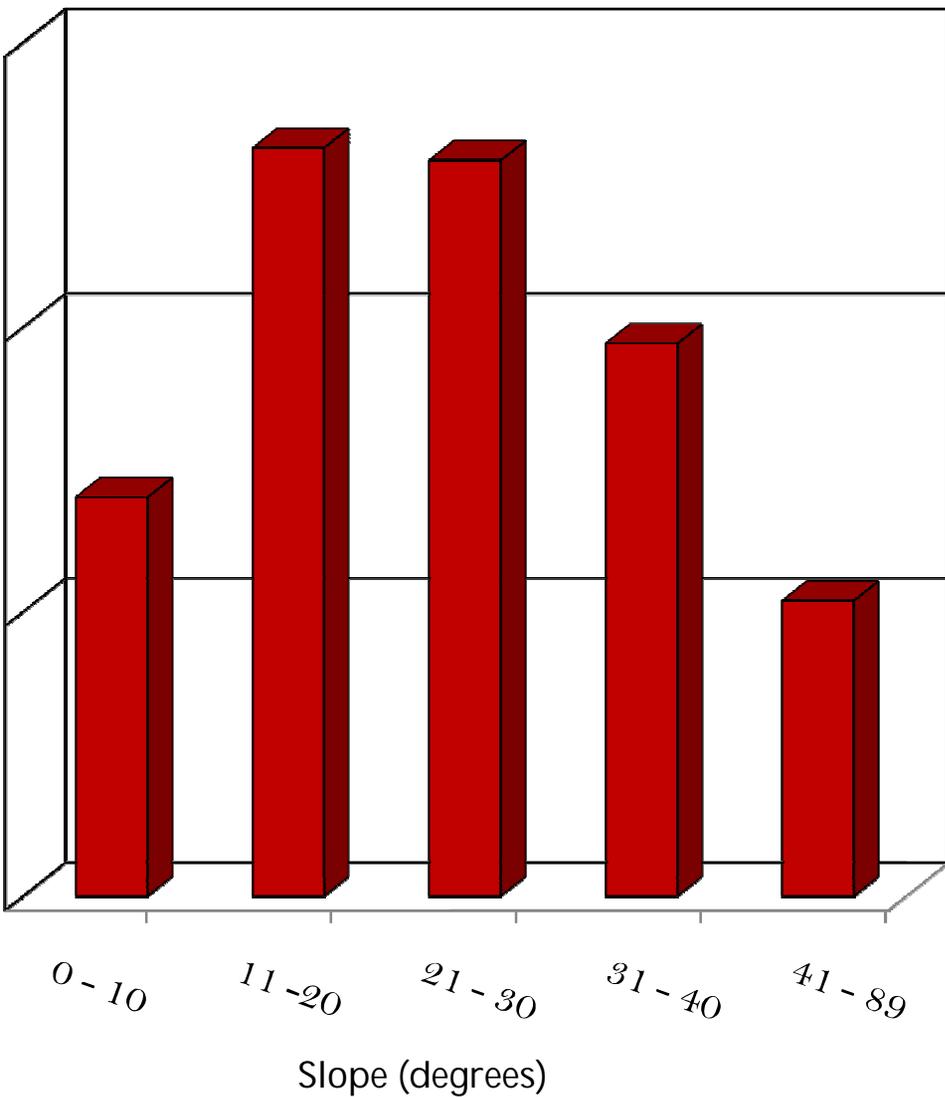


The *Digital Elevation Model* derived the 40 m interval contour lines which are used for analyzing the altitudinal variation in the topography. The elevation ranges from a minimum of 260 m to a maximum of 4500 m as per the derived DEM.

# NAMDAPHA NATIONAL PARK, ARUNACHAL PRADESH Elevation Distribution Map



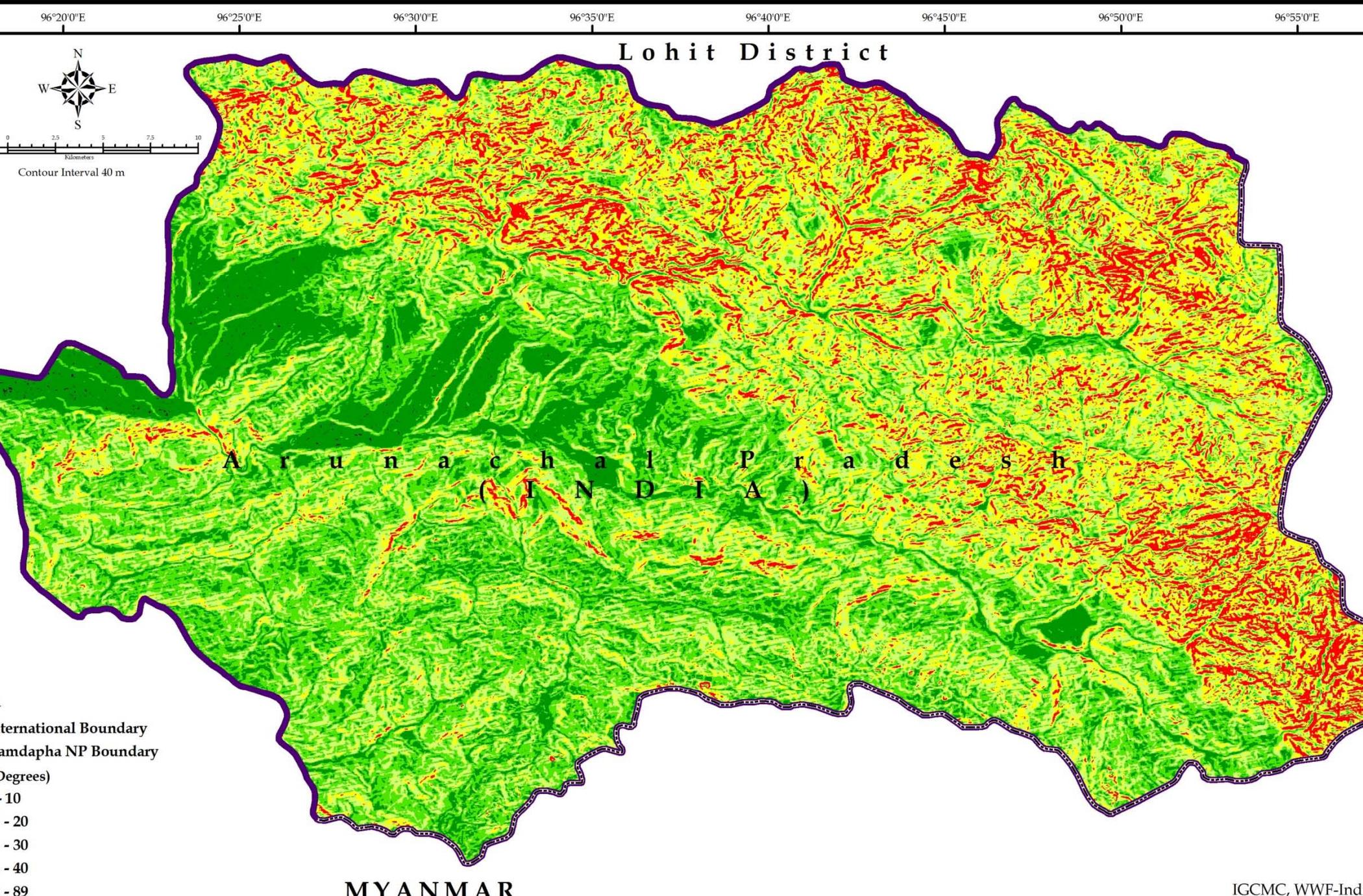
Area Distribution of Slope in Namdapha National Park



*Slope* identifies the steepest downhill slope at a location on a surface. Slope is calculated at each cell in rasters. For rasters, it is the maximum rate of change in elevation over each cell and its eight neighbors. The slope command takes a surface raster and calculates an output raster containing the slope at each cell. The lower the slope value, the flatter the terrain; the higher the slope value, the steeper the terrain.

# NAMDAPHA NATIONAL PARK, ARUNACHAL PRADESH

## Slope Distribution Map



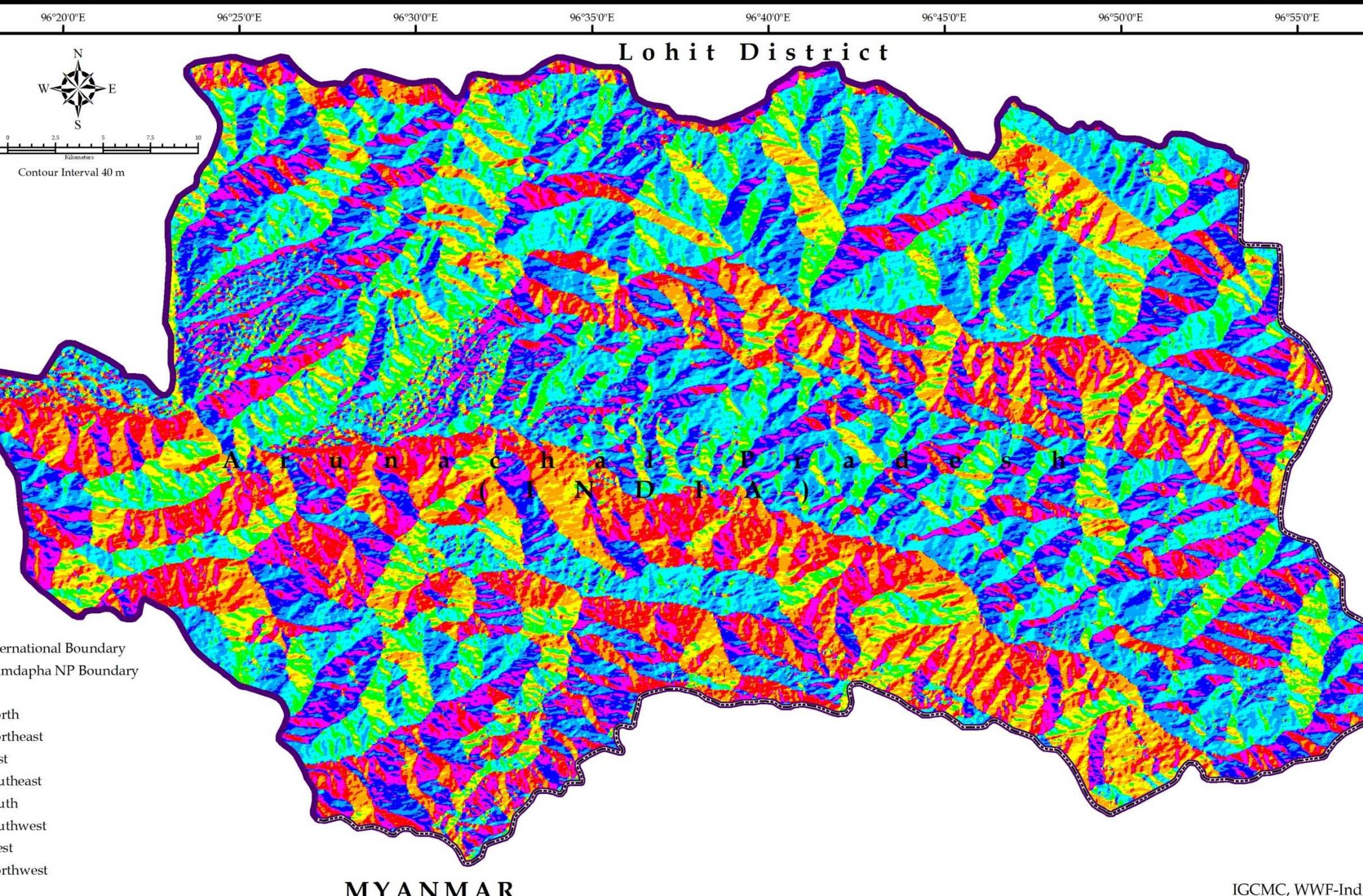
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the direction that a slope faces. It identifies the steepest down slope direction at a location or is thought of as slope direction or the compass direction a hill faces. Aspect is measured in degrees from 0 (due north) to 360 (again due north, coming full circle). Flat slopes and are given a value of -1.

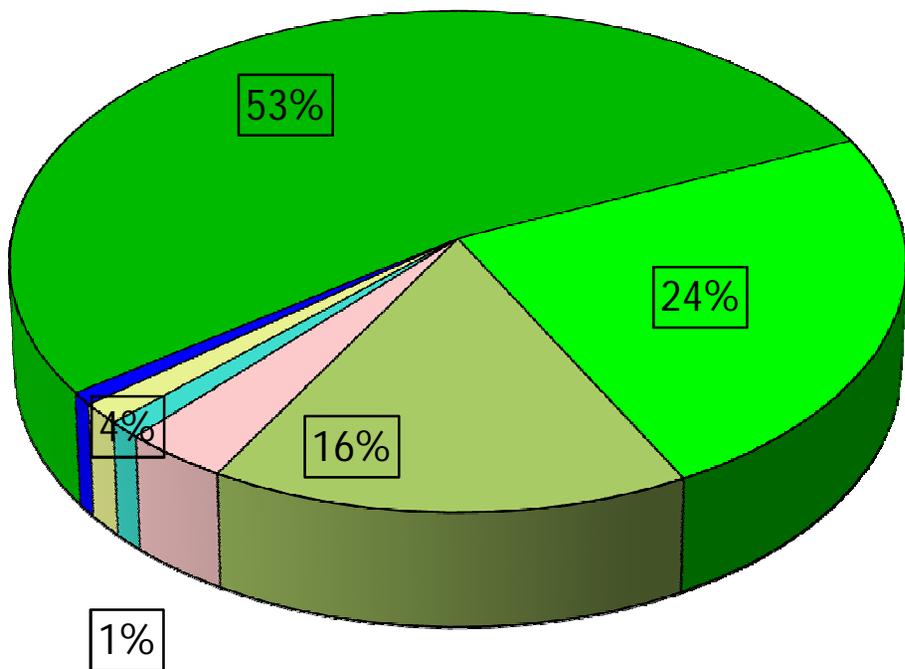
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# NAMDAPHA NATIONAL PARK, ARUNACHAL PRADESH

## Aspect Map



## Percentage of Area under Land use/Land cover classes



■ Dense Forest    ■ Open Forest    ■ Scrub Forest    ■ Grassland  
■ River bed    ■ River

**Dense forest:** all lands of forest cover having a canopy 40 percent and above.

**Open forest:** lands with forest cover having a canopy between 10 – 40 percent.

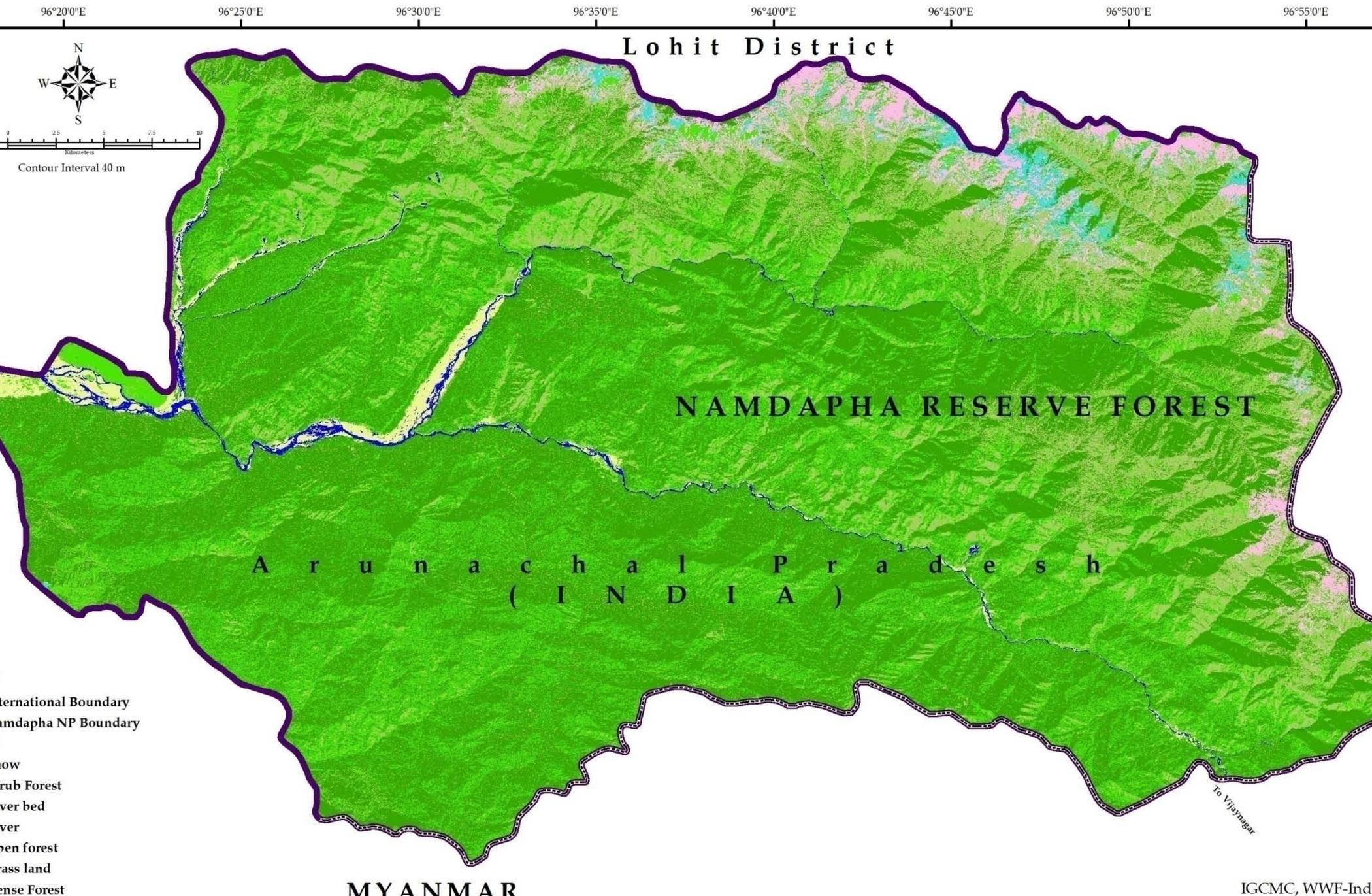
**Scrubland:** degraded forested lands having a canopy less than 10 percent.

**Non-forested area:** land without any kind of forest cover. Includes river, river bed, grassland and snow cover.

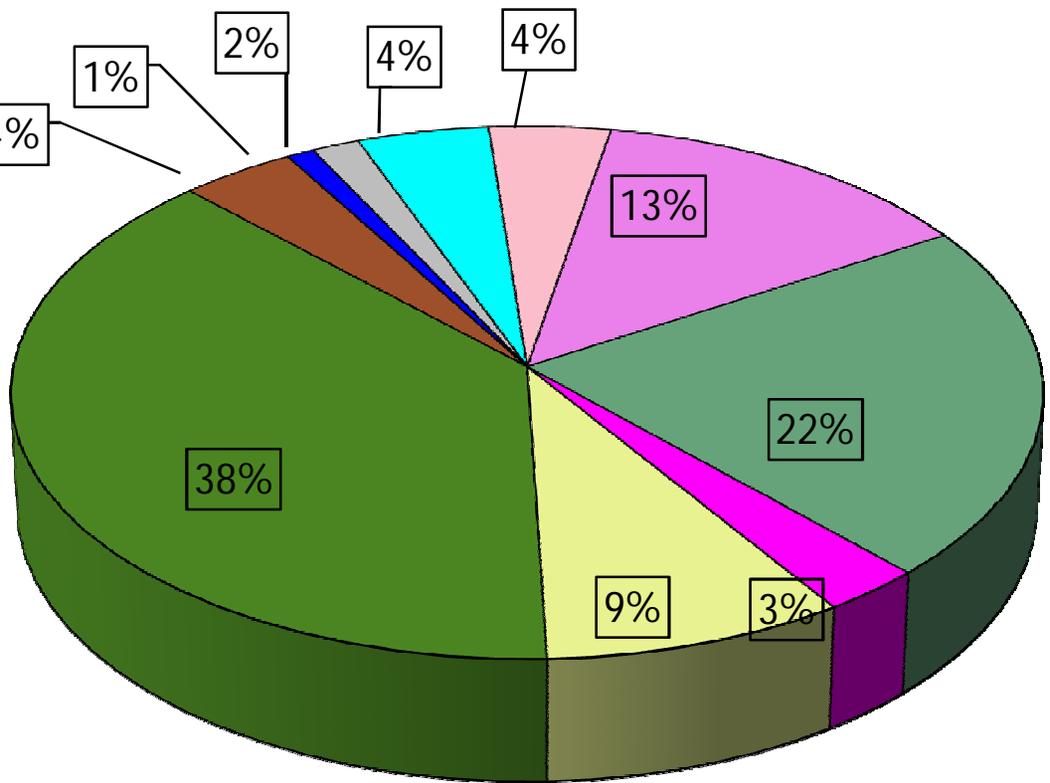
The term *land use* is distinct from *land cover*. *Land use* is a description of how people utilize land and socio-economic activity like urban and agricultural land uses. *Land cover* is the material at the surface of the earth and includes grass, trees, forests, bare ground, water, etc.

# NAMDAPHA NATIONAL PARK, ARUNACHAL PRADESH

## Land Use and Land cover Map



# Percentage of Area under Vegetation type

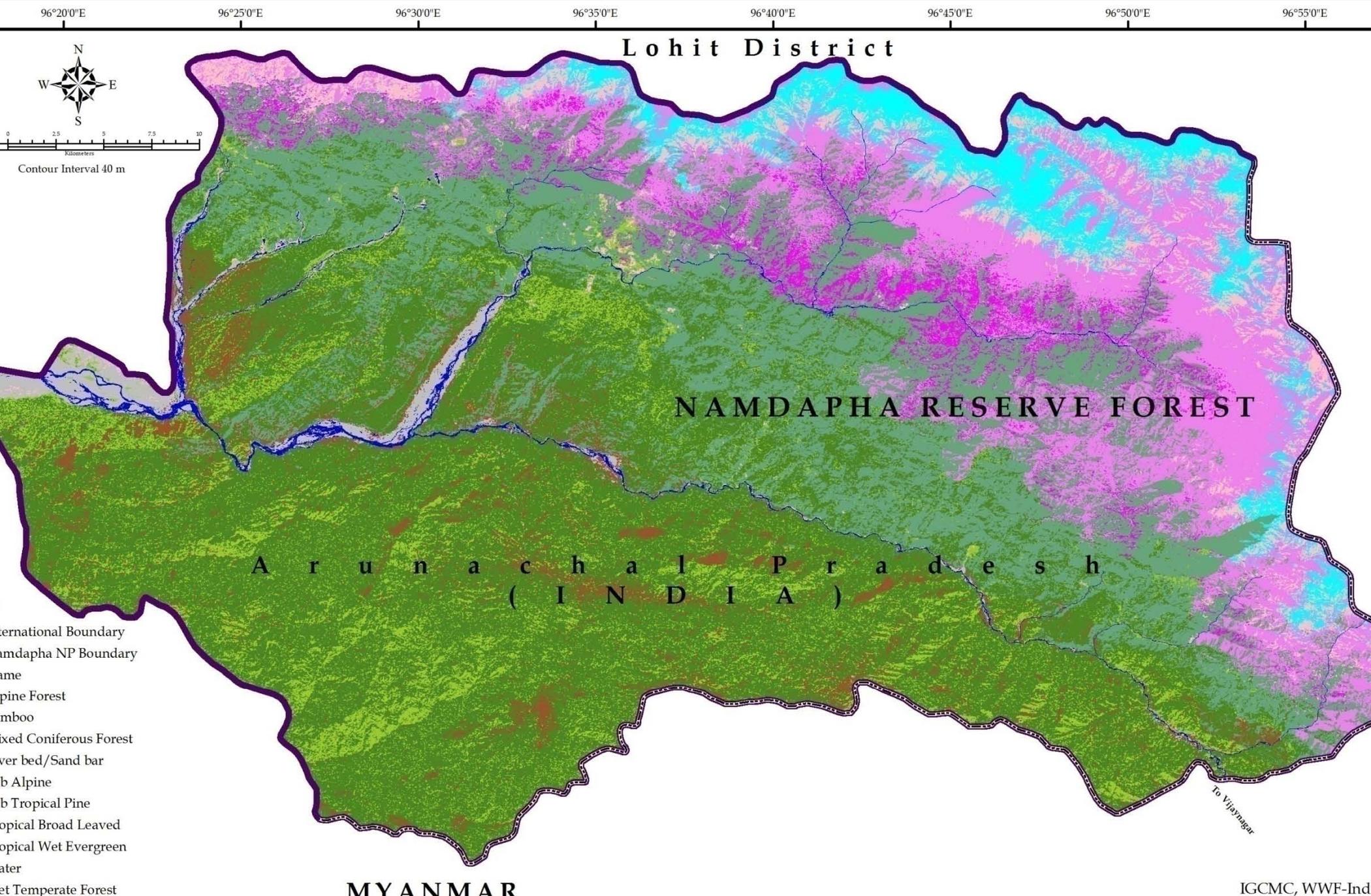


- Sub-Alpine
- Wet Temperate
- Tropical Wet Evergreen
- Bamboo forest
- River bed/Sand bar

The National Park harbors extensive forests, the northernmost lowland rainforests in the world. With elevation, there is a transition in habitats from subtropical broad-leaved forests to sub-tropical pine forests, temperate broad-leaved forests, alpine meadows and perennials. Though primary forests cover most of the park, there are extensive bamboo and secondary forests.

# NAMDAPHA NATIONAL PARK, ARUNACHAL PRADESH

## Vegetation Type Map





*MOULING NATIONAL PARK*

ared a **National Park** in 1986. The name '*Mouling*' has been derived from the highest peak as per local faith and belief.

Upper Siang District, Arunachal Pradesh

**Temperature:** 15°C to 38°C (lower altitudes); 4°C (2200 m onwards)

q km

**Precipitation:** 2343 mm annually

3°28'49" - 28°41'2.56" N

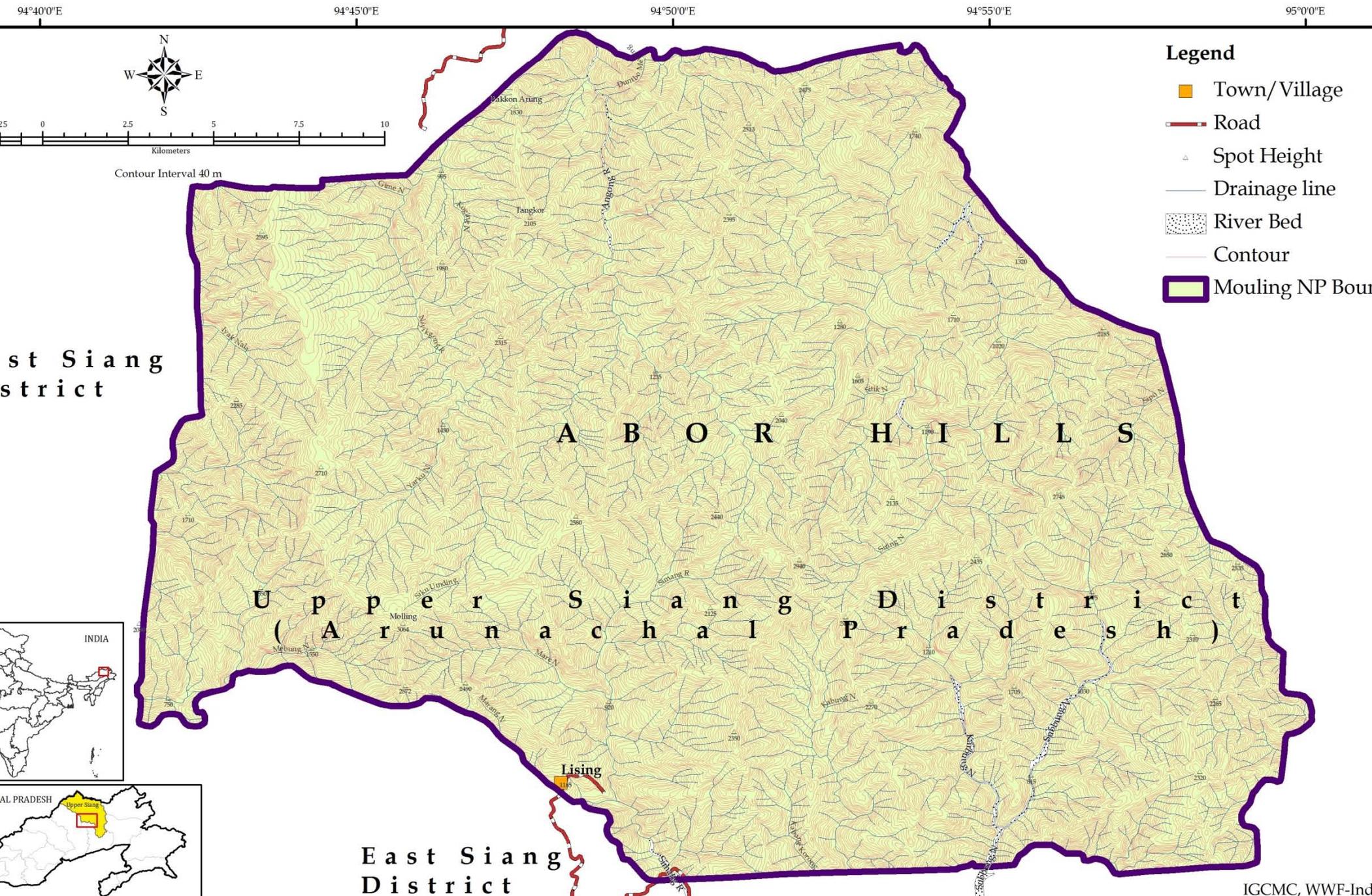
94°43'4.81" - 95°01'49.60" E

**Flora and Fauna:** The temperature variation is favourable for a wide variety of plant and animal growth.

600m - 3064m

# MOULING NATIONAL PARK, ARUNACHAL PRADESH

## Location Map



### Legend

- Town/Village
- Road
- Spot Height
- Drainage line
- River Bed
- Contour
- Mouling NP Boundary

East Siang District

A B O R H I L L S

U p p e r S i a n g D i s t r i c t  
( A r u n a c h a l P r a d e s h )

East Siang District

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Feature map depicts the boundary of the National Park, drainage network, road distribution of villages and towns, also provide information on the elevation distribution and spot height. It is located in the *Adi* hills of the eastern Himalayas adjoining the S. Although the boundary of the park is based on artificial and natural boundaries such as the west, on-ground demarcation of sections of the boundary is still due.

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network map basically maps the drainage system of Mouling National Park. The entire Na  
by a number of perennial brooks and streams. Thirteen major perennial streams flow  
Mouling ranges and all voids in the mighty Siang River. The Siring, Subong, Krobong an  
n into the Siang on the eastern boundary and the Siyom on the western boundary of the pa



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vide the vital linkages between places. Road network map depicts these necessary linka  
ea. Although there are no major road network within the park area, but some major ro  
fringe areas of the National Park.



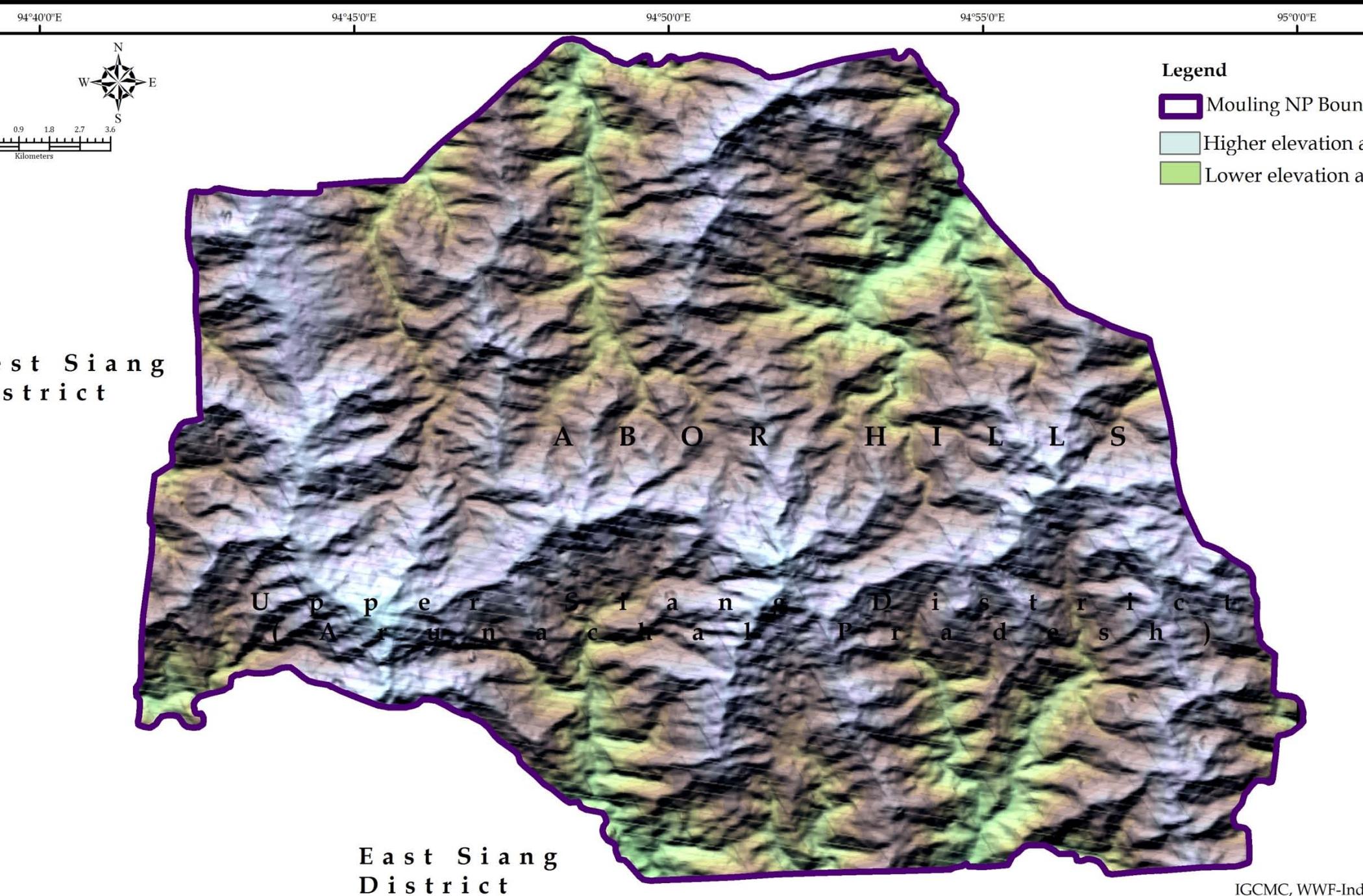
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ography is characterised by rugged mountainous terrain with sharp cliffs. The altitude ranges from 1000 m to 2000 m. At present the park is relatively well protected due to inaccessibility. The Siang River is a prominent feature in the landscape, and carves deeply through high, rugged mountains (which peak at 2000 m) to a valley as low as 300 m in the vicinity of the park.

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# MOULING NATIONAL PARK, ARUNACHAL PRADESH

## Relief Distribution Map



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shows the distribution of '*contour*' lines at an interval of 40 m within the Moulting National Park. The topographic variations can easily be seen in the contour map. '*Digital Elevation Model*' (DEM) was derived from the digitised contour lines at an interval of 40 m.

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# MOULING NATIONAL PARK, ARUNACHAL PRADESH

## Elevation Map



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shows the distribution of '*contour*' lines at an interval of 200 m within Mouling National Park. Contour lines represent places of equal elevation. Spot height shows elevation at a particular location point.

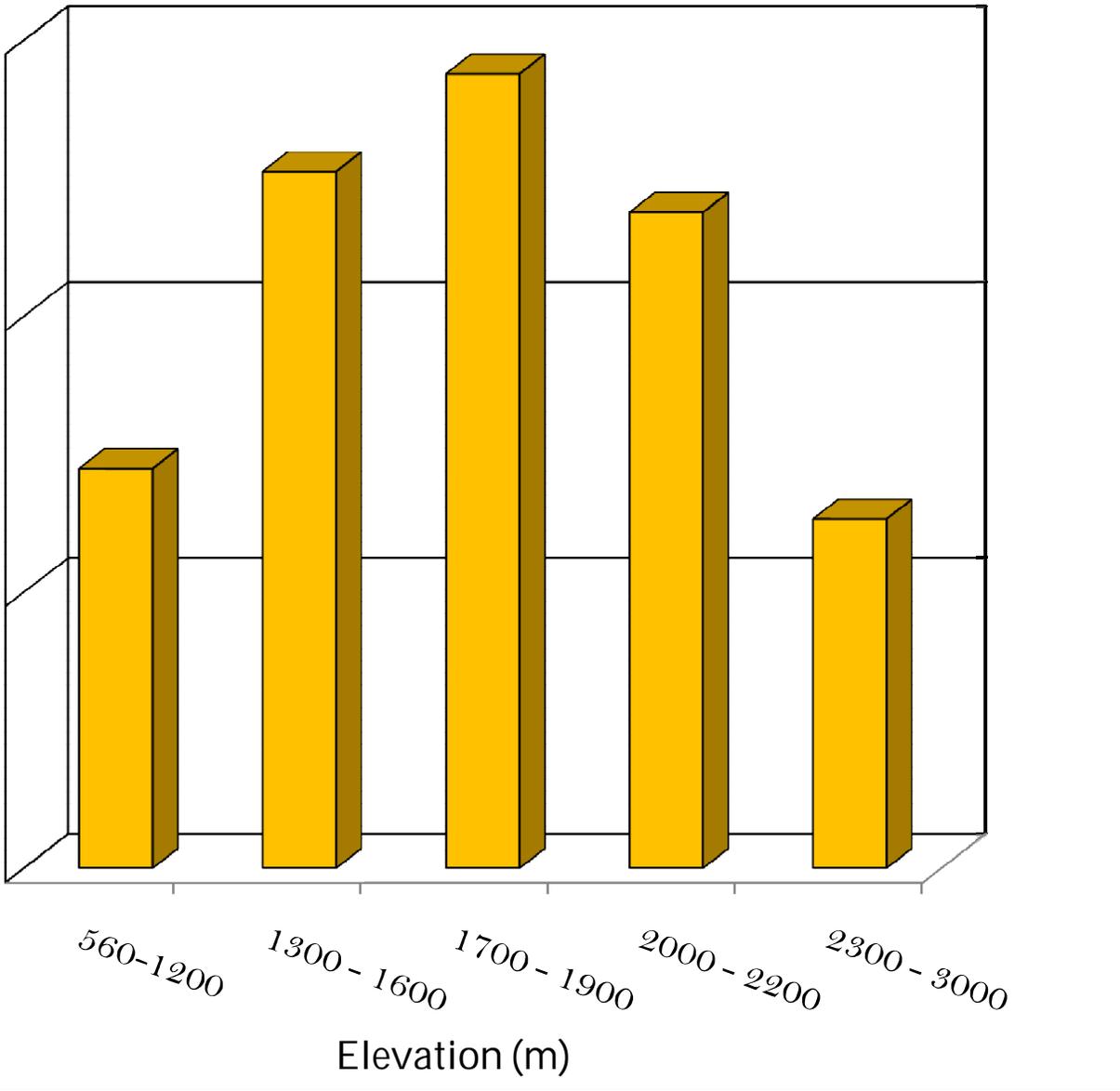
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# MOULING NATIONAL PARK, ARUNACHAL PRADESH

## Elevation Map



## Area Distribution of Elevation in Mouling National Park



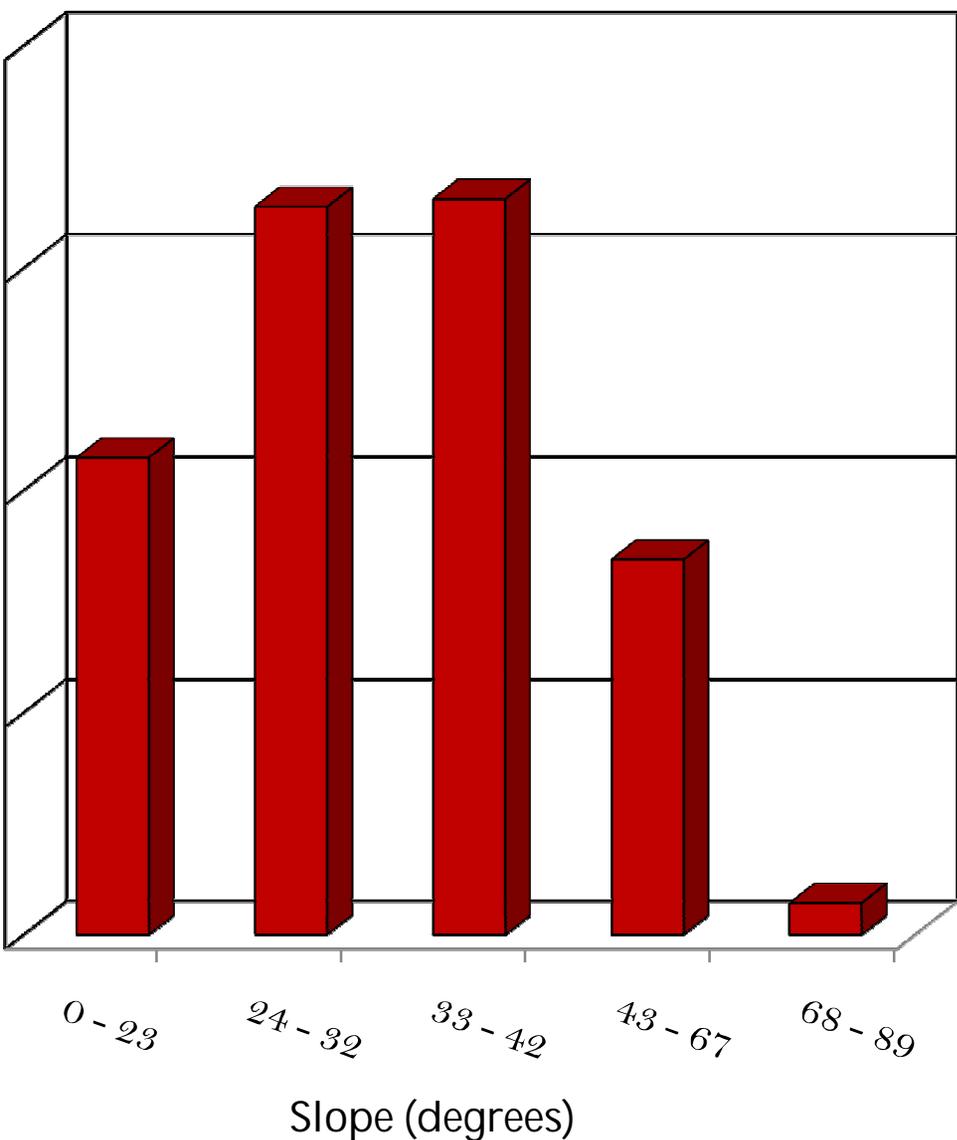
The *Digital Elevation Model* derived 40 m interval contour lines was analyzing the altitudinal variation topography. The elevation ranges from a minimum of 560 m to maximum of 3000 m as per the derived DEM.

# MOULING NATIONAL PARK, ARUNACHAL PRADESH

## Elevation Map



Area Distribution of Slope in Mouling National Park



*Slope* identifies the steepest downhill slope at a location on a surface. Slope is calculated for each cell in rasters. For rasters, it is the maximum rate of change in elevation over each cell and its eight neighbors. The slope command takes a surface raster and calculates an output raster containing the slope at each cell. The slope value, the flatter the terrain; the higher the slope value, the steeper the terrain.

# MOULING NATIONAL PARK, ARUNACHAL PRADESH

## Elevation Map



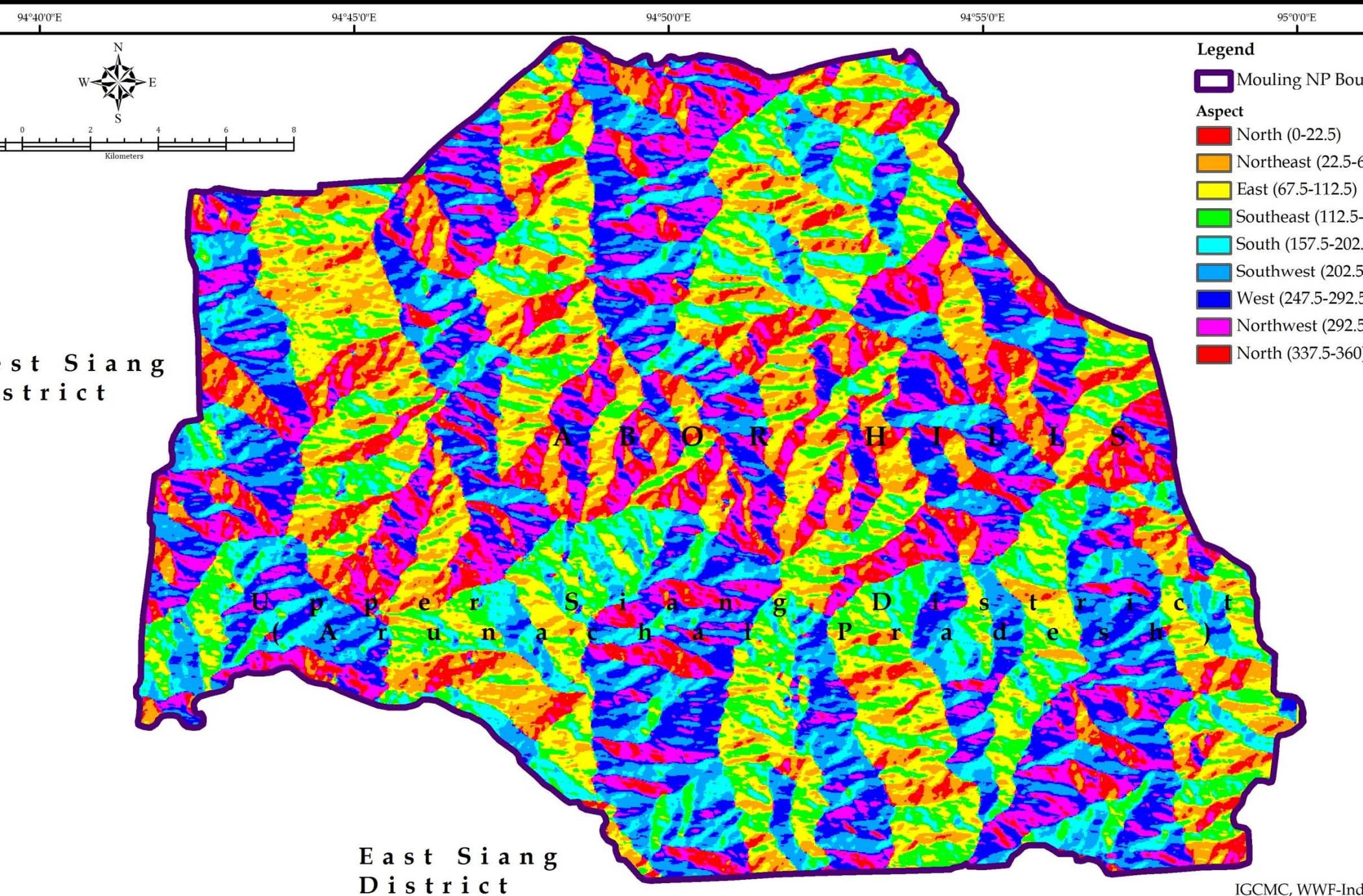
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the direction that a slope faces. It identifies the steepest down slope direction at a location or is thought of as slope direction or the compass direction a hill faces. Aspect is measured in degrees from 0 (due north) to 360 (again due north, coming full circle). Flat slopes and are given a value of -1.

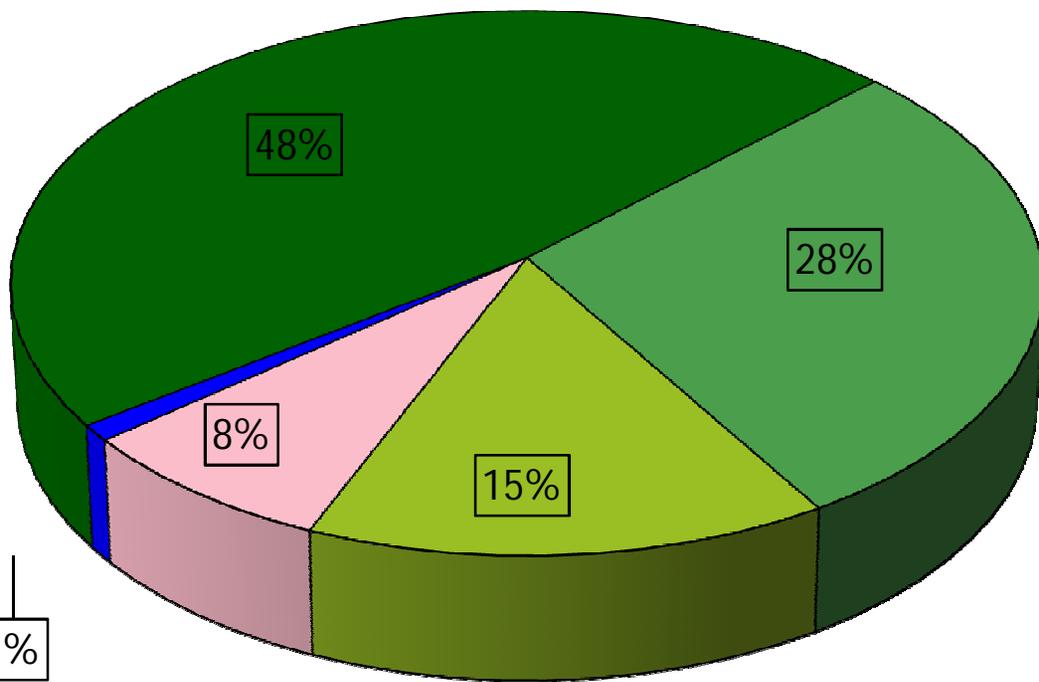
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# MOULING NATIONAL PARK, ARUNACHAL PRADESH

## Aspect Map



## Percentage of Area under Land use/Land cover classes



Forest
  Open Forest
  Scrub land

Grassland
  River

**Dense forest:** all lands of forest cover having a canopy density of 40 percent and above.

**Open forest:** lands with forest cover having a canopy density between 10 – 40 percent.

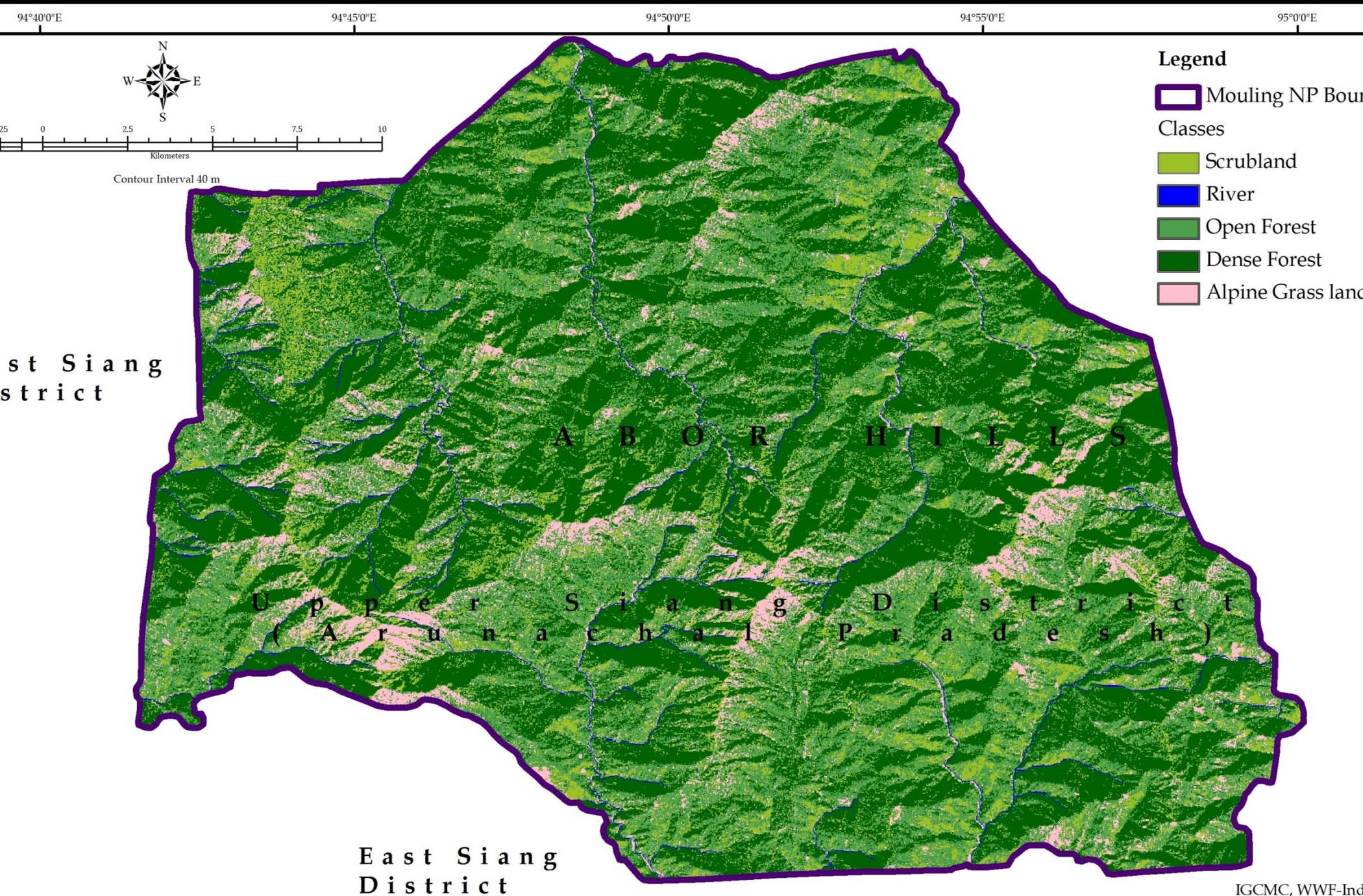
**Scrubland:** degraded forested lands having a canopy density less than 10 percent.

**Non-forested area:** land without any kind of forest cover. Includes river and grassland

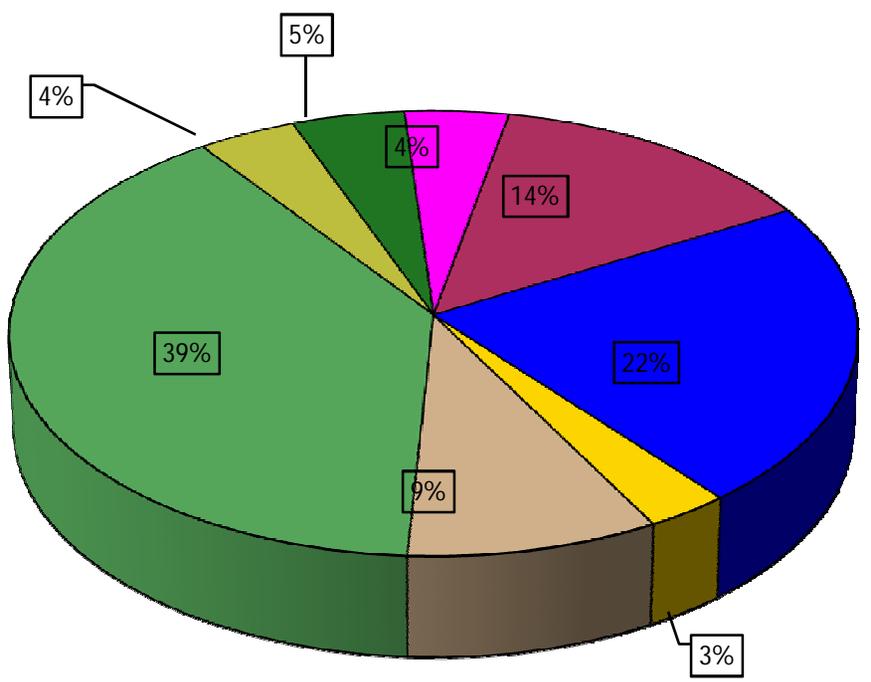
The term *land use* is distinct from *land cover*. *Land use* is a description of how people use the land and socio-economic activity like agriculture and agricultural land uses. *Land cover* is the physical material at the surface of the earth. It includes grass, trees, forests, water, ground, water, etc.

# MOULING NATIONAL PARK, ARUNACHAL PRADESH

## Land use and Land cover Map



### Percentage of Area under Vegetation type

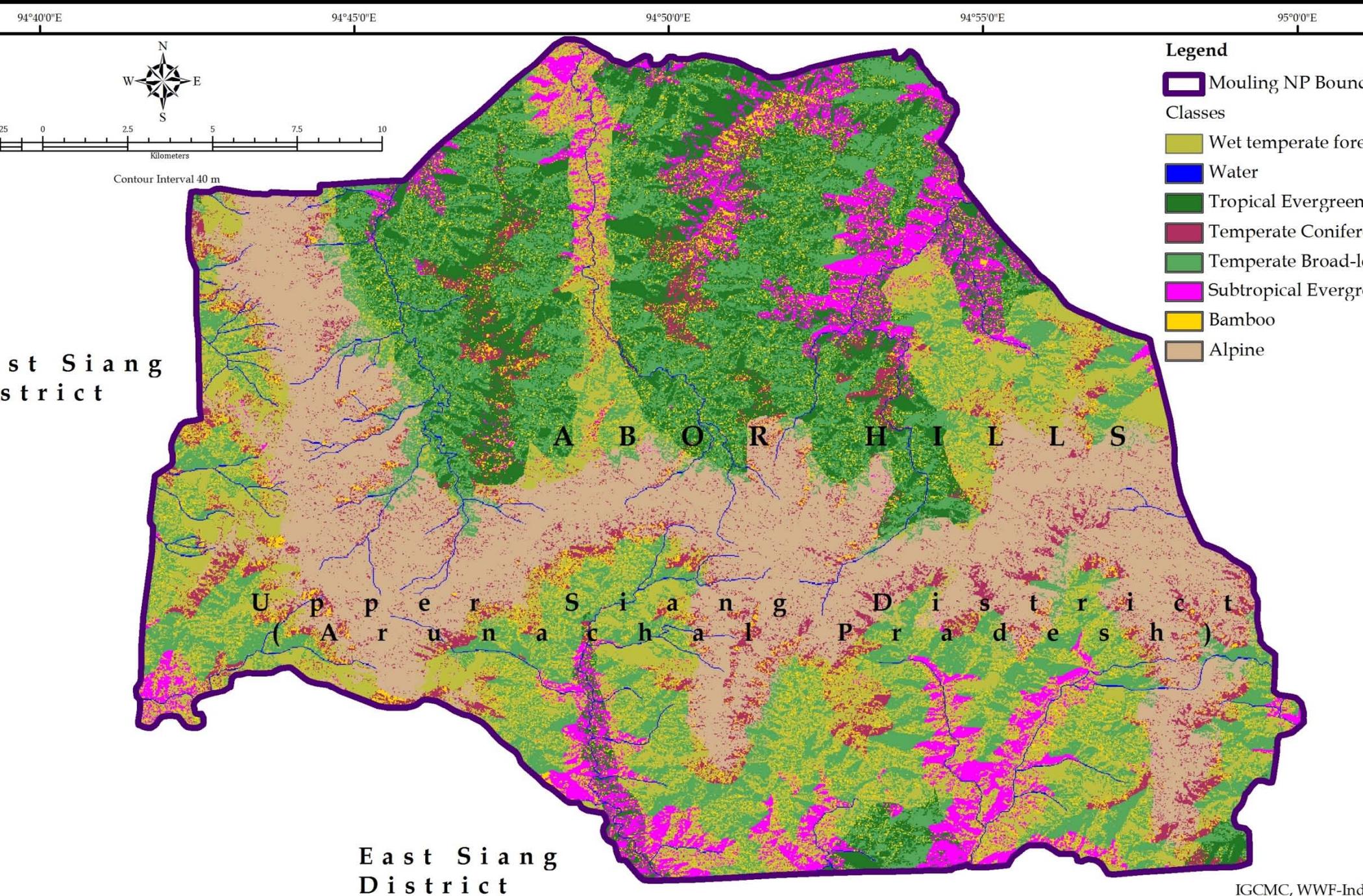


- Tropical Evergreen forest
- Subtropical Evergreen forest
- Temperate Conifer forest
- Water
- Bamboo
- Alpine
- Temperate Broad-leafed forest
- Temperate Wet forest

Tropical wet evergreen and semi-evergreen dominate the low to middle altitudes in the valley along the tributaries of the main river. Wet subtropical broad-leaved and temperate forest are found in the upper reaches. Very thick cane and bamboo forest along the wet banks of the streams at lower altitudes and high water current are a source of major erosion in approaching the park.

# MOULING NATIONAL PARK, ARUNACHAL PRADESH

## Vegetation Type Map





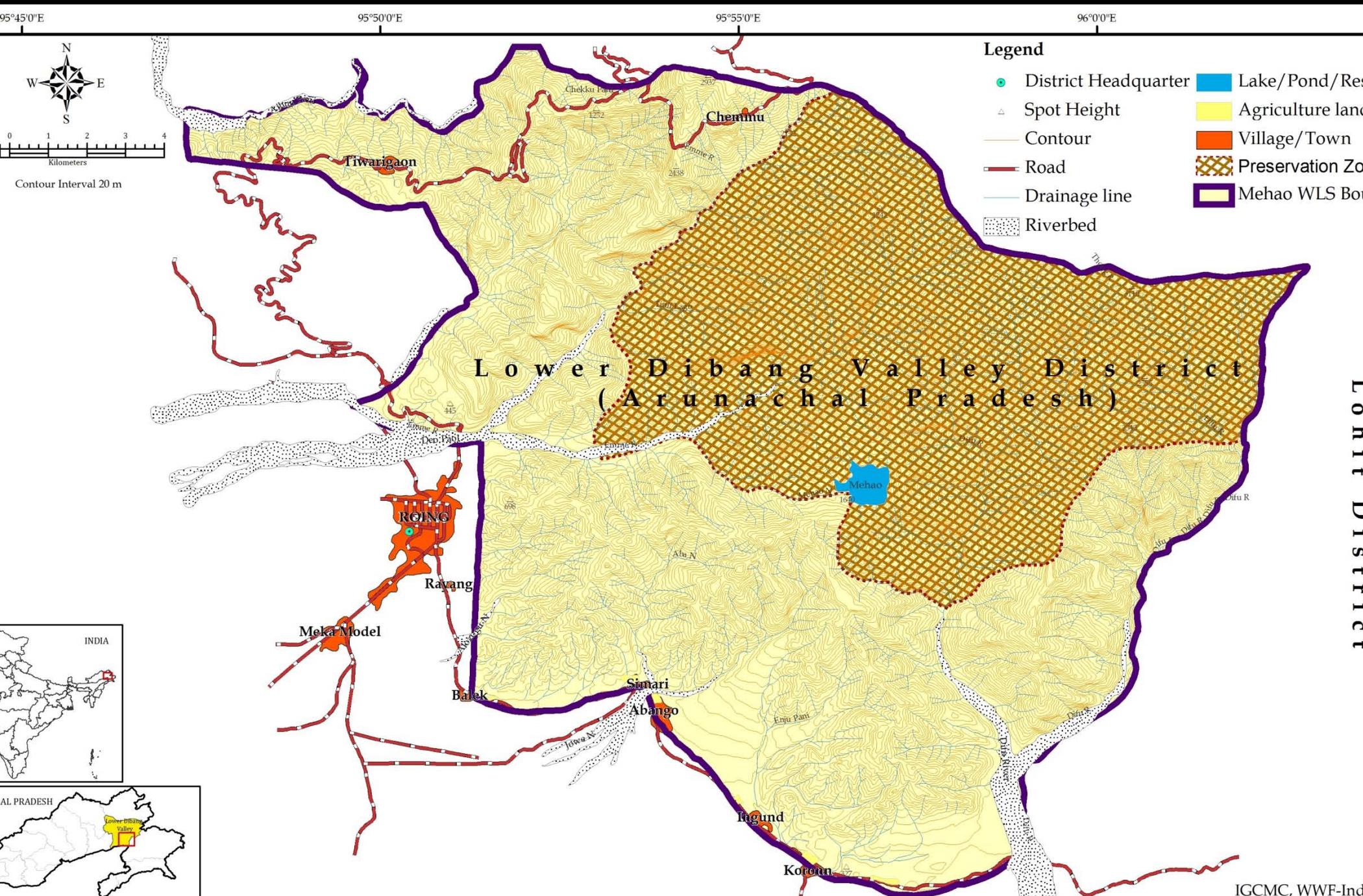
*MEHAO WILDLIFE SANCTUARY*

Lower Dibang Valley Arunachal Pradesh	<b>Temperature:</b> 4°C to 38°C (lower altitudes); -3°C to 12°C (higher altitudes)
15 sq km	<b>Precipitation:</b> 2500 mm annually
28°05' - 28°15' N	<b>Vegetation:</b> Mehao is home to diverse habitats and wildlife
Longitude: 93°30' – 95°48' E	
Altitude: 400m – 3568m	

Declared a **Wildlife Sanctuary** in 1980. It is named after the '*Mehao Lake*', which was created a 'Independence day' earthquake on 15<sup>th</sup> August, 1950.

# MEHAO WILDLIFE SANCTUARY, ARUNACHAL PRADESH

## Location Map



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feature map depicts the boundary of the Wildlife Sanctuary, drainage network, road distribution of villages and towns, also provide information on the elevation distribution and spot height. The entire area of the Sanctuary is of young mountains, the conservation geological formation and its ecosystem is of great significance.

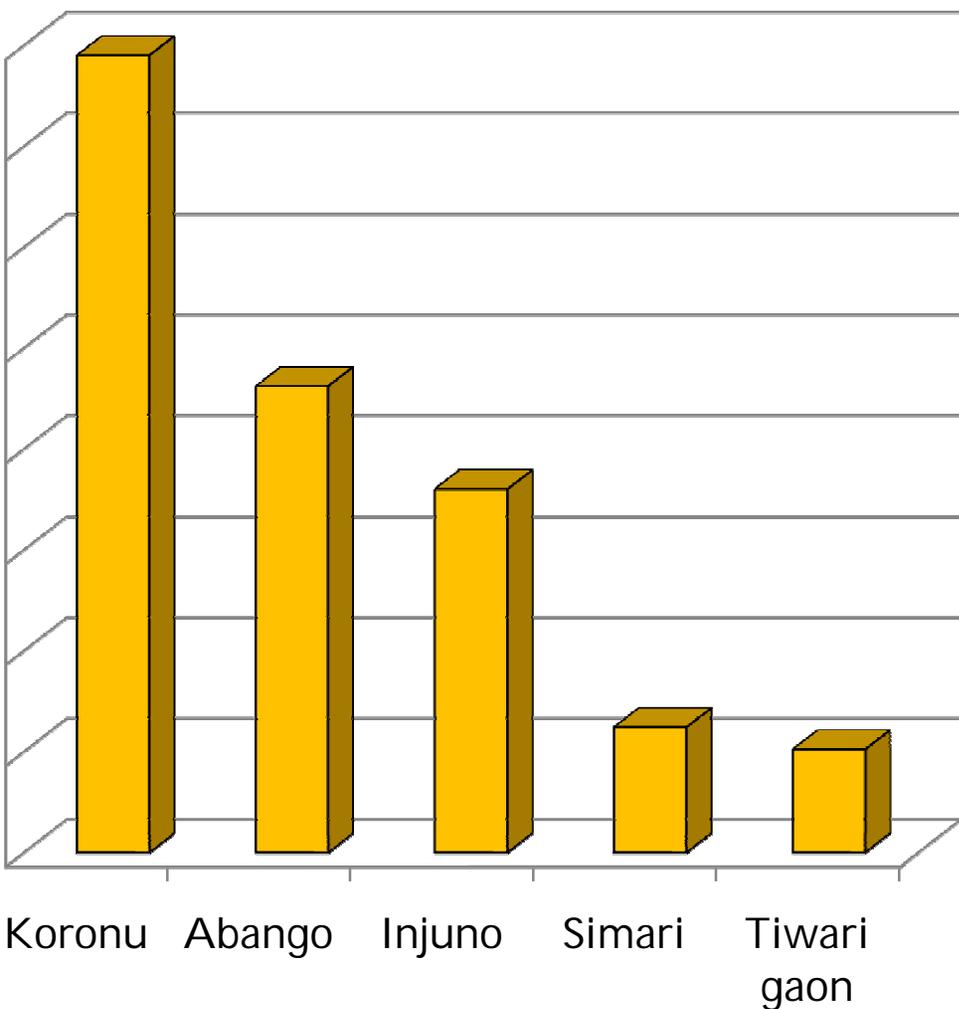
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network map basically maps the drainage system of Mehao Wildlife Sanctuary. The sanctuary is characterized by numerous perennial streams running mostly north-south. There are also number of smaller streams that flow into these rivers which flow with heavy volume during rainy seasons. There are also several water bodies in the heart of the sanctuary.



## Population of Villages inside Sanctuary area



2004. Management Plan of Mehao Wildlife  
g: 2006-07 to 2010-11

**Nearest Town:** Roing, Lower Dibang Valley dist

**Nearest Railway station:** Tinsukia, Assam

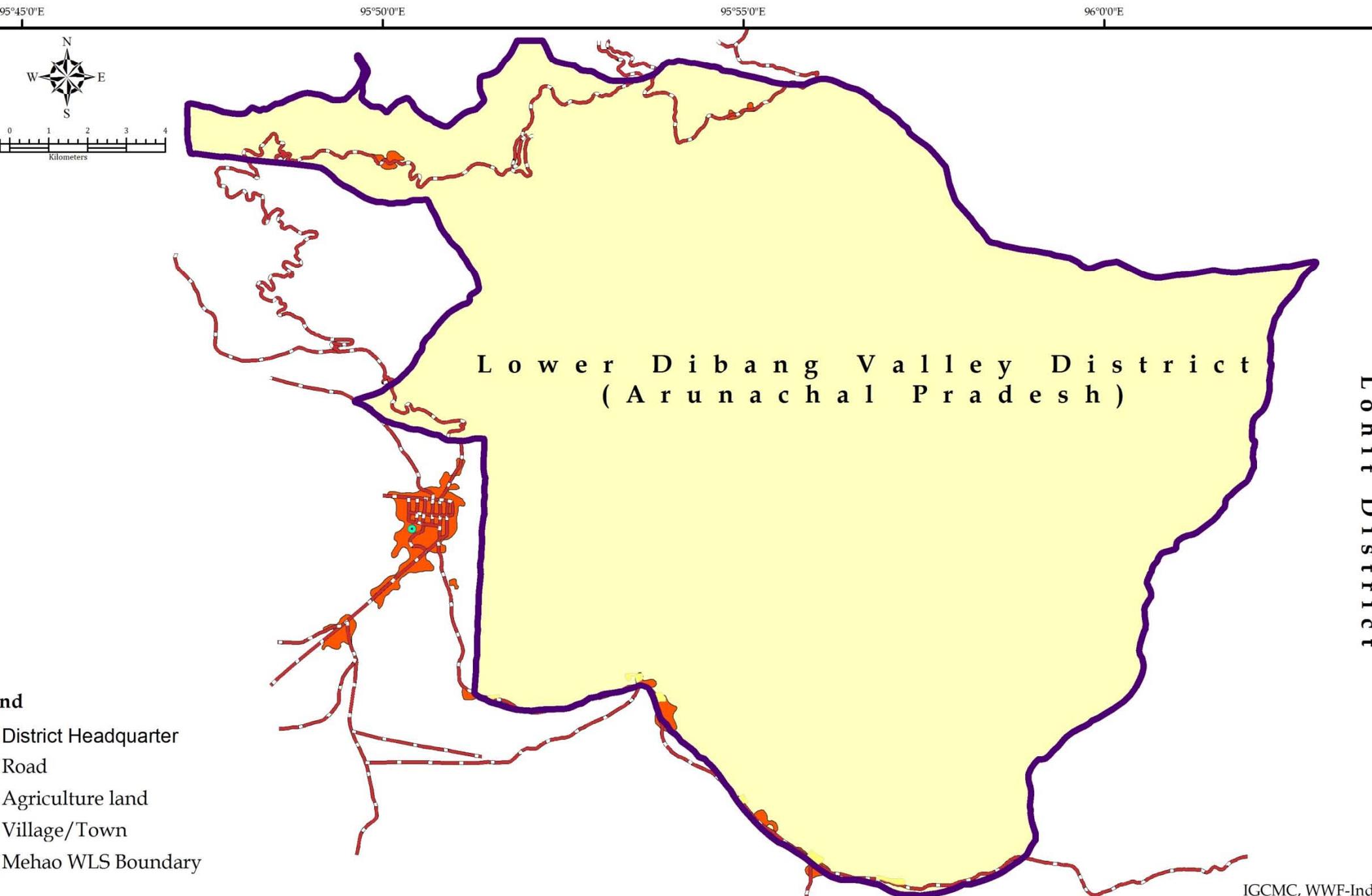
**Nearest Airport:** Dibrugarh, Assam

**Ferry crossing:** Across Brahmaputra at Dholla/S  
Ghat

Roads provide the vital linkages between  
Road network map depicts these necessary  
within the sanctuary area. NH-37, the ro  
Dibrugarh/Tinsukia town to Dhola, is t  
approach to the sanctuary area. Mayudia  
northern boundary line and a tourist spot o  
Anini road by the side of Siyundia peak is a  
by road.

# MEHAO WILDLIFE SANCTUARY, ARUNACHAL PRADESH

## Road and Village/Town Location Map



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e varies from 400m above sea level at southern boundary to 3568m in northern boundary. It comprises of smaller hills of varying heights running north-south. The valleys are rivers and streams. The sanctuary is interspersed with small flat land at different elevations. Different wildlife.

# MEHAO WILDLIFE SANCTUARY, ARUNACHAL PRADESH

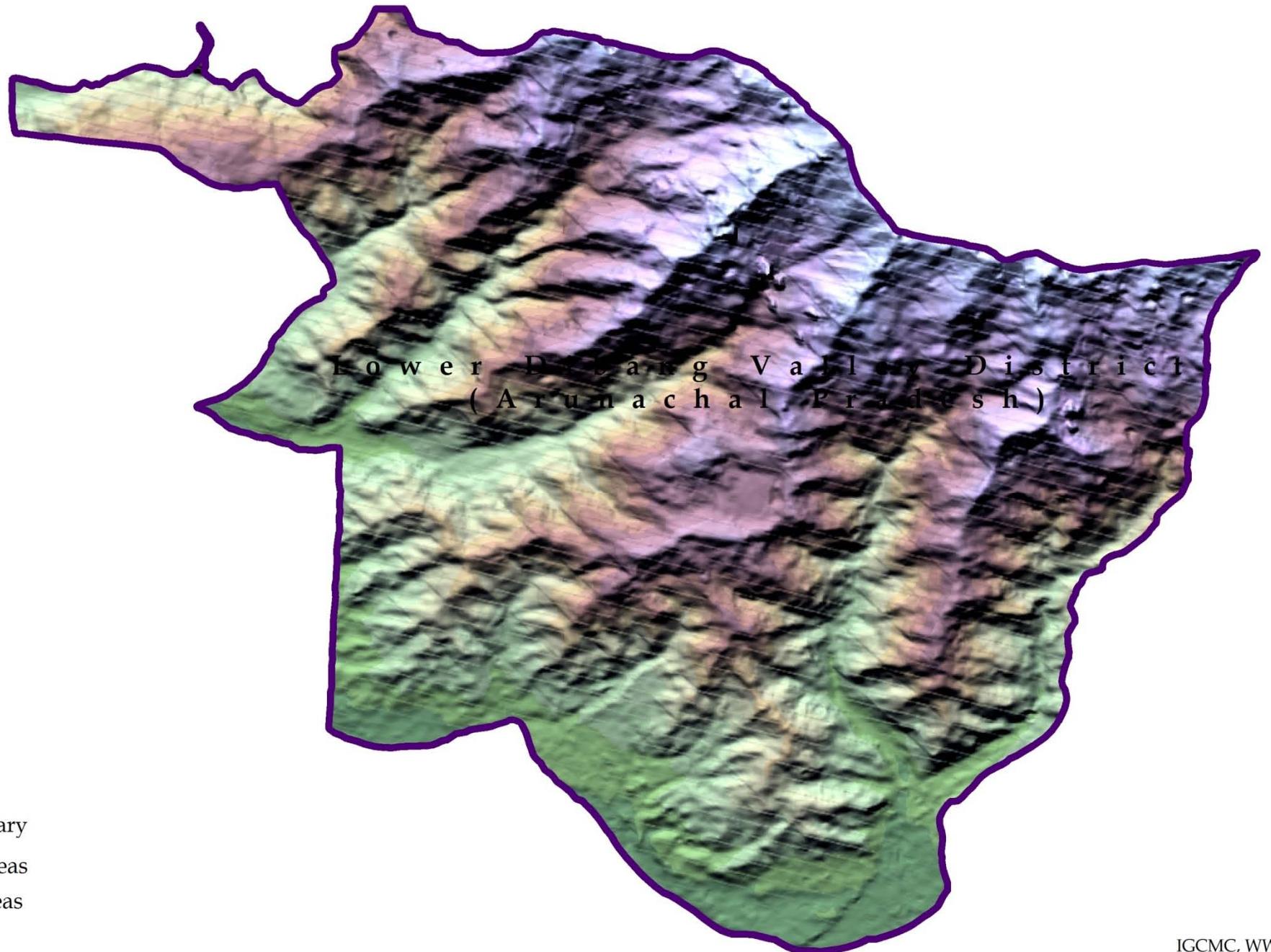
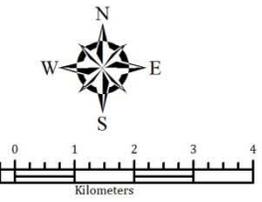
## Relief Distribution Map

95°45'0"E

95°50'0"E

95°55'0"E

96°0'0"E



nd  
Mehao WLS Boundary  
Higher elevation areas  
Lower elevation areas

Lower Dibang Valley District

shows the distribution of '*contour*' lines at an interval of 40 m within Mehao Wildlife Sanctuary. Elevation variations can easily be seen in the contour map. '*Digital Elevation Model*' (DEM) was digitised contour lines at an interval of 40 m.

# MEHAO WILDLIFE SANCTUARY, ARUNACHAL PRADESH

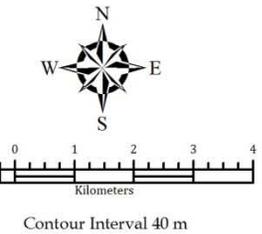
## Elevation Map

95°45'0"E

95°50'0"E

95°55'0"E

96°0'0"E



Legend

- Spot Height
- Major Contour (200 m)
- Contour
- Mehao WLS Boundary

LOWER DIBANG VALLEY DISTRICT

shows the distribution of '*contour*' lines at an interval of 200 m within Mehao Wildlife  
e lines joining places of equal elevation. Spot height shows elevation at a particular locatio

# MEHAO WILDLIFE SANCTUARY, ARUNACHAL PRADESH

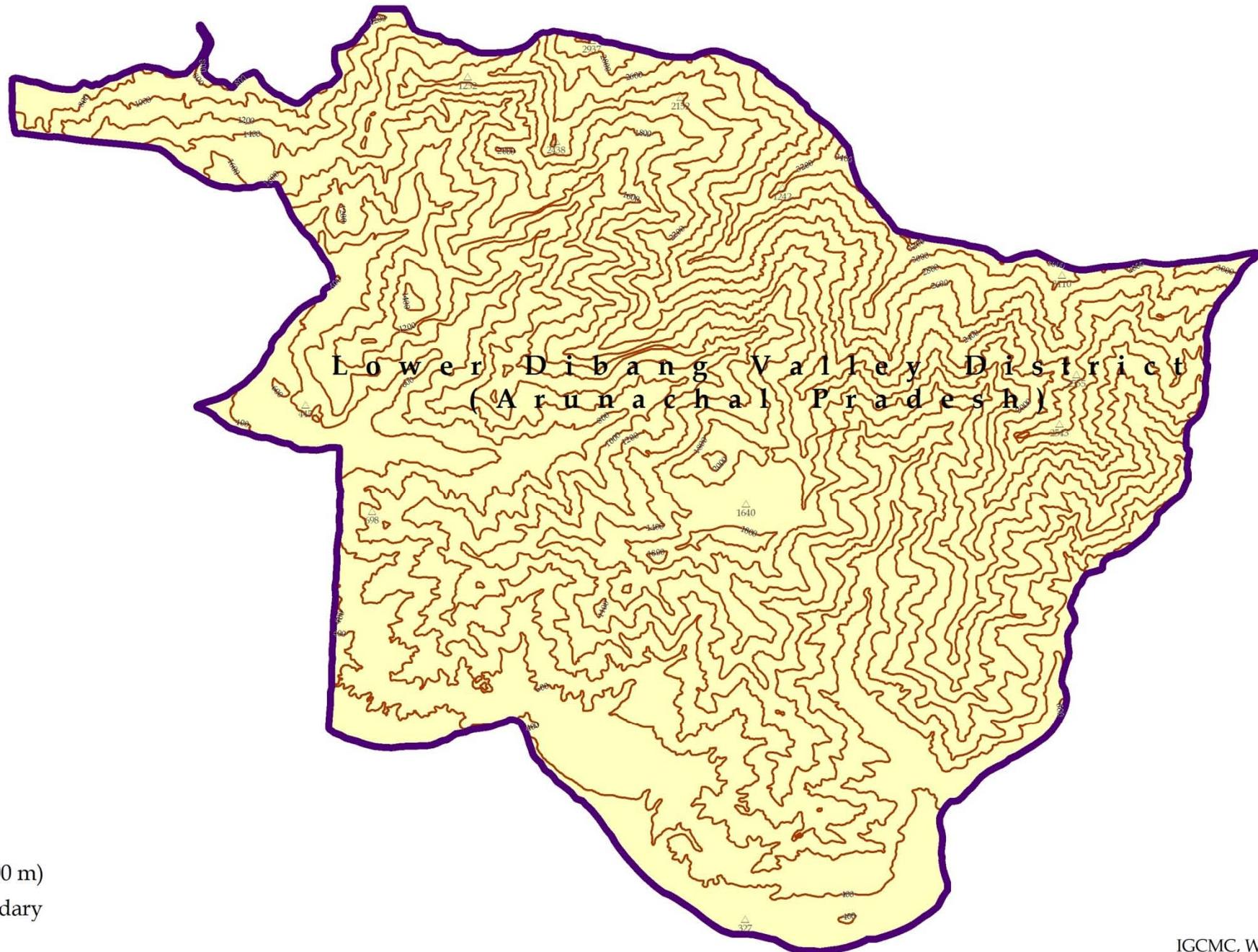
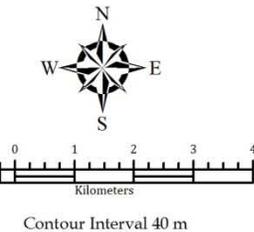
## Major Contour and Spot Height Map

95°45'0"E

95°50'0"E

95°55'0"E

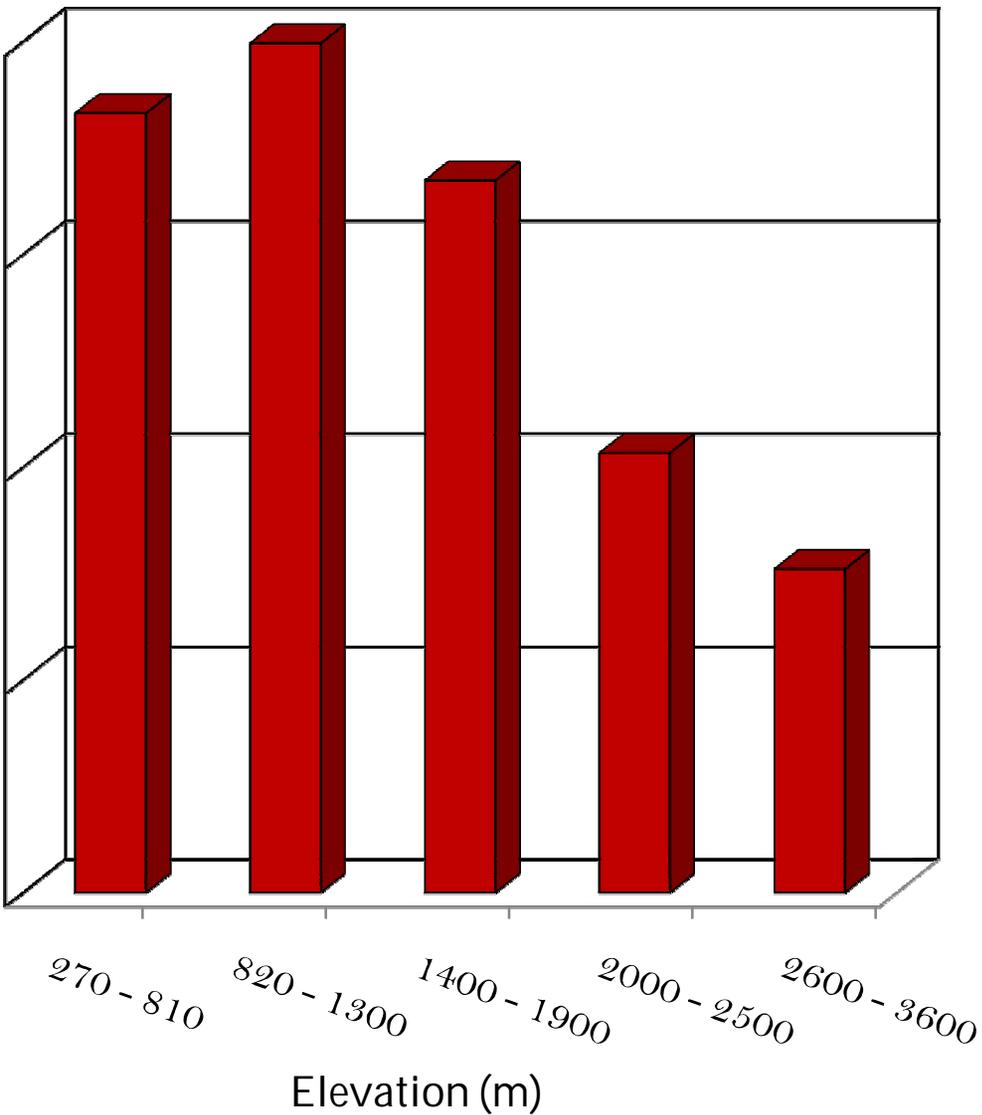
96°0'0"E



Legend

- Spot Height
- Major Contour (200 m)
- Mehao WLS Boundary

## a Distribution of Elevation in Mehao Wildlife Sanctuary



The *Digital Elevation Model* derived from interval contour lines was used for analyzing altitudinal variations in topography. The ranges range from a minimum of 270 m to a maximum of 3600 m as per the derived DEM.

# MEHAO WILDLIFE SANCTUARY, ARUNACHAL PRADESH

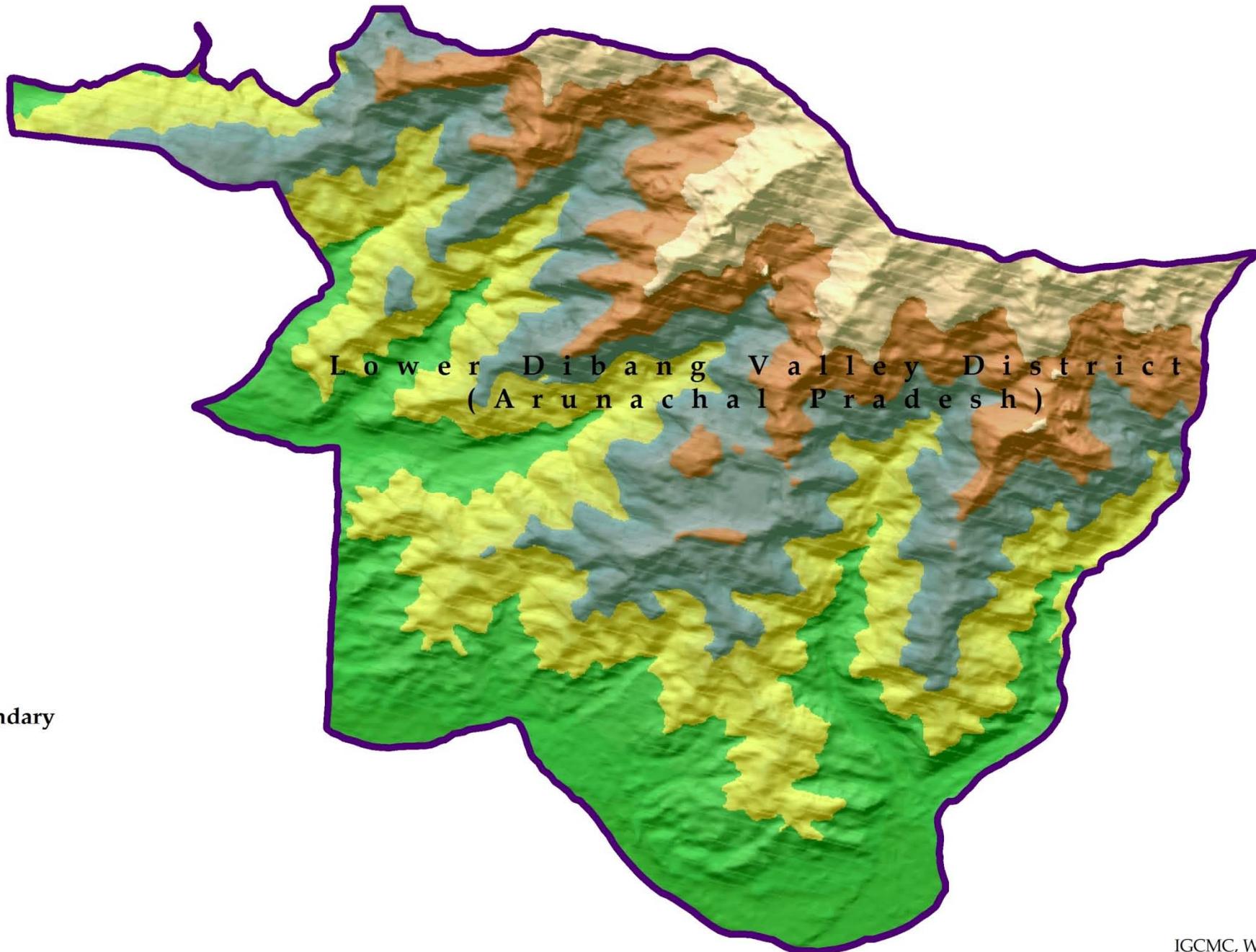
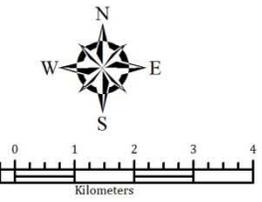
## Elevation Distribution Map

95°45'0"E

95°50'0"E

95°55'0"E

96°0'0"E



Lower Dibang Valley District  
(Arunachal Pradesh)

Legend

Mehao WLS Boundary

Elevation (metres)

270 - 810

820 - 1,300

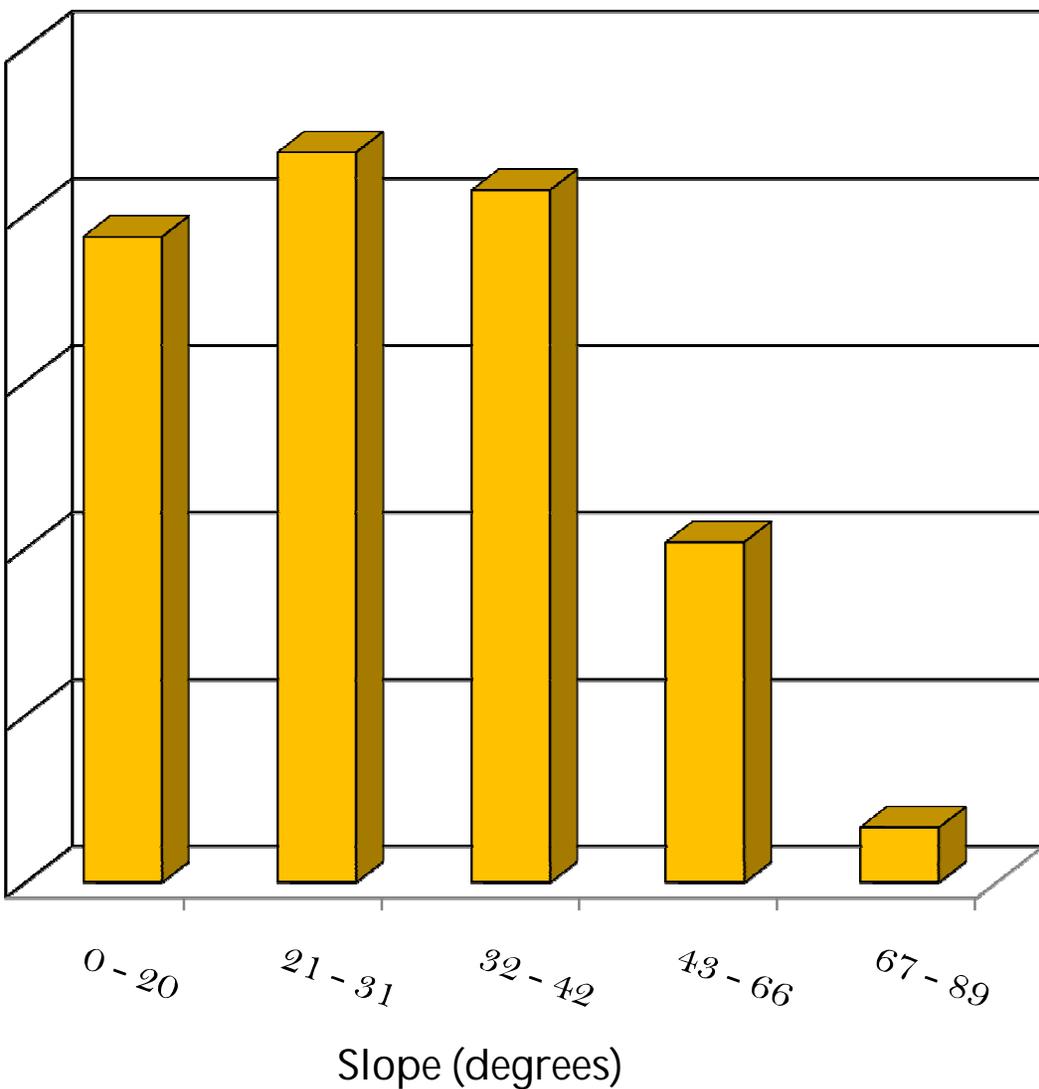
1,400 - 1,900

2,000 - 2,500

2,600 - 3,600

Lower Dibang Valley District

## Area Distribution of Slope in Mehao Wildlife Sanctuary



*Slope* identifies the steepest downhill a location on a surface. Slope is calculated for each cell in rasters. For rasters, the command calculates the maximum rate of change in elevation between each cell and its eight neighbors. The command takes an input surface raster and calculates an output raster containing the slope at each cell. The lower the slope value, the flatter the terrain; the higher the slope value, the steeper the terrain.

# MEHAO WILDLIFE SANCTUARY, ARUNACHAL PRADESH

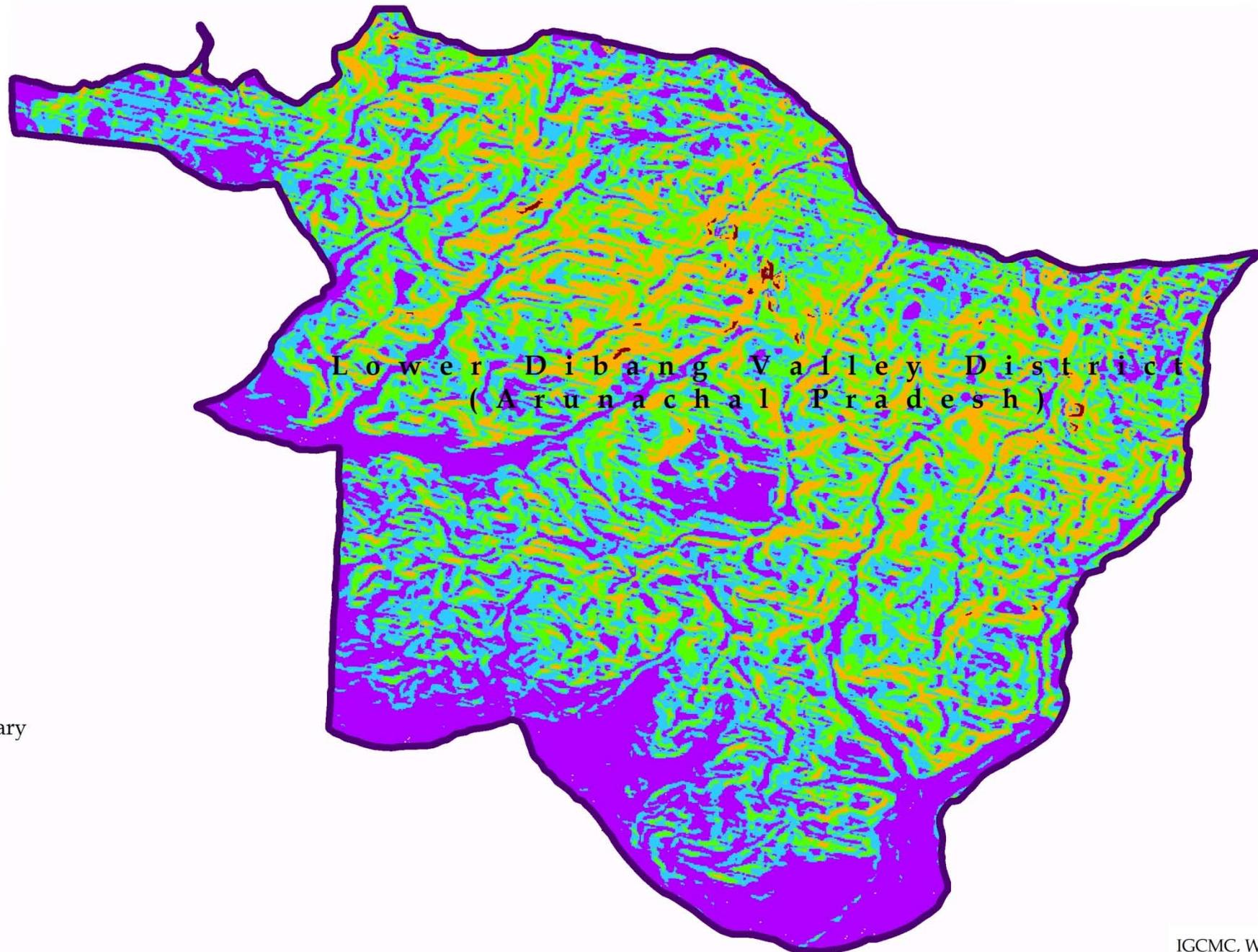
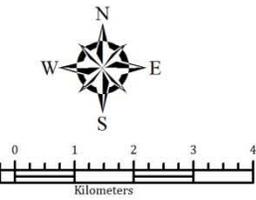
## Slope Distribution Map

95°45'0"E

95°50'0"E

95°55'0"E

96°0'0"E



nd

Mehao WLS Boundary

(Degrees)

0 - 20

21 - 31

32 - 42

43 - 66

67 - 89

LOWER DIBANG VALLEY DISTRICT

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the direction that a slope faces. It identifies the steepest down slope direction at a location or is thought of as slope direction or the compass direction a hill faces. Aspect is measured in degrees from 0 (due north) to 360 (again due north, coming full circle). Flat slopes and are given a value of -1.

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# MEHAO WILDLIFE SANCTUARY, ARUNACHAL PRADESH

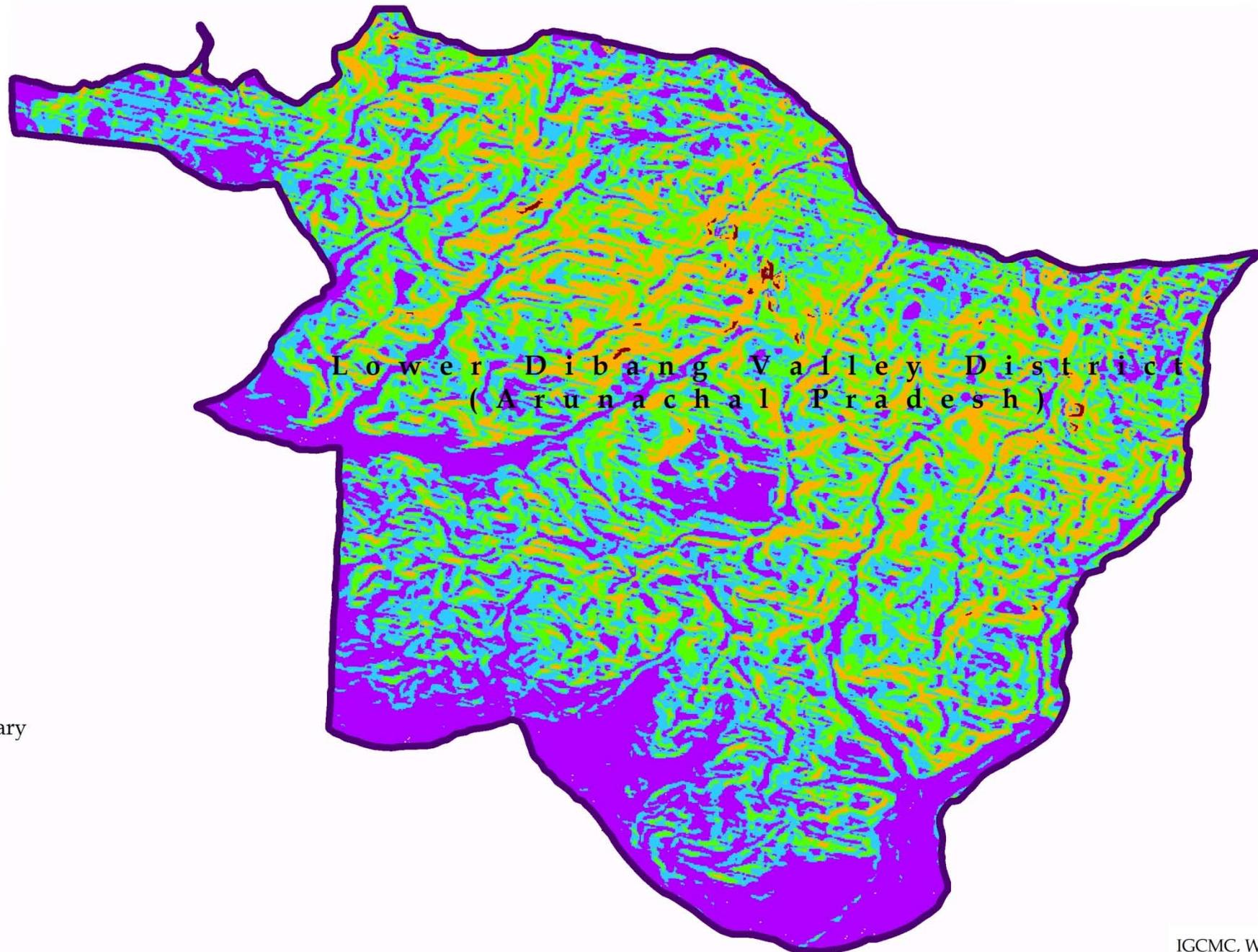
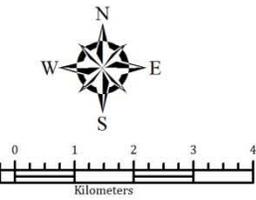
## Slope Distribution Map

95°45'0"E

95°50'0"E

95°55'0"E

96°0'0"E



nd

Mehao WLS Boundary

(Degrees)

0 - 20

21 - 31

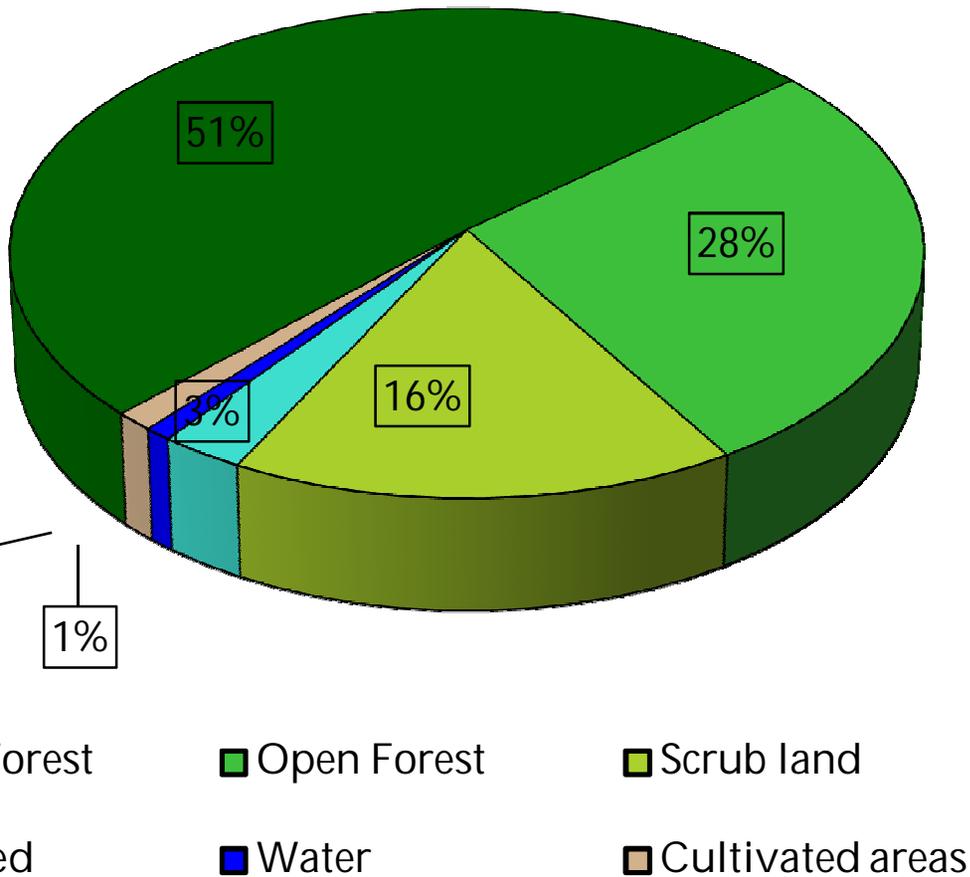
32 - 42

43 - 66

67 - 89

LOWER DIBANG VALLEY DISTRICT

## Percentage of Area under Land use/Land cover classes



**Dense forest:** all lands of forest cover having a canopy of 40 percent and above.

**Open forest:** lands with forest cover having a canopy of between 10 – 40 percent.

**Scrubland:** degraded forested lands having a canopy of less than 10 percent.

**Non-forested area:** land without any kind of forest cover. Includes river and grassland

The term *land use* is distinct from *land cover*. *Land use* is a description of how people utilize the land for socio-economic activity like urban and agricultural land uses. *Land cover* is the physical material on the surface of the earth and includes grass, trees, forests, bare ground, water, etc.

# MEHAO WILDLIFE SANCTUARY, ARUNACHAL PRADESH

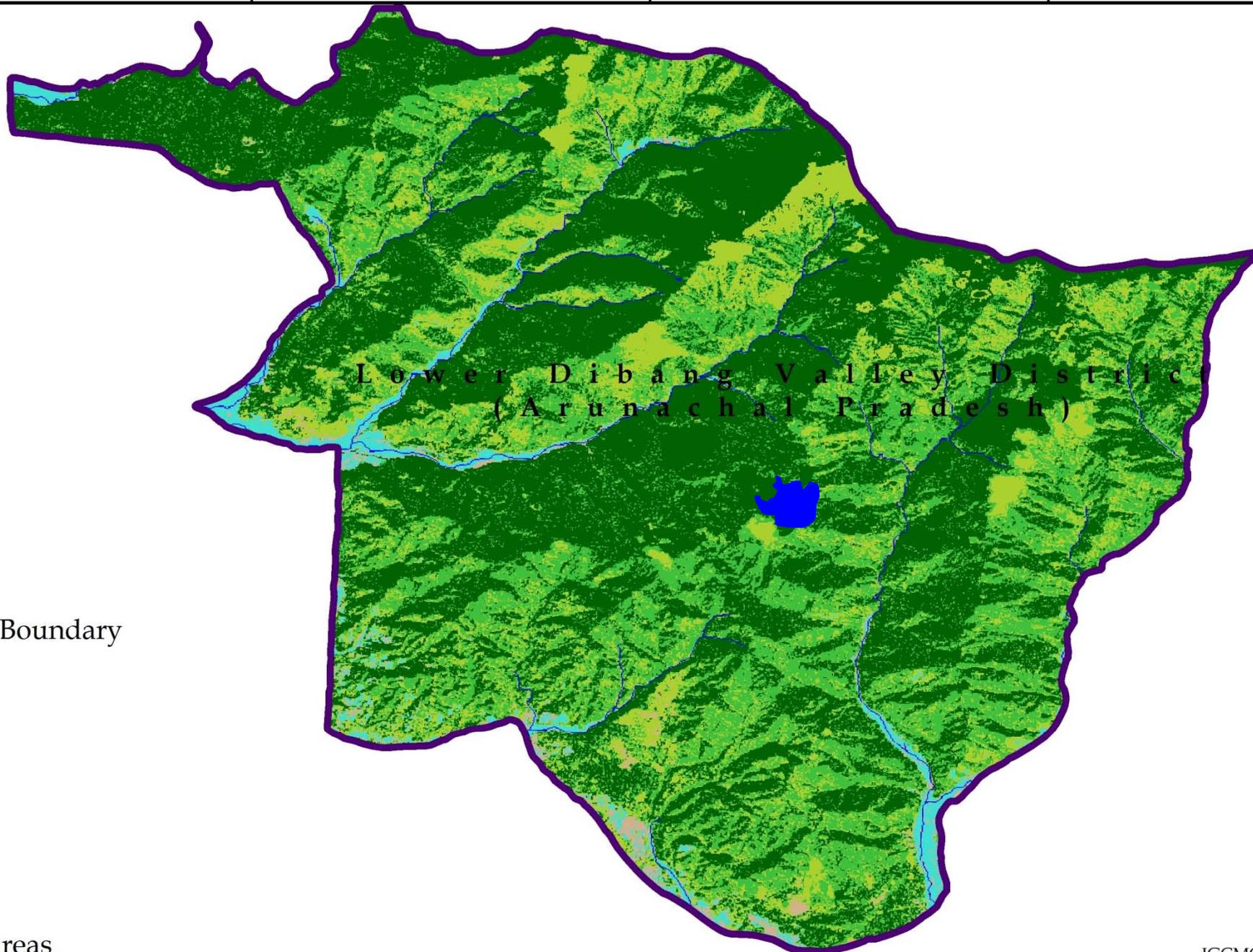
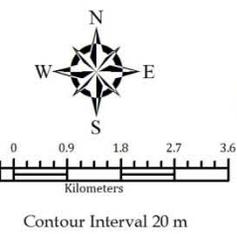
## Land use and Land cover Map

95°45'0"E

95°50'0"E

95°55'0"E

96°0'0"E



Legend

Mehao WLS Boundary

Water

Shrubland

River bed

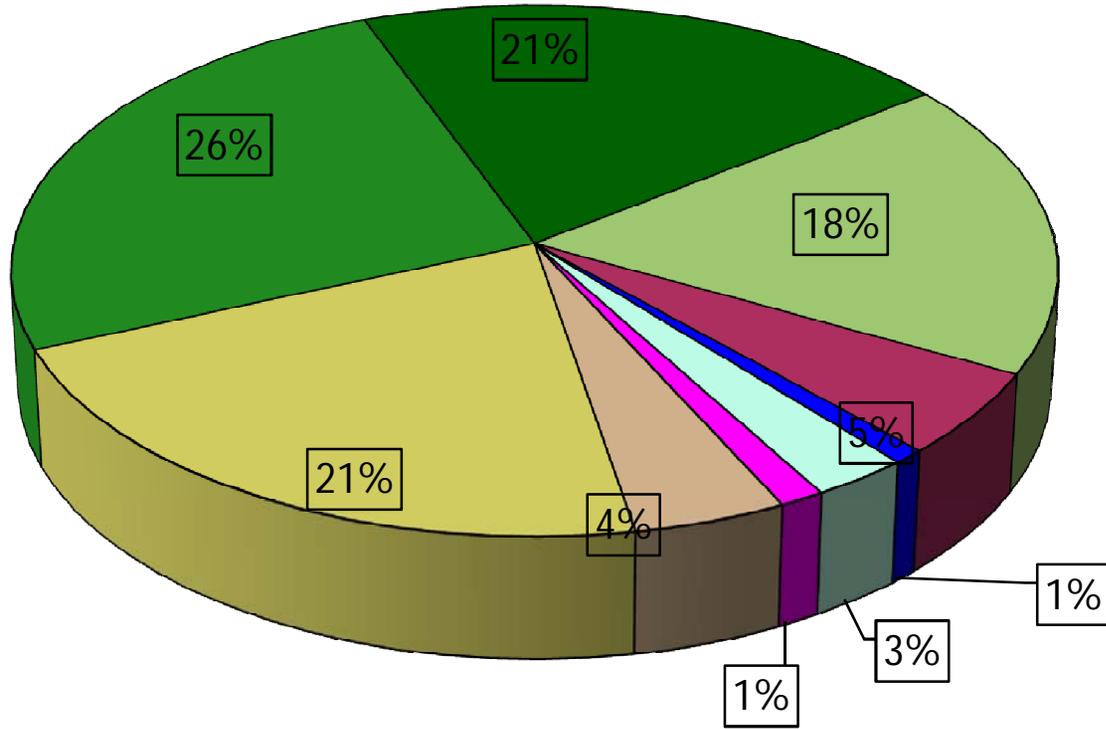
Open forest

Dense forest

Cultivation areas

Lower Dibang Valley District

### Percentage of Area under Vegetation type



Tropical Broadleaved forest  
 bamboo  
 river Bed  
 pine forest  
 temperate Wet Evergreen forest

- Tropical Evergreen forest
- River
- Agriculture
- Mixed Coniferous forest

Tropical wet evergreen occur in low elevations. Low elevation bamboo also occur, sub-tropical broadleaved forests are found higher up dominant forests. Temperate and coniferous forests occur even higher up. The high elevations of the sanctuary have some moist scrub.

# MEHAO WILDLIFE SANCTUARY, ARUNACHAL PRADESH

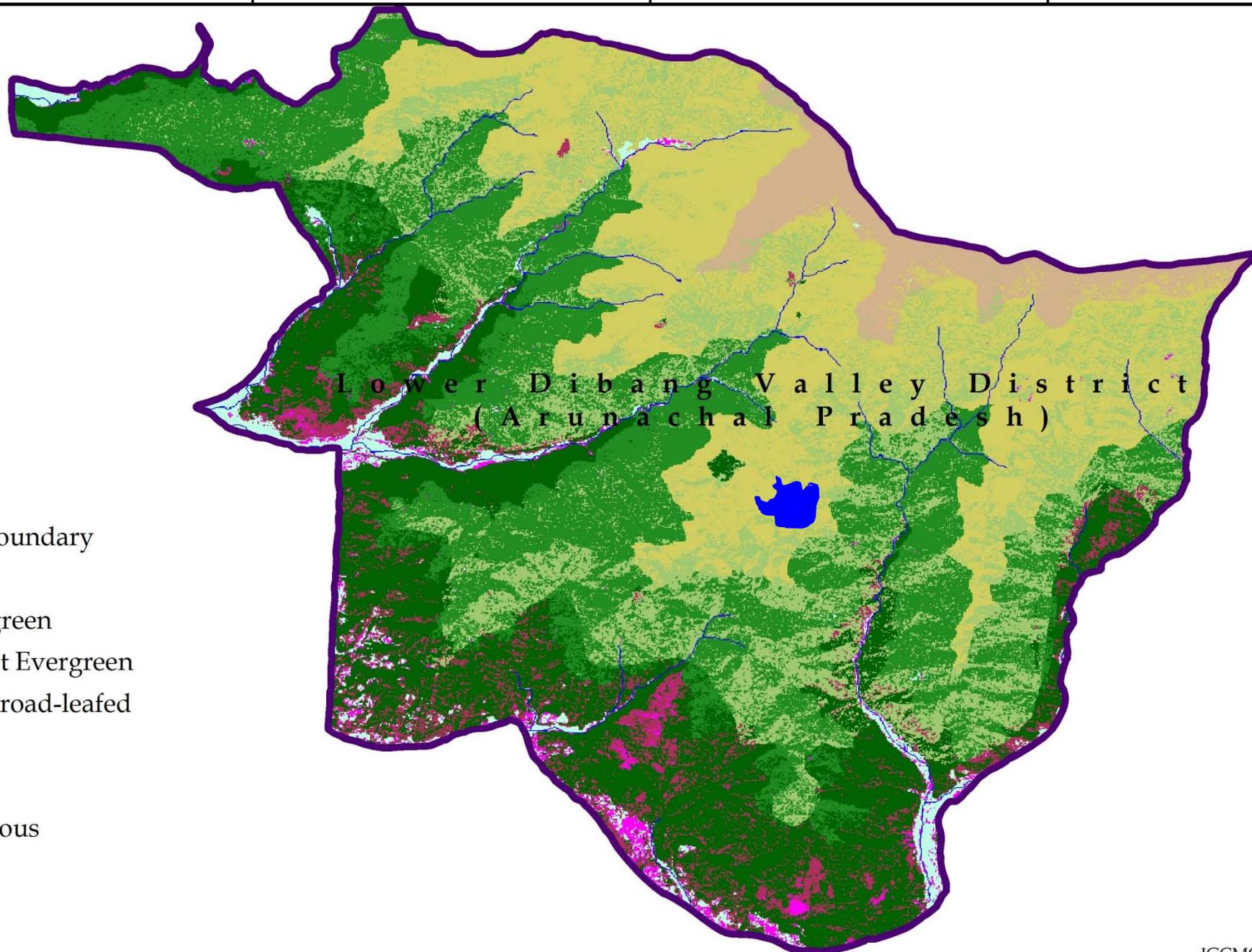
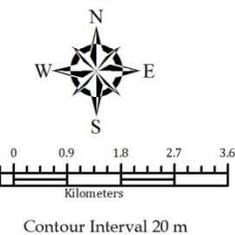
## Vegetation Type Map

95°45'0"E

95°50'0"E

95°55'0"E

96°0'0"E



nd

Mehao WLS Boundary

es

Tropical Evergreen

Temperate Wet Evergreen

Sub Tropical Broad-leafed

River Bed

River

Mixed Coniferous

Bamboo

Alpine Forest

Agriculture

LOWER DIBANG VALLEY DISTRICT



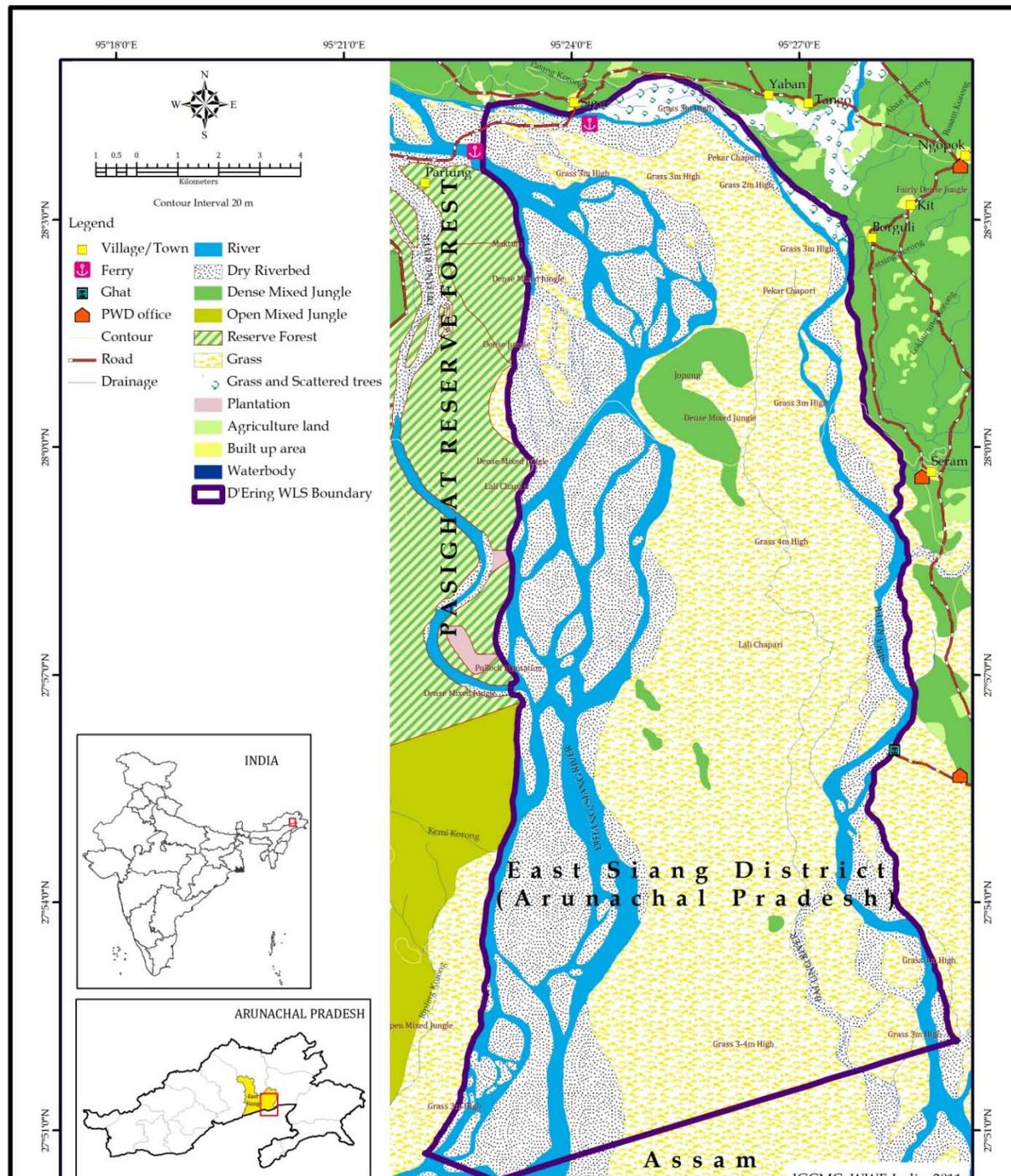
*RING MEMORIAL WILDLIFE SANCTUA*

East Siang Arunachal Pradesh	<b>Average Temperature:</b> 36°C (maximum); 8°C (minimum)
1433.20 sq km	<b>Precipitation:</b> 1433.20 mm annually
27°51' - 28°05' N	<b>Vegetation:</b> The sanctuary area is a large alluvial grassland and patches of woodland
95°22' – 95°29' E	<b>Ranges:</b> Anchalghat, Namsing and Barguli wildlife ranges

While Lali Reserve Forest was notified as Lali Wildlife Sanctuary in 1978. The sanctuary was recently renamed as Daying Ering (D'Ering) Memorial Wildlife Sanctuary after an eminent leader of the area.



# D'ERING MEMORIAL WILDLIFE SANCTUARY ARUNACHAL PRADESH Location Map



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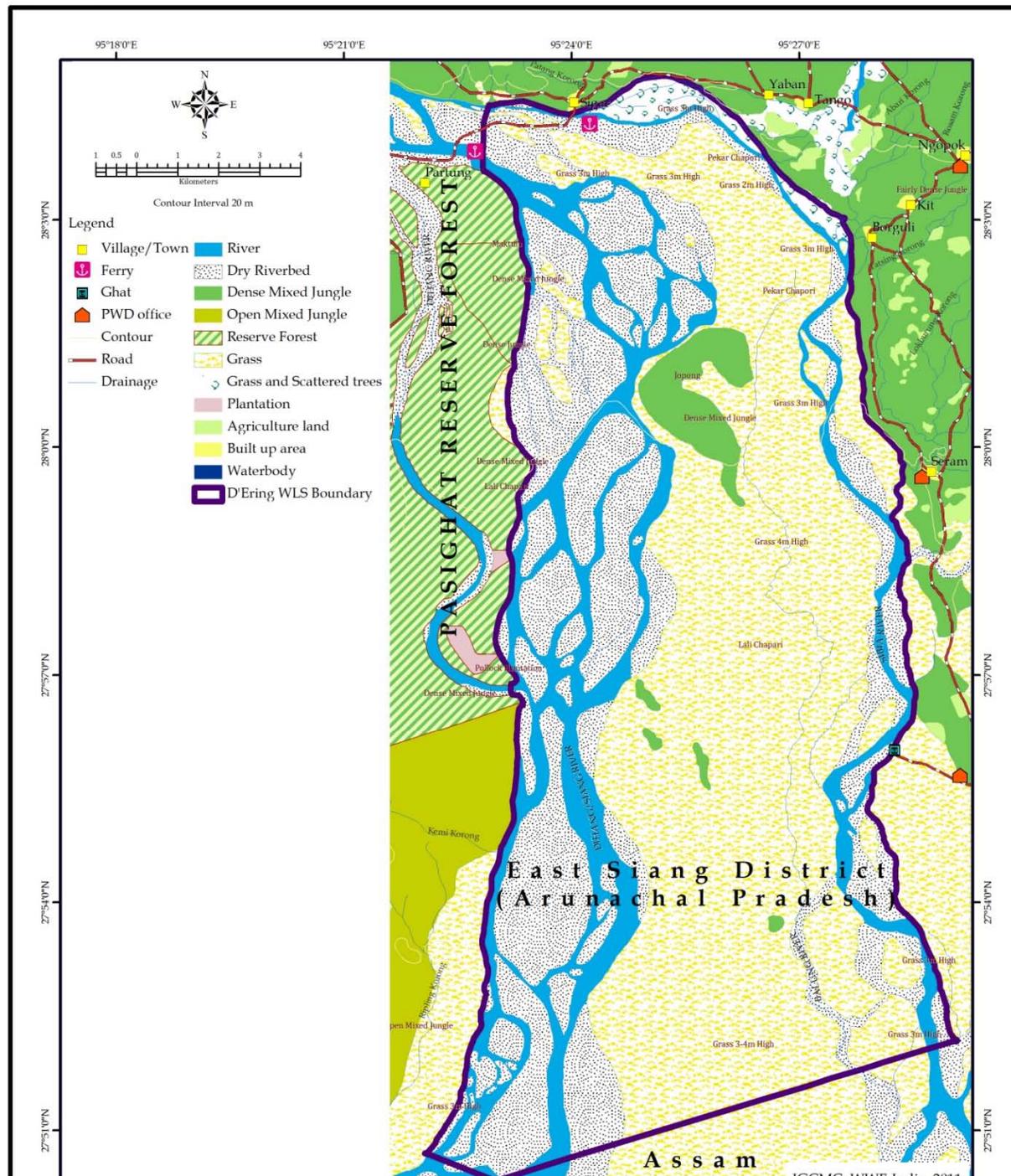
eature map depicts the boundary of the Wildlife Sanctuary, drainage network, road distribution of villages and towns, also provide information on the elevation distribution and spot height.

s of northern half of a River Island formed between River Siang and Sibia. Both the river course forming several islands.

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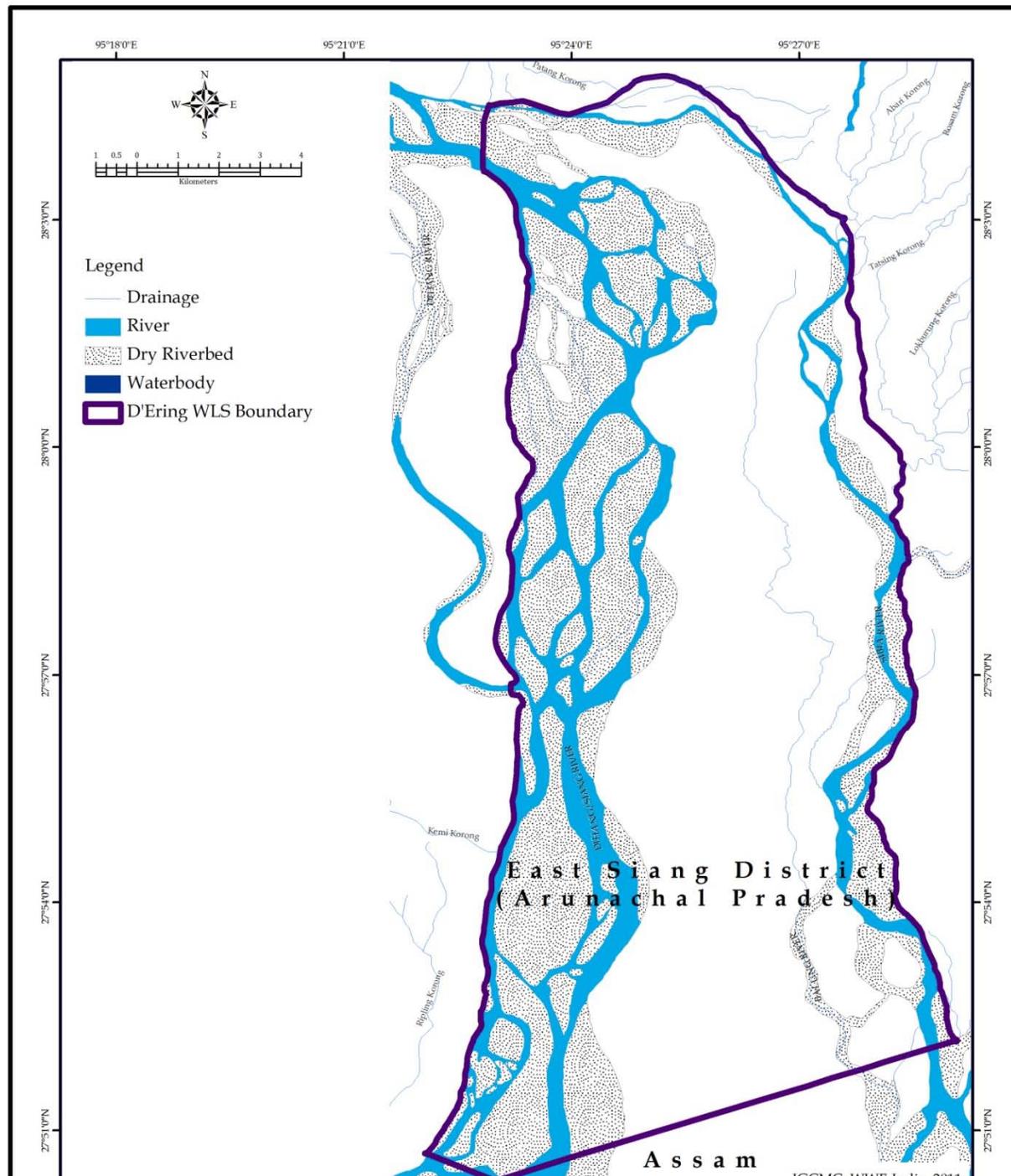
# D'ERING MEMORIAL WILDLIFE SANCTUARY ARUNACHAL PRADESH Physical Feature Map



network map basically maps the drainage system of Mehao Wildlife Sanctuary. The s  
d by river water from all sides except southern side. On the eastern and western side th  
s form a network of river courses. But the core area is devoid of water source except few p



# D'ERING MEMORIAL WILDLIFE SANCTUARY ARUNACHAL PRADESH Drainage Map



Location: Pasighat, East Siang district

Nearest railway station: Murkongselek (Jonai), Assam

Nearest port: Mohanbari, Arunachal Pradesh

Access: Across Siang River at Oyramghat

**Village inside the protected area. Villages located within the P.A. but within a distance of 10km from the boundary are:**

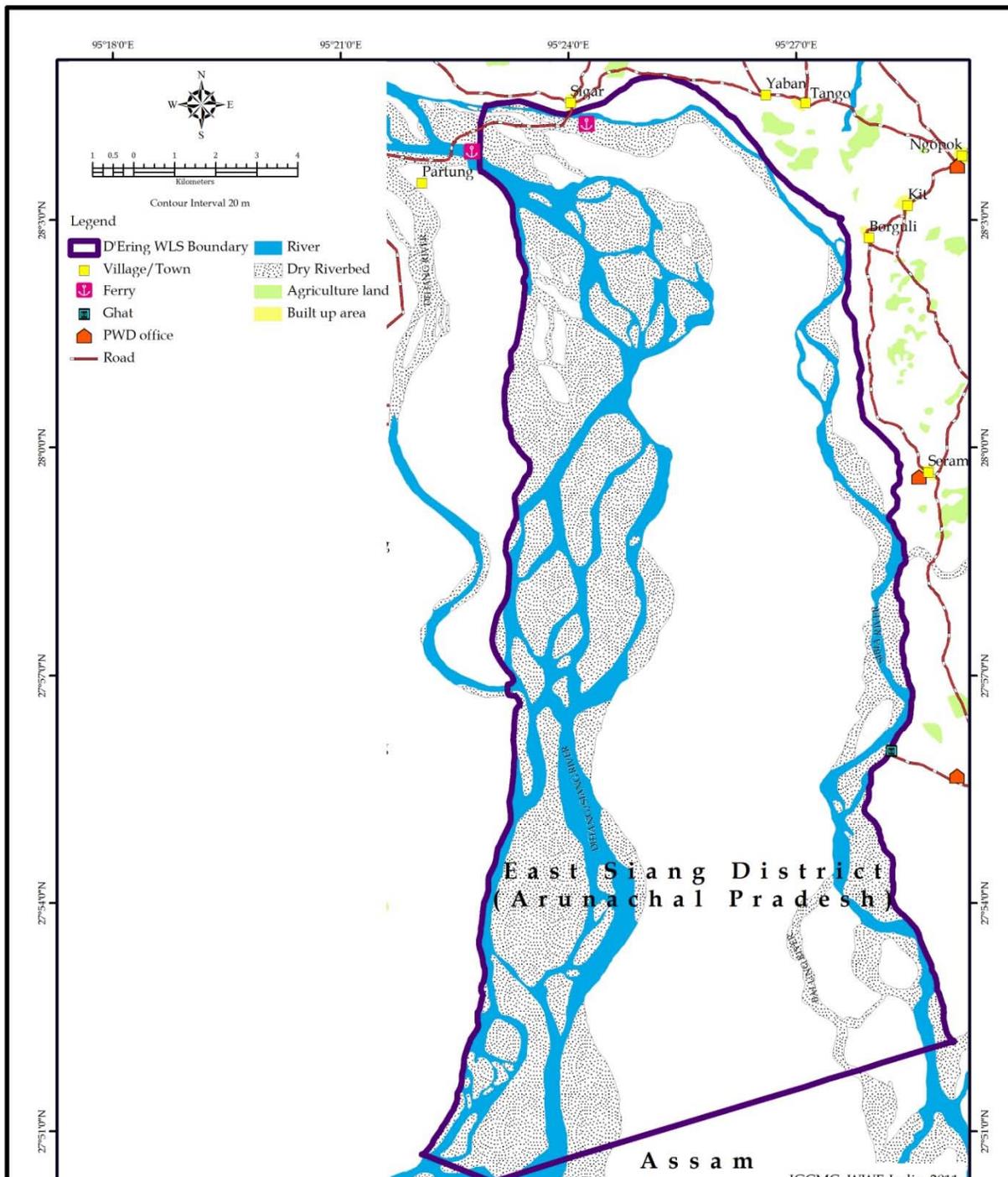
(Township area)

16. Oyan
17. Sika Bamin
18. Sika Tode
19. Borguli
20. Rani

Roads provide the vital linkages between the villages. Road network map depicts these necessary roads within the sanctuary area. The Sanctuary is not directly approachable from Anchalghat, the nearest headquarter, which is 35 km from Pasighat. During the dry season it becomes approachable through Borguli, which is 2.5 km from Mebo sub-headquarter.



# D'ERING MEMORIAL WILDLIFE SANCTUARY ARUNACHAL PRADESH Road and Town/Village Location Map



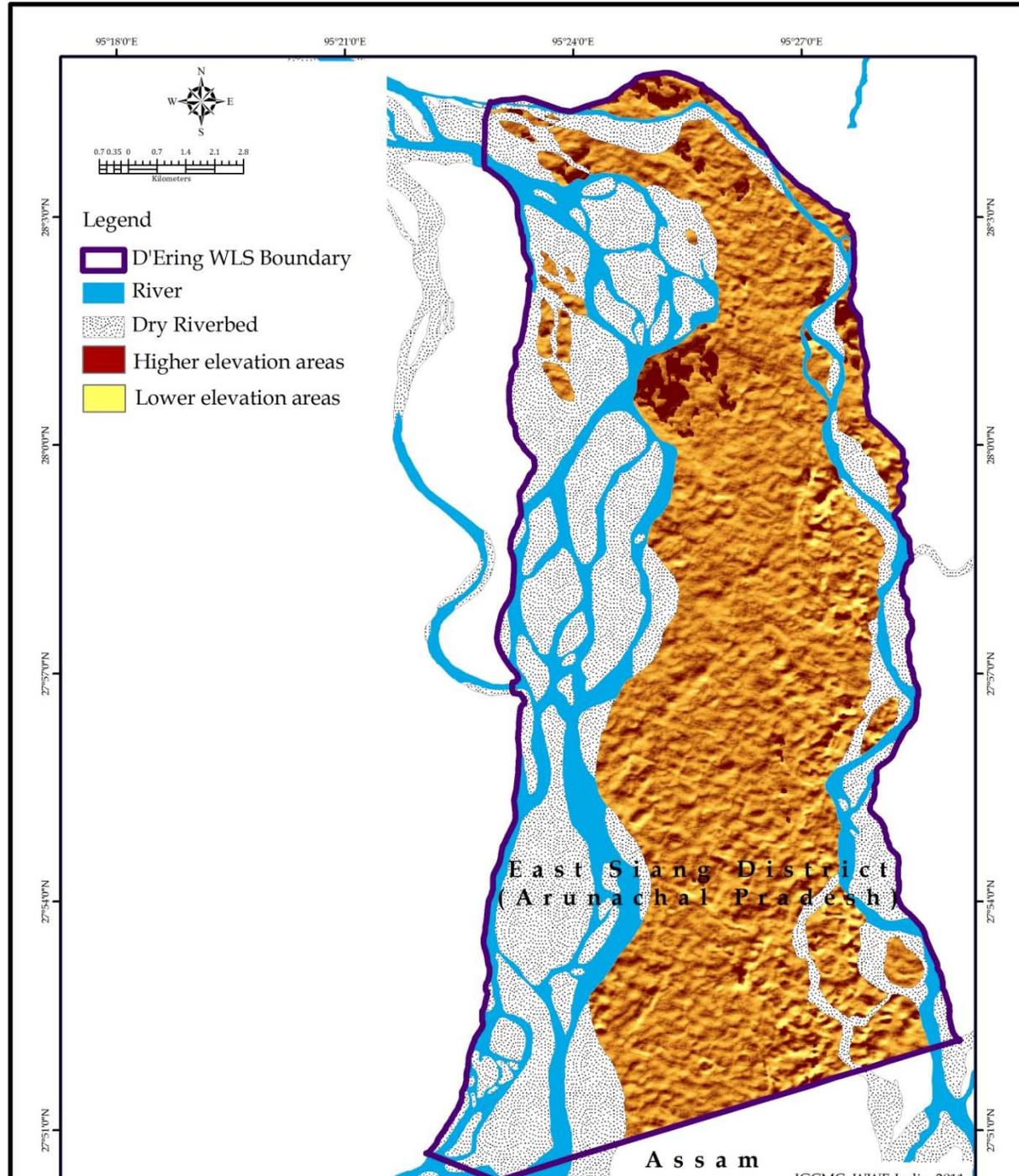
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area is riverine plain criss-crossed by river Siang and Sibia forming several riverine islands. The elevation of the area ranges from 135m to 140m above MSL gradually decreasing from north to south. The area is formed as a result of alluvial deposits left by the river Siang due to gradual change

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# D'ERING MEMORIAL WILDLIFE SANCTUARY ARUNACHAL PRADESH Relief Distribution Map



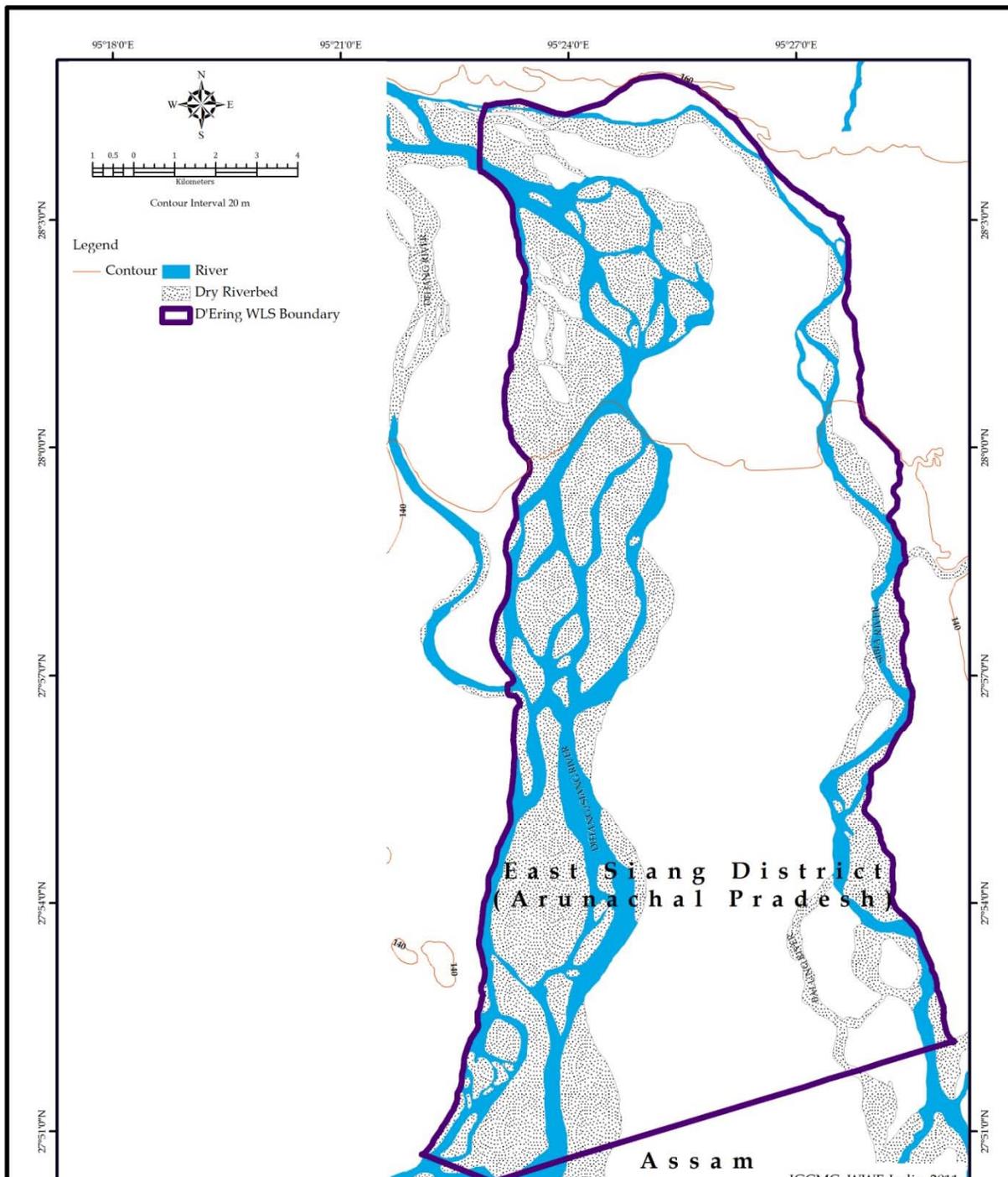
---

shows the distribution of '*contour*' lines at an interval of 20 m within D'Ering Wildlife Sanctuary. Elevation variations can easily be seen in the contour map. '*Digital Elevation Model*' (DEM) was generated and contour lines at an interval of 40 m.

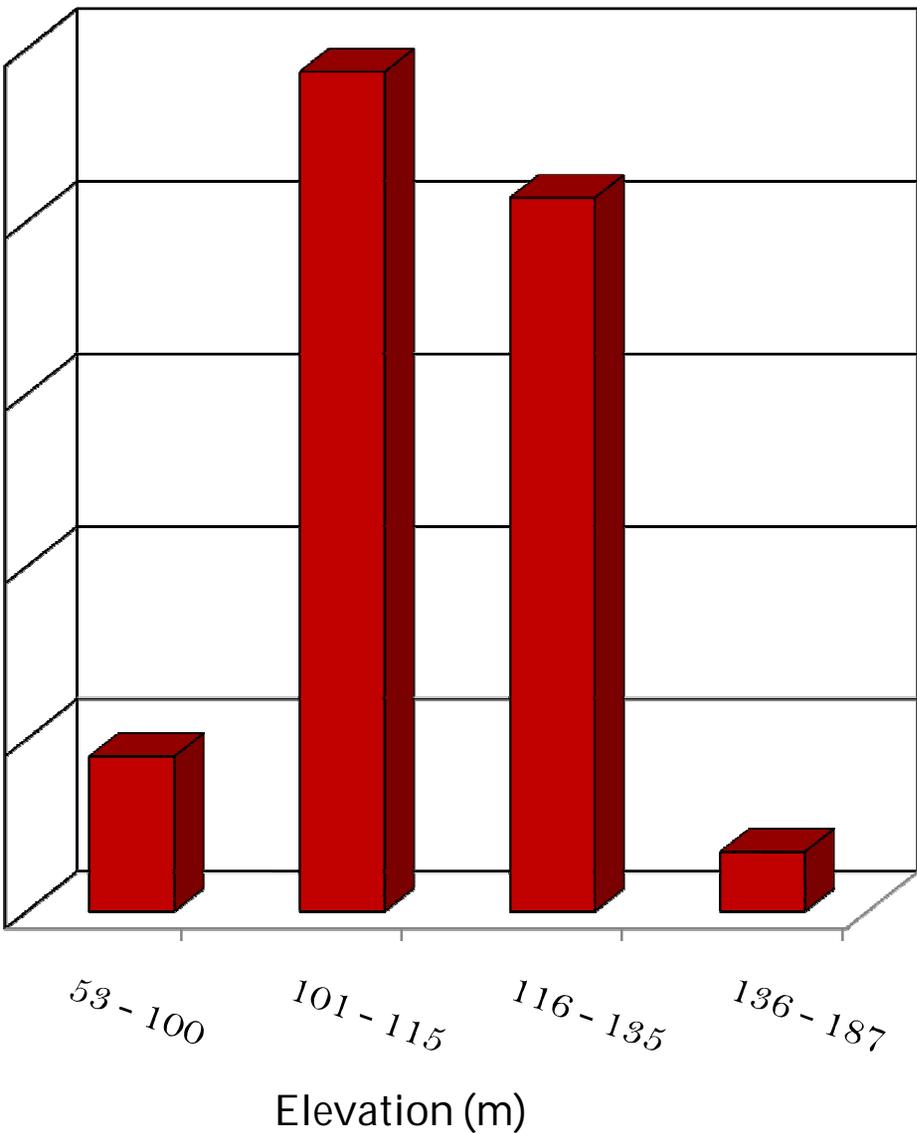
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# D'ERING MEMORIAL WILDLIFE SANCTUARY ARUNACHAL PRADESH Contour Map



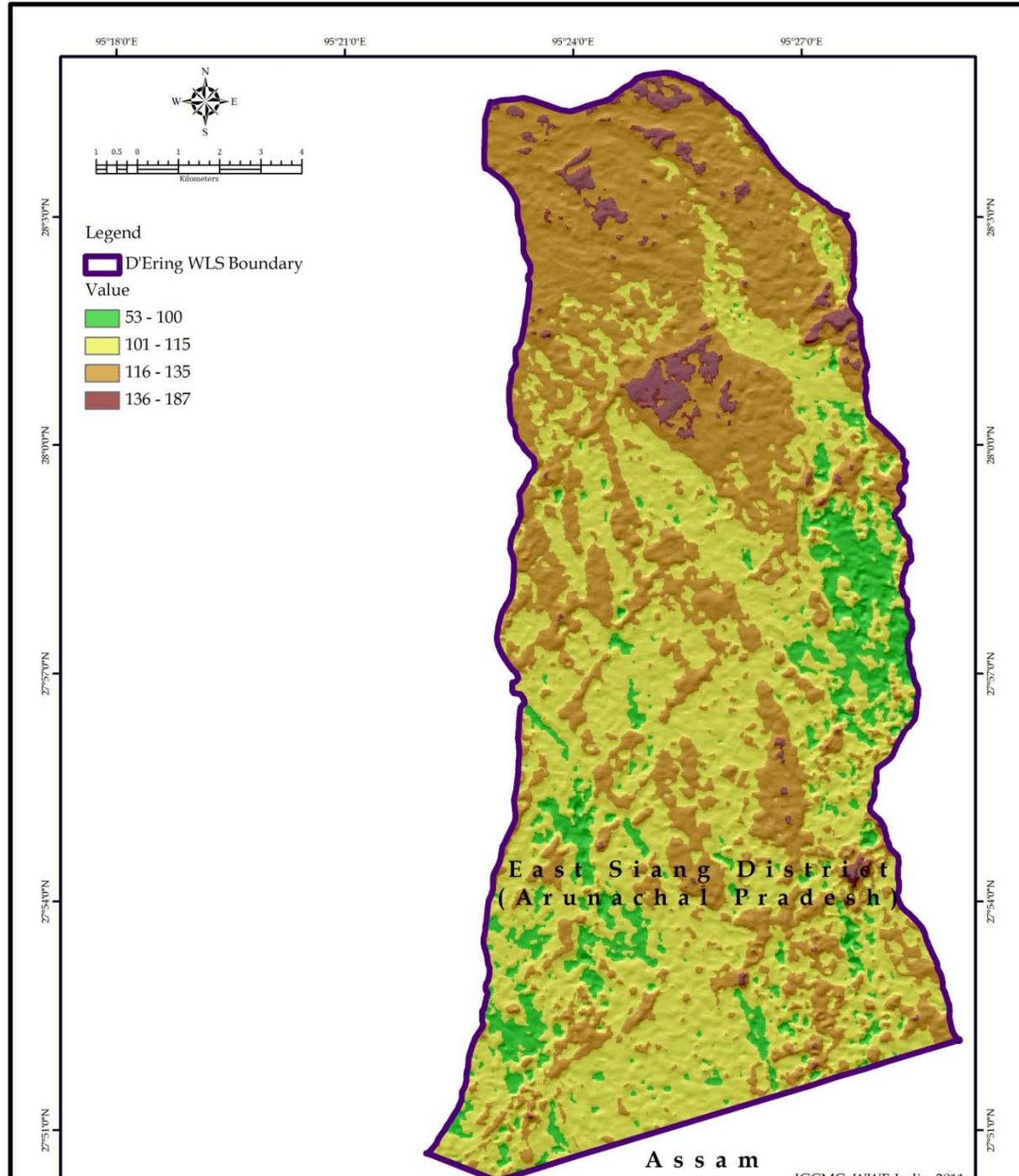
## Area Distribution of Elevation in D'Ering Wildlife Sanctuary



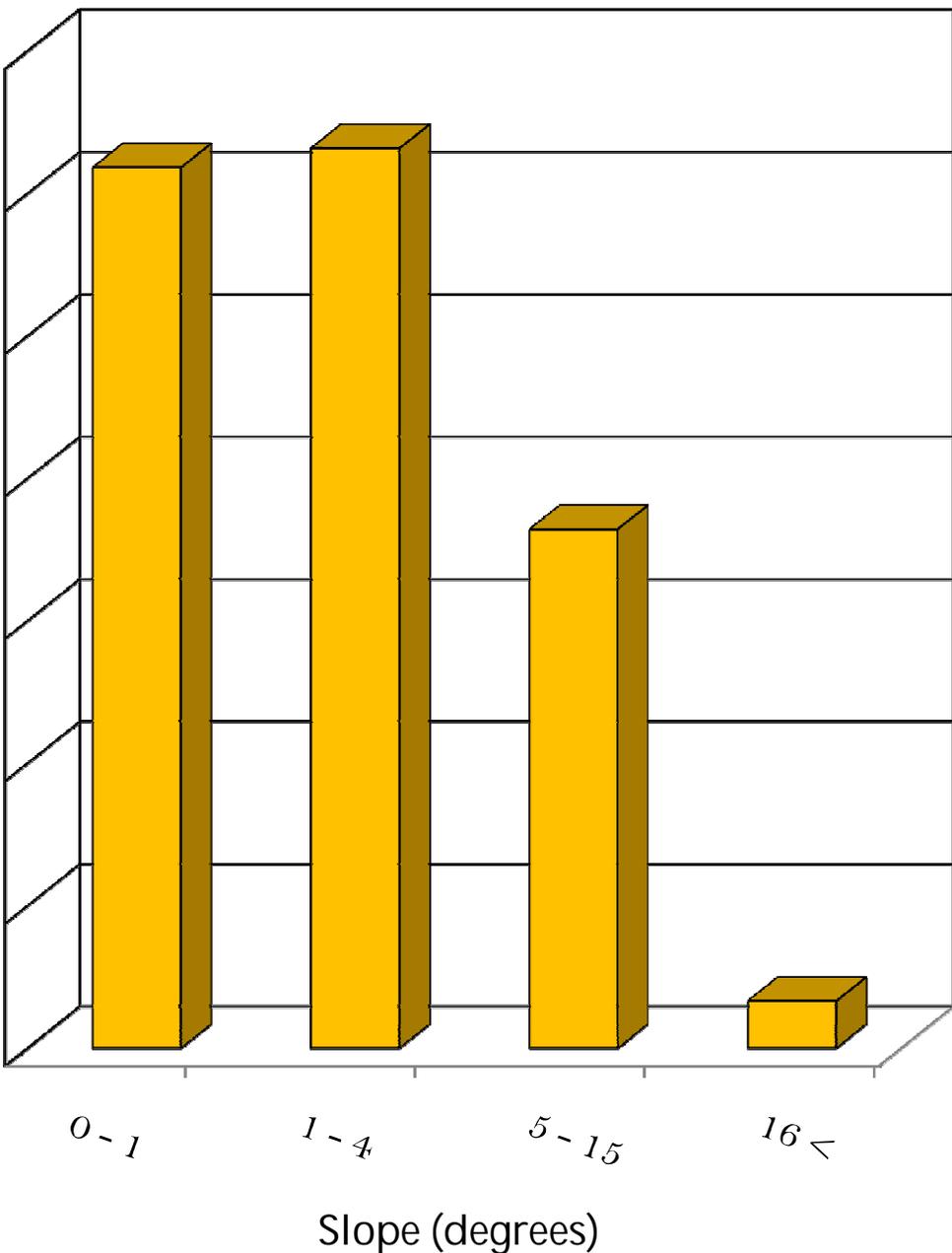
The *Digital Elevation Model* derived from interval contour lines was used for analyzing altitudinal variations in topography. The elevation ranges from a minimum of 53 m to maximum of 187 m as per the derived DEM.



# D'ERING MEMORIAL WILDLIFE SANCTUARY ARUNACHAL PRADESH Elevation Distribution Map



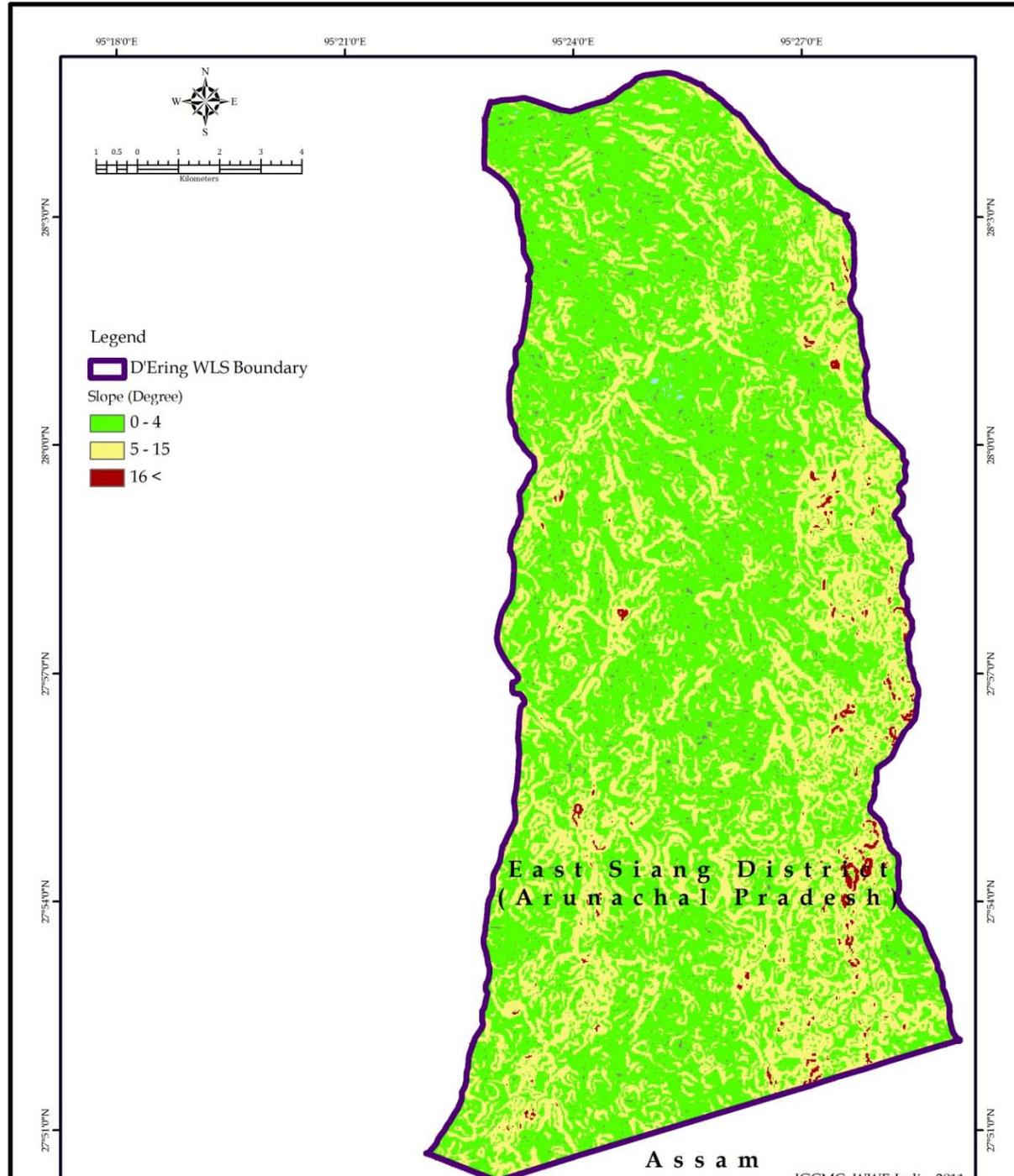
## Area Distribution of Slope in D'Ering Wildlife Sanctuary



*Slope* identifies the steepest downhill slope at a location on a surface. Slope is calculated for each cell in rasters. For rasters, it is the maximum change in elevation over each cell and its neighbors. The slope command takes a surface raster and calculates an output raster containing the slope at each cell. The lower the value, the flatter the terrain; the higher the value, the steeper the terrain.



# D'ERING MEMORIAL WILDLIFE SANCTUARY ARUNACHAL PRADESH Slope Distribution Map



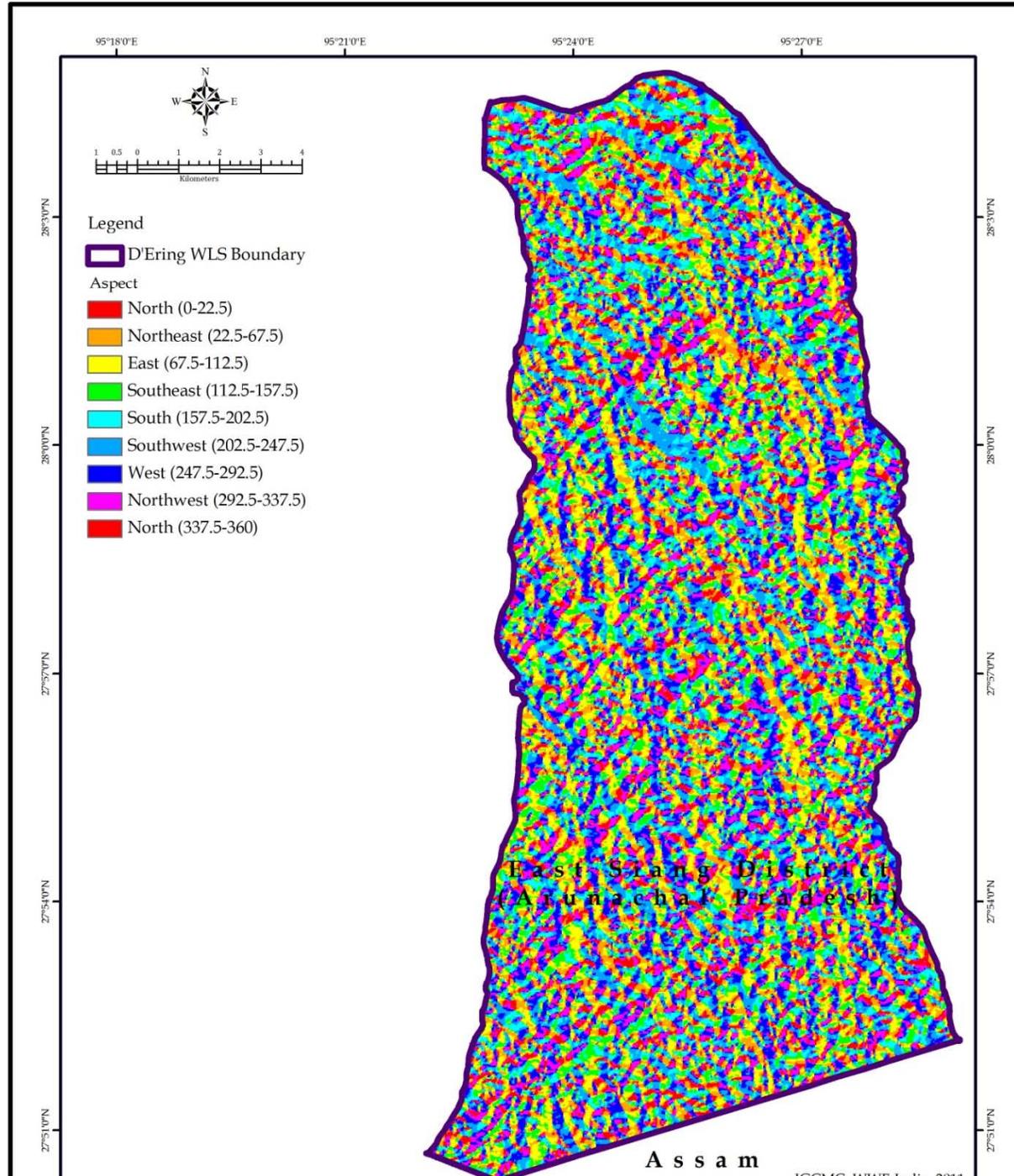
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the direction that a slope faces. It identifies the steepest down slope direction at a location or is thought of as slope direction or the compass direction a hill faces. Aspect is measured in degrees from 0 (due north) to 360 (again due north, coming full circle). Flat slopes and are given a value of -1.

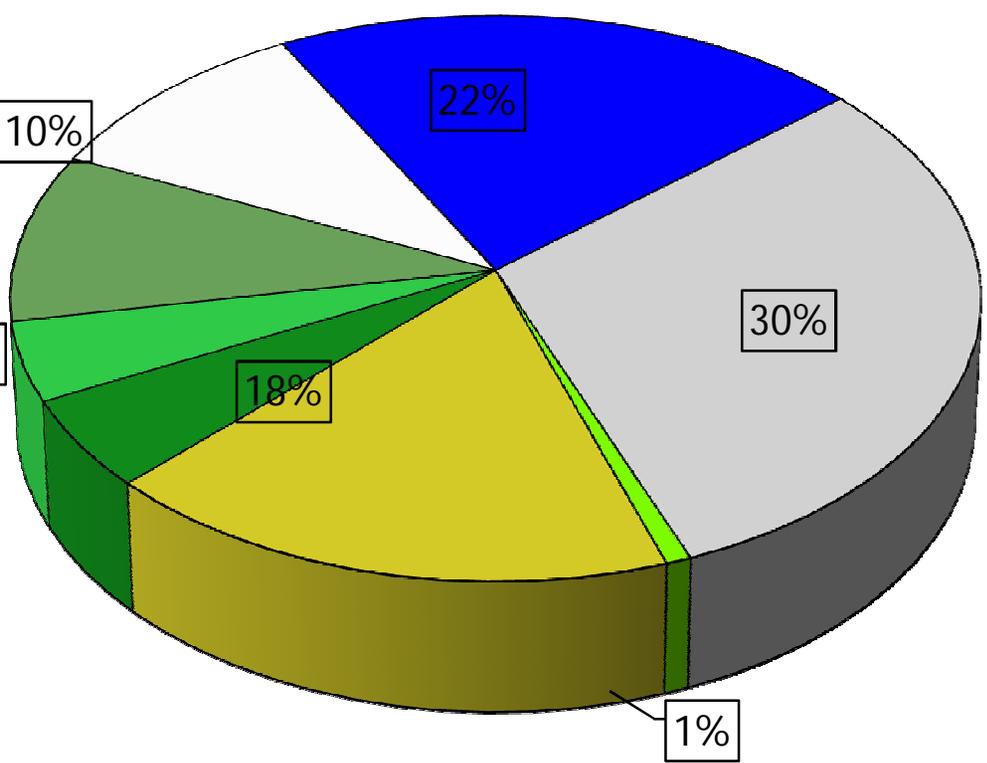
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# D'ERING MEMORIAL WILDLIFE SANCTUARY ARUNACHAL PRADESH Aspect Map



Percentage of Area under Land use/Land cover classes



Dense Forest  
 Scrubland  
 Open land  
 Grass 2m with trees

Open Forest  
 River bed/Sand  
 Open land  
 Grass 2m

**Dense forest:** all lands of forest cover having a canopy of 40 percent and above.

**Open forest:** lands with forest cover having a canopy between 10 – 40 percent.

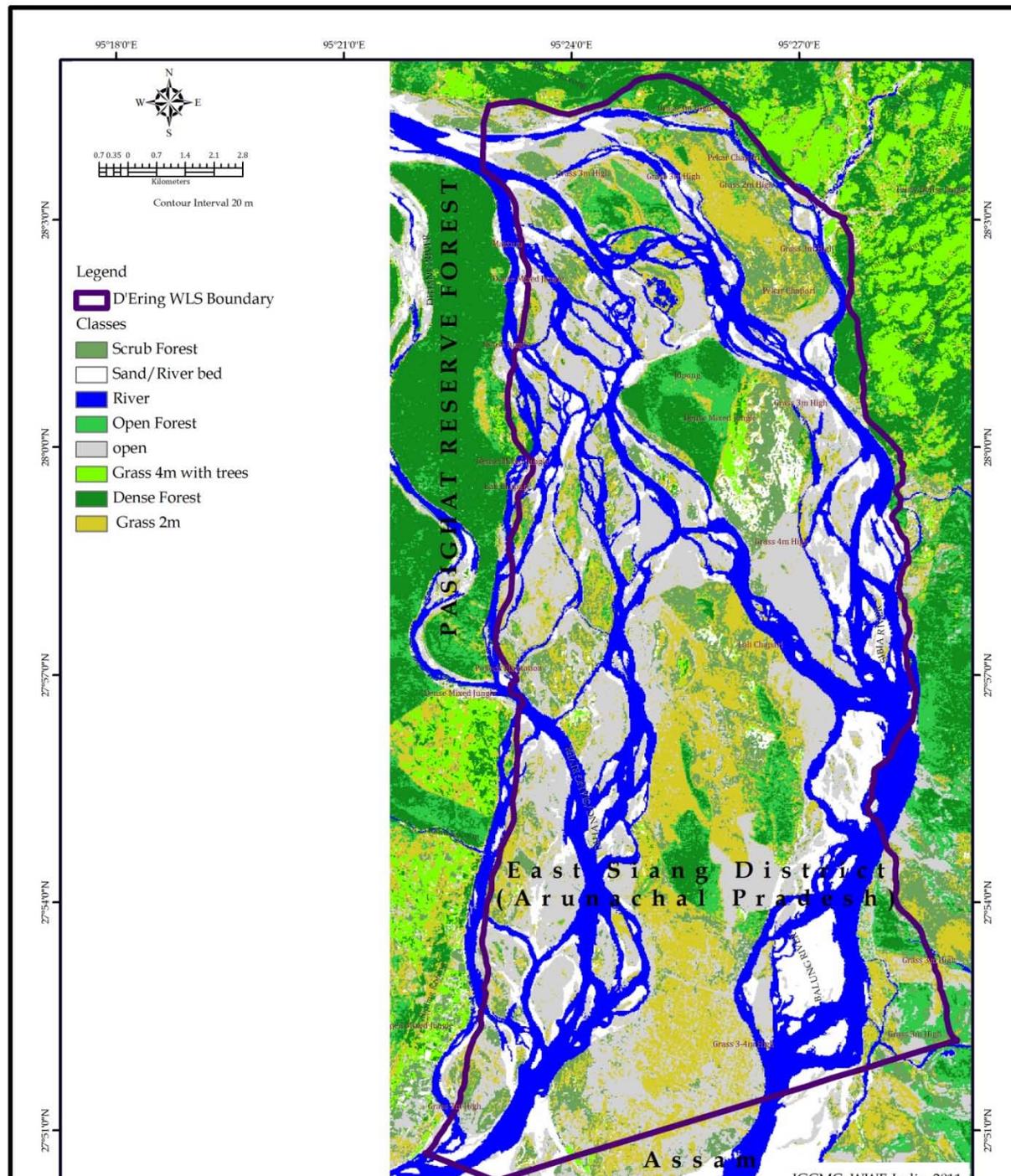
**Scrubland:** degraded forested lands having a canopy less than 10 percent.

**Non-forested area:** land without any kind of forest cover. Includes river and grassland

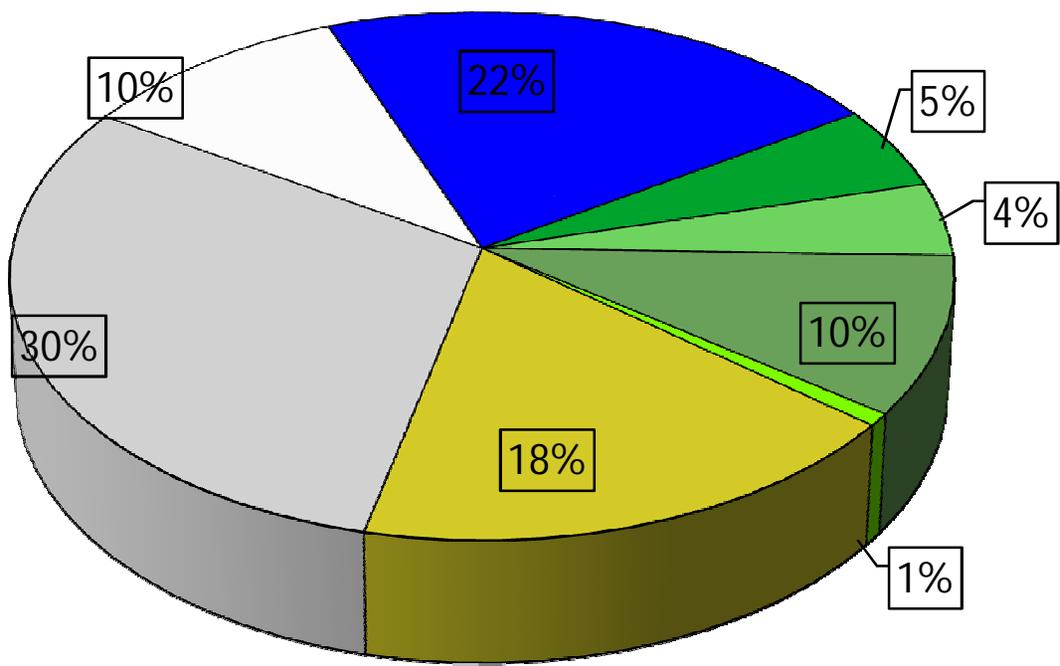
*Land use* is distinct from *land cover*. *Land use* is a description of how people utilize the land through human activity like urban and agricultural land uses. *Land cover* is the physical material at the surface.



# D'ERING MEMORIAL WILDLIFE SANCTUARY ARUNACHAL PRADESH Land use and Land cover Map



Percentage of Area under Vegetation type



- Tropical Evergreen Forest
  - Scrub Forest
  - Grass 2m
  - River bed/Sand
- l Semi-evergreen forest  
m with trees  
and

The vegetation covers of the sanctua early stages of succession. 75% of th under the cover of alluvial grassl approximately 15% of the area under v woodland falls under Assam Alluv Semi Evergreen Forest [2/C -1 Champion & Seth's classification.



us, 2000. *Management Plan of D'Ering Wildlife Sanctuary* .

am, A., Sarmah, R., Adhikari, D., Majumder, M., and Khan, M.L., 2004. Anthropogenic threats and biodiversity in Namdapha nature reserve in the eastern Himalayas. *Current Science*. 87(4), pp. 447-454.

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*Mehao wildlife sanctuary*. Nature Conservation Foundation. [Online] Available at: [www.namdapha.in/index.php?option=com\\_content&view=article&id=33&Itemid=7](http://www.namdapha.in/index.php?option=com_content&view=article&id=33&Itemid=7) (Accessed on 03.03.2011).

*D'Ering wildlife sanctuary*. Nature Conservation Foundation. [Online] Available at: [www.namdapha.in/index.php?option=com\\_content&view=article&id=27&Itemid=7](http://www.namdapha.in/index.php?option=com_content&view=article&id=27&Itemid=7) (Accessed on 12.07.2011).

*Mouling National Park*. Nature Conservation Foundation. [Online] Available at: [www.namdapha.in/index.php?option=com\\_content&view=article&id=33&Itemid=7](http://www.namdapha.in/index.php?option=com_content&view=article&id=33&Itemid=7) (Accessed on 23.08.2011).

Project Tiger, *Namdapha tiger reserve*. [Online] Available at: <http://projecttiger.nic.in/namdapha.htm> (Accessed on 10.08.2011).

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Singh, T.P., and Srivastava, G., 2005. Vegetation cover type mapping in Mouling national park in Arunachal Pradesh – an integrated geospatial approach. *Journal of the Indian Society of Remote Sensing*. 33(4), pp. 547-563.

*Land cover*. [Online] Available at: [http://en.wikipedia.org/wiki/Land\\_cover](http://en.wikipedia.org/wiki/Land_cover) (Accessed on 16.09.2011).