



भारतीय वनस्पति सर्वेक्षण
BOTANICAL SURVEY OF INDIA



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**ANNUAL PROGRESS REPORT (April 2020– March
2021)**

Botanical Survey of India, APCR, Itanagar

There are total of eight research projects running at APRC, Itanagar. These are –

1. Fern Family Pteridaceae of India (as contribution to ‘Pteridophytic Flora of India’) (Ongoing project)
2. Flora India, vol. 15 (submitted)
3. Flora india, vol 16 (submitted)
4. Materials for Flora of Arunachal Pradesh, vol. 4 (submitted)
5. Floristic studies in selected High Altitude Wetlands (HAWs) and its environs representing 5 districts of Arunachal Pradesh. (New project)
6. Enumeration of RET species of Arunachal Pradesh. (New project)
7. Fern and Fern-allies of Dihang-Dibang Biosphere Reserve of Arunachal Pradesh. (Ongoing project)
8. Taxonomy & Ecology of Pteridophytes of Lower Subansiri district with special focus to Talle valley wildlife sanctuary, Arunachal Pradesh (Ongoing project)

Achievement of BSI, APRC, Itanagar

- New to India:3
- New to North-East India:3
- New to State:14
- Project submitted:2
- Paper published:10

Herbarium Specimens

Mounted	2250
Stitched	2250
Labelled	1634
Poisoned/ Repoisoned	1552
Dusted	5100
Genus cover changed	138
Species cover changed	272
Digitization of specimens	2600



Staff Position and strength of BSI, APRC, Itanagar

Sl. No.	Designation	Name of the Official	Sanction strength	Man in Position
GROUP A				
1.	Scientist 'E'	Dr. V. K. Rawat	1	1
	Scientist 'D'	Dr. M. K. Kandwal (Deployed to BGIR)	1	1
2	Scientist 'C'	Dr Manas R Debta Dr. U. Tiwari Dr. K. Chowlu	3	3
GROUP B				
3	Botanist	Dr Ranjit Daimari	2	1
GROUP C				
4	Office suptd.	Lav Kumar Das	1	1
5	Botanical Assistant	Amit D. Pande (deployed to Pune) Arijit Ghosh (deployed from Shillong)	2	2
6	Lib. Information Asstt.	K. Kiran	1	1
7	Head Asstt.	VACCANT	1	0
8	Jr. Hindi Translator	VACCANT	1	0
9	Preservation Asstt. Level-1	VACCANT	1	0
10	Drive Cum Mechanic	VACCANT	1	0
11	UDC	Dilip Sardar	1	1
12	Stenographer Gr-II	VACANT	1	0
13	LDC	Shri Vivek Kumar	1	1
14	Fieldman	Shri S. L. Mandar	1	1
15	Chowkidar	VACCANT	3	0
16	Garden Attendant (MTS)	Smt L. M. Biswakarma	1	0
17	Safaiwala (MTS)	VACCANT	1	0
Total Staff strength			23	12

Project -1: Fern Family Pteridaceae of India

(Pteridophytic flora of India)

(August 2018 to March 2022)

Executing Scientist – Dr Vineet K. Rawat



Literature Studied:

➤ All published literature are scrutinised; only 02 new records to Arunachal Pradesh are found to be reported from the literature.

Herbaria consulted: Three

- ARUN, Itanagar
- GB Pant National Institute of Himalayan Environment, Itanagar
- State Forest Research Institute, Itanagar

Output:

- ❖ A checklist of 174 species belonging to 19 genera has been prepared.
- ❖ Completed description of 105 species of family Pteridaceae along with nomenclatural citation, ecological notes.
- ❖ Keys to all the 105 species completed.
- ❖ Photoplate of 51 species prepared.
- ❖ Digitised 135 specimens collected from NE India.
- ❖ Illustration of 25 species prepared.
- ❖ More than 100 species are photographed from different places of Papum Pare district.

*Prepared 300 species as a checklist as materials for Pteridophytic flora of Arunachal Pradesh.

<i>Nam e of Genus</i>	Number of Species described
Acrostichum	01
Actiniopteris	01
<i>Adiantum</i> L.	26
<i>Aleuritopteris</i> Fee	19
Annogramma	2
<i>Ceratopteris</i> Brongn.	02
<i>Cerosora</i> (Baker) Domin.	01
<i>Coniogramme</i> Fee	05
<i>Cryptogramma</i> R.Br.	01
<i>Doryopteris</i> J.Sm.	01
<i>Mickelopteris</i> Fraser-Jenk.	01
<i>Notholaena</i> R.Br.	04

<i>Nam e of Genus</i>	Number of Species described
<i>Oeosporangium</i> Vis.	05
<i>Onychium</i> Kaulf.	07
<i>Pallaea</i>	04
<i>Pityrogramma</i> Link	01
<i>Pteris</i> L.	69
<i>Syngamma</i>	01
<i>Taenitis</i> Willd. ex Schkuhr	02
Total 19 genus/174 spp.	

Project 3: Flora of India, Vol. 16: Families **Symplocaceae and Oleaceae**

Duration: September 2020–December 2020

Executing scientist – Dr UmeshKumar L. Tiwari

Manuscript prepared for the families includes 13 genera and 139 taxa (of 113 species, 14 subspecies and 12 varieties) in India along with key for the easy identification of the taxa (29 pp) and compiled Vol. 16 for Flora of India.

Families	Number of Genera	Number of Taxa	Number of Species	Number of subspecies	Number of varieties
Symplocaceae	1	49	36	7	6
Oleaceae	12	90	77	7	6
Total	13	139	113	14	12



Project 4: Materials of the Flora of Arunachal Pradesh Vol. 4

Duration: July 2019–March 2021

Executing scientist – Dr UmeshKumar L. Tiwari

	Number of Family	Number of Genera	Number of Taxa
Total number	77	261	598

* Overall 977 taxa are recorded as an addition to the Angiospermic flora of Arunachal Pradesh state.

Research Publications:

1. RATHI R.S., K.C. BHATT, A. PANDEY, U.L. TIWARI, K. PRADHEEP, N.S. PANWAR & S.P. AHLAWAT (2020). *Tubocapsicum anomalum* (Franch. & Sav.) Makino: A New Record to the Flora of Arunachal Pradesh, India. *Indian Journal of Plant Genetic Resources* 33(1): 115–118.
2. KANWAL K.S., U.L. TIWARI, M.S. LODHI & R.S. RAWAL (2020). *Meconopsis merakensis* var. *merakensis* (Papaveraceae), a new record for India. *Rheedea* 30(3): 391–395.
3. TIWARI, U.L. & V.K. RAWAT 2019 (pub. 2020). Some addition to the flora of Arunachal Pradesh and India. *Bulletin of Arunachal Forest Research* 34(1&2): 29–33.

Project 4a: Materials of the Flora of Arunachal Pradesh, Vol. 4

Duration: July 2019–March 2021

Executing scientist – Dr Manas R. Debta

	Number of Family	Number of Genera	Number of Taxa
Total number	75	349	375

➤ Each taxon is cited by current nomenclature and accompanied with a brief description along with their habitat, ecology and local name, if any.

Format of a description (Flacourtiaceae)

Homalium ceylanicum (Gardner) Benth., J. Proc. Linn. Soc., Bot. 4: 35. 1859. *Blakwellia ceylanica* Gardner, Calcutta J. Nat. Hist. 7: 452. 1847. *Homalium minutiflorum* Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 41: 308. 1872. *H. ceylanicum* subsp. *minutiflorum* (Kurz) R.L. Mitra, Fl. India 2: 411. 1993; S.S. Dash, Fl. Kurung Kumey 343. 2017. *H. bhamoense* Cubit & W.W. Sm., Rec. Bot. Surv. India 6: 36. 1914; G.D. Pal, Fl. Low. Subansiri 1: 105. 2013. *H. bhamoense* var. *debbarmanii* P.C. Kanjilal in Kanjilal et al., Fl. Assam 1: 85. 1934. *H. ceylanicum* var. *debbarmanii* (P.C. Kanjilal) H.B.Naithani & S.Biswas in H.B.Naithani, Flow. Pl. India, Nepal & Bhutan 49. 1990.

Medium to large trees; bark smooth; branchlets grayish pubescent. Leaves simple, petiolate, elliptic-oblong or elliptic, margins entire. Flowers yellowish white or cream, in clusters, borne on axillary, pendulous racemes.

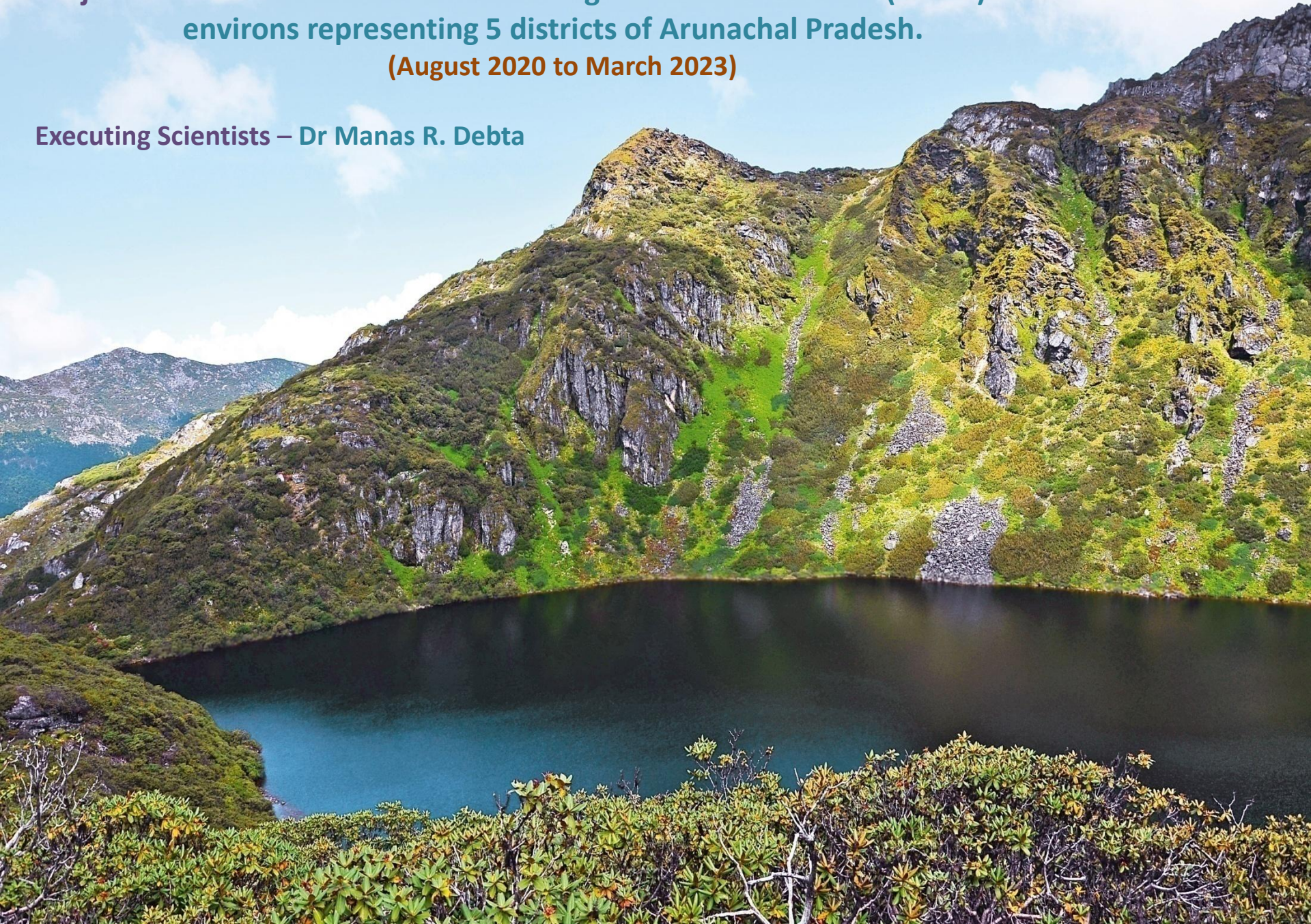
Fls. & Frts.: March – Dec.

Distrib.: Kurung Kumey, Lower Subanasiri; between 500-1800 m; in primary forests, usually on slopes and ridges.

Project-5: Floristic studies in selected High Altitude Wetlands (HAWs) and its environs representing 5 districts of Arunachal Pradesh.

(August 2020 to March 2023)

Executing Scientists – Dr Manas R. Debta



Wetland selected: Five

1. Pankeng Teng Pso or PT Tso lake, Tawang district
2. Sela lake, West Kameng district
3. Titapuri lake, Upper Siang district
4. Kamo Uyea lake, Upper Dibang Valley district
5. Glow lake, Lohit district

Literature studied:

- All published literature are scrutinised; only 05 new records to Arunachal Pradesh from wetland areas are found to be reported from the literature.
- Only a single work on Nagula lake was carried out by GBPNIHE, Itanagar but no specimens traced from their herbarium.

Herbaria consulted: Three

- ARUN, Itanagar
 - GB Pant National Institute of Himalayan Environment, Itanagar
 - State Forest Research Institute, Itanagar
- Very very few works on floristic documentation on HAWs of Arunachal Pradesh have been conducted but .

Checklist prepared: A tentative checklist of 78 taxa is prepared from the collection belonging to marshy or wet habitat of high altitudes.

Tours conducted: Nil

(Field tours could not be conducted due to Covid-19 induced budget restriction)

Publication

1. KRISHNA CHOWLU, A.N. RAO, MANAS R. DEBTA AND VINEET K. RAWAT. (2020). *Eulophia promensis* (Orchidaceae) – An addition to the flora of Manipur, India. *Richardiana* 4: 232-237.
2. MANAS R. DEBTA AND K. AMBRISH. (2021). *Vegetation and Floristic Analysis in Col. Sher Jung National Park, Sirmaur district, Himachal Pradesh*. In L.J. Singh & V. Ranjan (eds.), *New Vistas in Indian Flora* 2: 613-638.
3. ASHISH K. SONI, MANAS R. DEBTA AND VINEET K. RAWAT. (2020). An overview of family Pteridaceae in North East India. *Indian Fern J.* 37: 277-287.

Research paper communicated: One

VINEET K. RAWAT AND MANAS R. DEBTA. Aesthetic ferns and fern-allies having horticultural potential from Arunachal Pradesh, India. communicated to *Bulletin of Arunachal Forest News*

Addition to the flora of Arunachal Pradesh, vol. 4

Duration – April 2019 to March 2021

Executing Scientist: Dr Krishna Chowlu

Added 150 species to the project 'Addition to the flora of Arunachal Pradesh.

This include the following families:
Orchidaceae, Balsaminaceae, Poaceae, Gingeraceae, Apiaceae,
Asteraceae, Diapensiaceae, Dilleniaceae, Ericaceae, Fabaceae,
Gentianaceae, Hypericaceae, Passifloraceae, Piperaceae, Polygonaceae,
Ranunculaceae, Rosaceae, Rubiaceae, Salicaceae, Schisandraceae,
Vitaceae, Cyperaceae, Scrophulariaceae, etc.

Project-6 - Enumeration of RET species of Arunachal Pradesh

(August 2020 to March 2022)

Executing Scientists – Dr Krishna Chowlu

Plants Extinct and Possibly/Presumed Extinct is *Paphiopedilum wardii* Summerh. (Orchidaceae) likewise all the possible list is preparing and it will be submitted in the final report. But study of herbarium materials of ASSAM and local people interaction about the uses of RET plants in Arunachal Pradesh could not be made due to the COVID pandemic.

After flowering, correct identification of the species available in and around Itanagar Campus is done.

During the year 2020-2021, no field tour has been conducted in Arunachal Pradesh but consulted all the possible literature for the addition to the Flora of Arunachal Pradesh in ARUN, SFRI, Itanagar.

Interaction with the local people for knowing the utility of the RET plants could not be conducted because of pandemic situation.

FERN AND FERN-ALLIES OF DIHANG-DIBANG BIOSPHERE RESERVE OF ARUNACHAL PRADESH

Mr. Chhandam Chanda
Senior Research Fellow

Dr. Vineet Kumar Rawat
Scientist – E & HoO



Study Area

- The Dihang-Dibang Biosphere reserve, situated at the eastern most stretches of the great Himalayas, is a protected forest area spread over three districts of Arunachal Pradesh- Dibang valley, Upper Siang and West Siang covering 5112 sq. km area.
- The whole area is well-watered with the rivers Siang and Dibang, along with their tributaries and branches.
- Average annual temperature ranges from below 0° C to 25° C.
- Average annual humidity is 82%.
- Annual average rainfall is 3500-5000 mm.
- Two protected forests come under DDBR: Dibang Wildlife Sanctuary and Mouling National Park.

Total Work details

- Field tours taken: 5
- Number of specimens collected: 602
- Number of species collected: 180 - 200 (a tentative number, as specimens collected from the last tour are still under study)
- Number of herbarium sheets prepared: 442
- Number of species dissected, identified and documented: 129
- Number of species photographed under microscope: 118

Works done in last year (Apr, 2020-March, 2021)

- Field tours taken: 1
- Number of specimens collected: 153
- Number of species collected: 70-100 (an approximate number, as specimens are still under study)
- Number of herbarium sheets prepared: 149
- Number of species dissected, identified and documented: 99
- Number of species photographed under microscope: 65

TAXONOMY & ECOLOGY OF PTERIDOPHYTES OF LOWER SUBANSIRI DISTRICT WITH SPECIAL FOCUS TO TALLE VALLEY WILDLIFE SANCTUARY, ARUNACHAL PRADESH

Mr. Ashish Kumar Soni
Junior Research Fellow
Botanical Survey of India
Arunachal Pradesh Regional
Centre
Itanagar, Arunachal Pradesh-
791111

Dr. Vineet Kumar Rawat
Scientist 'E' & 'HoO'
Botanical Survey of India
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About Study Area...

1. Lower Subansiri District...
2. Tale Valley Wildlife Sanctuary...

1. About Lower Subansiri District...

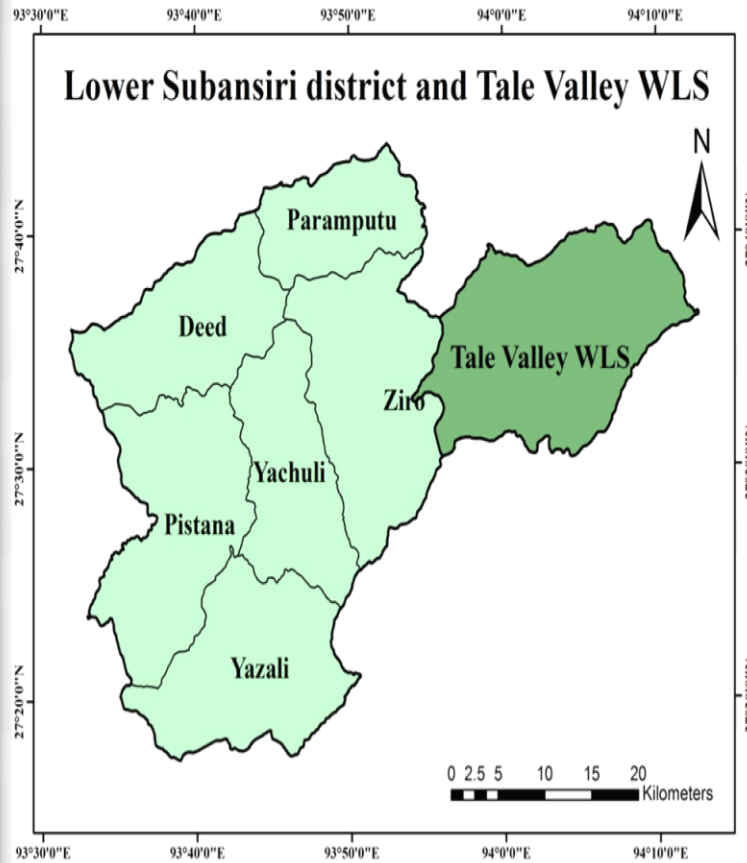
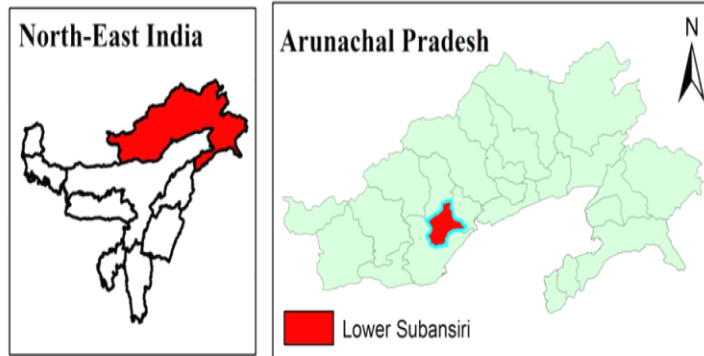
The name of the District is derived from the Subansiri River, a tributary of Mighty Brahmaputra that flow through Raga Circle of Kamle District. The District of Lower Subansiri, which is lying approx between $92^{\circ}40'$ and $94^{\circ}21'$ East Longitude and $26^{\circ}55''$ and $28^{\circ}21'$ North Latitudes, **covers an area of 3,460 (approx) Sq.km.**

2. About Tale Valley Wildlife Sanctuary...

Talle Valley Wildlife Sanctuary ($27^{\circ}32'$ N; $93^{\circ}52'$ E) is a portion of the Talle Valley Reserved Forest **in Lower Subansiri district of Arunachal Pradesh** with ***an area of 337 sq. km.*** was declared as a wildlife sanctuary on 14th July 1995. The area is surrounded by hills, covered with densely thick vegetation.

➤ Topography...

The topography of the District is mostly mountainous terrain, where the Hill Ranges varies approximately from 1000 to 1600 metres above sea level.



Map of the Study Site...

ANNUAL PROGRESS REPORT (April 2020- March 2021)

- Number of tours undertaken: 01
- Total area covered: 160 sq/km
- Number of Collected Specimens:
282
- Number of species collected: 197
- Number of species indentified :
168
- Number of species incorporated:
07

Research Publication during this year:

Soni, A. K., M. R. Debta AND V. K. Rawat. 2020. An Overview of Family Pteridaceae in North East India. *Indian Fern Journal*. 37: 277-287.

Soni, A. K. AND V. K. Rawat. 2020. A New subspecies Record for the Pteridophytic Flora of Arunachal Pradesh, India: *Hypodematum crenatum* (Forssk.) Kuhn subsp. *crenatum* (Dryopteridaceae). *Indian Fern Journal*. 37: 288-292.

Soni, A. K. AND V. K. Rawat. 2020. *Lindsaea heterophylla* (Lindsaeaceae) A New Record for The Eastern Himalaya, Pteridogeographical Region of India. *Indian Fern Journal*. 37: 293-298.



Plate : A. A patch of *Nephrolepis cardifolia*., B. Preparation of Local wine (Apung) by a Nishi lady for Nyokum festival., C. Poacher showing *Azolla* sp. to a muddy pond., D. On a suspension bridge., E. The Nishi Nyokum festival- a dance by ladies., F. Nishi man in traditional attire

