Supplementary File(s)

Mitochondrial DNA and distribution modelling evidenced the lost genetic diversity and wild-residence of Star Tortoise, *Geochelone elegans* (Testudines: Testudinidae) in India

Shantanu Kundu[1†], Tanoy Mukherjee[2†], Ah ran Kim[3], Soo Rin Lee[3], Abhishek Mukherjee[4], Won-Kyo Jung[3], Hyun-Woo Kim[1,3*]

[1]Department of Marine Biology, Pukyong National University, Busan 48513, South Korea.

[2]Agricultural and Ecological Research Unit, Indian Statistical Institute, Kolkata 700108, India.

[3]Research Center for Marine Integrated Bionics Technology, Pukyong National University, Busan 48513, South Korea.

[4]Biological Sciences Division, Indian Statistical Institute, Kolkata 700108, India.

†These authors contributed equally to this work.

* Corresponding author:

Hyun-Woo Kim Ph. D.

Department of Marine Biology, Pukyong National University

48513, Republic of Korea

Tel: 82-51-629-5926, Fax: 82-51-629-5930

E-mail: kimhw@pknu.ac.kr

Table S1. Primary environmental and topographical variables used modelling.

Sl. No.	Code	Variables description
Bioclimatic		
1.	bio_1	Annual Mean Temperature
2.	bio_2	Mean Diurnal Range (Mean of monthly (max temp - min temp)
3.	bio_3	Isothermality (BIO2/BIO7) (* 100)
4.	bio_4	Temperature Seasonality (standard deviation *100)
5.	bio_5	Max Temperature of Warmest Month
6.	bio_6	Min Temperature of Coldest Month
7.	bio_7	Temperature Annual Range (BIO5-BIO6)
8.	bio_8	Mean Temperature of Wettest Quarter
9.	bio_9	Mean Temperature of Driest Quarter
10.	bio_10	Mean Temperature of Warmest Quarter
11.	bio_11	Mean Temperature of Coldest Quarter
12.	bio_12	Annual Precipitation
13.	bio_13	Precipitation of Wettest Month
14.	bio_14	Precipitation of Driest Month
15.	bio_15	Precipitation Seasonality (Coefficient of Variation)
16.	bio_16	Precipitation of Wettest Quarter
17.	bio_17	Precipitation of Driest Quarter
18.	bio_18	Precipitation of Warmest Quarter
19.	bio_19	Precipitation of Coldest Quarter
20.	aridity_index_2	Aridity Index
Topographic		
21.	elevation	Elevation
22.	aspect	Aspect
Anthropogenic		
23.	hii	Human Influence Index
LULC		
24.	LULC (Categorical)	Herbaceous Vegetation
		Water Bodies
		Cropland
		Bare land
		Shrubland
		Forest
		Urban

Table S2. ABGD and PTP results of the present dataset of *G. elegans* and *G. platynota*.

ABGD species delimitation results		
Recursive Partition with prior maximal distance P=1.00e-03) Distance JC69 Jukes-Cantor MinSlope=1.500000		
Group	**Number of Sequences**	**Details**
Group [1]	58	OP684115_Pet_Trade OP684116_Pet_Trade OP684117_Pet_Trade OP684118_Pet_Trade OP684119_Pet_Trade OP684120_Pet_Trade OP684121_Pet_Trade OP684122_Pet_Trade OP684123_Pet_Trade OP684124_Pet_Trade OP684125_Pet_Trade OP684126_Pet_Trade OP684127_Pet_Trade LR596680_Sri_Lanka LR596679_Sri_Lanka LR596678_Sri_Lanka LR596677_Sri_Lanka LR596676_Sri_Lanka LR596675_Sri_Lanka LR596674_Sri_Lanka LR596673_Sri_Lanka LR596672_Sri_Lanka LR596671_Sri_Lanka LR596670_Sri_Lanka LR596669_Sri_Lanka LR596668_Sri_Lanka LR596667_Sri_Lanka LR596666_Sri_Lanka LR596665_Sri_Lanka LR596664_Sri_Lanka LR596663_Sri_Lanka LR596662_Sri_Lanka LR596659_Pakistan LR596658_Pakistan LR596656_Pakistan LR596655_Pakistan LR596654_Pakistan LR596653_Turtle_Island_Austria LR596652_Turtle_Island_Austria LR596651_Turtle_Island_Austria LR596650_Turtle_Island_Austria LR596649_Turtle_Island_Austria LR596648_Turtle_Island_Austria LR596647_Turtle_Island_Austria LR596646_India

		LR596645_India LR596643_India LR596641_India LR596640_India LR596639_India LR596638_India MH459393_Bangladesh AY776256_India AY776255_India AY776254_Trade_Singapore AY776253_Trade_Singapore AY776252_Trade_Singapore AY776251_Trade_Singapore
Group [2]	1	LR596686_Geochelone_platynota
Group [3]	1	DQ497303_Geochelone_platynota
Group [4]	5	LR596685_Geochelone_platynota LR596684_Geochelone_platynota LR596683_Geochelone_platynota LR596682_Geochelone_platynota LR596681_Geochelone_platynota
Initial Partition with prior maximal distance P=1.00e-03 ; Barcode gap distance = 0.024 Distance JC69 Jukes-Cantor MinSlope=1.500000		
Group [1]	58	OP684115_Pet_Trade OP684116_Pet_Trade OP684117_Pet_Trade OP684118_Pet_Trade OP684119_Pet_Trade OP684120_Pet_Trade OP684121_Pet_Trade OP684122_Pet_Trade OP684123_Pet_Trade OP684124_Pet_Trade OP684125_Pet_Trade OP684126_Pet_Trade OP684127_Pet_Trade LR596680_Sri_Lanka LR596679_Sri_Lanka LR596678_Sri_Lanka LR596677_Sri_Lanka LR596676_Sri_Lanka LR596675_Sri_Lanka LR596674_Sri_Lanka LR596673_Sri_Lanka LR596672_Sri_Lanka LR596671_Sri_Lanka LR596670_Sri_Lanka LR596669_Sri_Lanka LR596668_Sri_Lanka LR596667_Sri_Lanka LR596666_Sri_Lanka LR596665_Sri_Lanka

		LR596664_Sri_Lanka LR596663_Sri_Lanka LR596662_Sri_Lanka LR596659_Pakistan LR596658_Pakistan LR596656_Pakistan LR596655_Pakistan LR596654_Pakistan LR596653_Turtle_Island_Austria LR596652_Turtle_Island_Austria LR596651_Turtle_Island_Austria LR596650_Turtle_Island_Austria LR596649_Turtle_Island_Austria LR596648_Turtle_Island_Austria LR596647_Turtle_Island_Austria LR596646_India LR596645_India LR596643_India LR596641_India LR596640_India LR596639_India LR596638_India MH459393_Bangladesh AY776256_India AY776255_India AY776254_Trade_Singapore AY776253_Trade_Singapore AY776252_Trade_Singapore AY776251_Trade_Singapore
Group [2]	6	LR596686_Geochelone_platynota LR596685_Geochelone_platynota LR596684_Geochelone_platynota LR596683_Geochelone_platynota LR596682_Geochelone_platynota LR596681_Geochelone_platynota
Group [3]	1	DQ497303_Geochelone_platynota

PTP species delimitation results:
Maximum likelihood solution # Max likilhood partition

Species	Support	Details
Species 1	1.000	DQ080040_Manouria_emys
Species 2	1.000	DQ497303_Geochelone_platynota
Species 3	0.183	LR596685_Geochelone_platynota, LR596684_Geochelone_platynota, LR596683_Geochelone_platynota, LR596682_Geochelone_platynota, LR596686_Geochelone_platynota, LR596681_Geochelone_platynota
Species 4	0.993	LR596640_India, LR596639_India, LR596641_India, LR596643_India, LR596645_India, LR596646_India, LR596648_Turtle_Island_Austria, LR596649_Turtle_Island_Austria,

		LR596650_Turtle_Island_Austria, LR596651_Turtle_Island_Austria, LR596652_Turtle_Island_Austria, LR596653_Turtle_Island_Austria, LR596654_Pakistan, LR596655_Pakistan, LR596656_Pakistan, LR596658_Pakistan, LR596659_Pakistan, LR596663_Sri_Lanka, LR596664_Sri_Lanka, LR596665_Sri_Lanka, LR596666_Sri_Lanka, LR596671_Sri_Lanka, LR596673_Sri_Lanka, LR596679_Sri_Lanka, LR596638_India, MH459393_Bangladesh, AY776256_India, AY776255_India, AY776253_Trade_Singapore, AY776251_Trade_Singapore, AY776254_Trade_Singapore, AY776252_Trade_Singapore, OP684124_Pet_Trade, OP684119_Pet_Trade, OP684116_Pet_Trade, OP684117_Pet_Trade, OP684126_Pet_Trade, OP684121_Pet_Trade, LR596662_Sri_Lanka, OP684115_Pet_Trade, OP684127_Pet_Trade, OP684118_Pet_Trade, OP684122_Pet_Trade, LR596647_Turtle_Island_Austria, OP684123_Pet_Trade, LR596680_Sri_Lanka, LR596678_Sri_Lanka, LR596674_Sri_Lanka, LR596670_Sri_Lanka, LR596669_Sri_Lanka, LR596668_Sri_Lanka, LR596667_Sri_Lanka, OP684120_Pet_Trade, OP684125_Pet_Trade, LR596677_Sri_Lanka, LR596676_Sri_Lanka, LR596675_Sri_Lanka, LR596672_Sri_Lanka

Highest Bayesian supported solution # Most supported partition found by simple heuristic search		
Species 1	1.000	DQ080040_Manouria_emys
Species 2	1.000	DQ497303_Geochelone_platynota
Species 3	0.993	LR596640_India, LR596639_India, LR596641_India, LR596643_India, LR596645_India, LR596646_India, LR596648_Turtle_Island_Austria, LR596649_Turtle_Island_Austria, LR596650_Turtle_Island_Austria, LR596651_Turtle_Island_Austria, LR596652_Turtle_Island_Austria, LR596653_Turtle_Island_Austria, LR596654_Pakistan, LR596655_Pakistan, LR596656_Pakistan, LR596658_Pakistan, LR596659_Pakistan, LR596663_Sri_Lanka, LR596664_Sri_Lanka, LR596665_Sri_Lanka, LR596666_Sri_Lanka, LR596671_Sri_Lanka, LR596673_Sri_Lanka, LR596679_Sri_Lanka, LR596638_India, MH459393_Bangladesh, AY776256_India, AY776255_India, AY776253_Trade_Singapore, AY776251_Trade_Singapore, AY776254_Trade_Singapore, AY776252_Trade_Singapore, OP684124_Pet_Trade, OP684119_Pet_Trade, OP684116_Pet_Trade, OP684117_Pet_Trade, OP684126_Pet_Trade, OP684121_Pet_Trade, LR596662_Sri_Lanka, OP684115_Pet_Trade, OP684127_Pet_Trade, OP684118_Pet_Trade, OP684122_Pet_Trade, LR596647_Turtle_Island_Austria, OP684123_Pet_Trade, LR596680_Sri_Lanka, LR596678_Sri_Lanka, LR596674_Sri_Lanka,

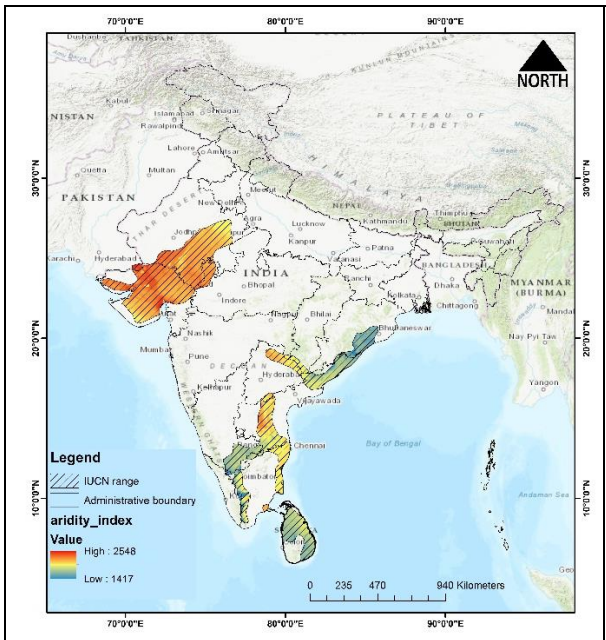
		LR596670_Sri_Lanka, LR596669_Sri_Lanka, LR596668_Sri_Lanka, LR596667_Sri_Lanka, OP684120_Pet_Trade, OP684125_Pet_Trade, LR596677_Sri_Lanka, LR596676_Sri_Lanka, LR596675_Sri_Lanka, LR596672_Sri_Lanka
Species 4	0.817	LR596685_Geochelone_platynota
Species 5	0.626	LR596684_Geochelone_platynota
Species 6	0.436	LR596683_Geochelone_platynota
Species 7	0.246	LR596682_Geochelone_platynota
Species 8	0.190	LR596686_Geochelone_platynota, LR596681_Geochelone_platynota

Table S3. Genetic landscape shape interpolation analysis results showing the residual genetic distances used as landscape heights.

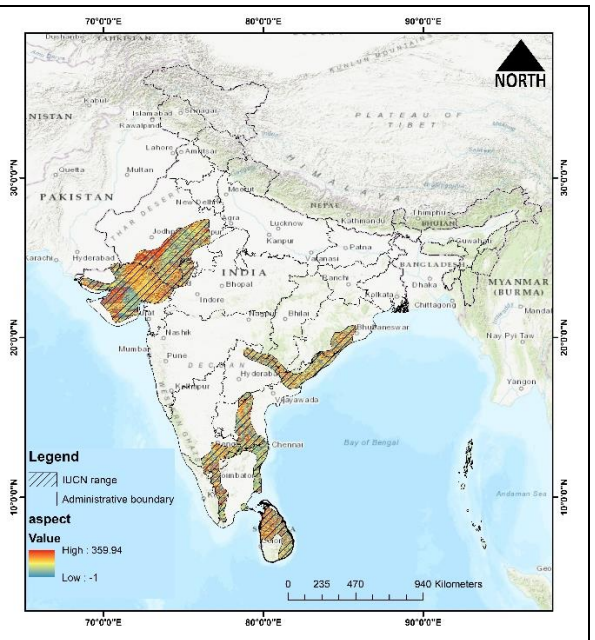
X-coord	Y-coord	Height
72.365	23.48	-1.09170982625668E-02
74.69	18.315	-1.36517334256465E-02
75.485	18.115	-9.98555883019389E-03
89.97	26.29	-7.4014159812967E-03
88.31	24.51	-5.10758410843002E-03
90.03	24.38	-5.52442013713364E-03
70.68	24.39	-1.51862029460058E-02
73.8	19.025	-1.38844755249351E-02
78.54	15.375	-1.00637621187474E-02
78.225	15.045	-1.32278160088791E-02
78.125	13.28	-1.04641633109542E-02
87.065	21.45	-5.7258493175152E-03
85.765	20.065	-1.05296355197483E-02
87.07	21.215	-3.49147293775031E-03
79.015	14.245	-8.16085422948892E-03
79.045	13.725	-1.04190412482271E-02
79.62	14.36	-1.15344721287776E-02
87.005	23.36	-7.42482694417526E-03
75.9	20.21	-8.29243980585676E-03
79.03	13.45	-9.87415115871616E-03
79.635	13.565	-1.10632247192882E-02
80.37	8.065	1.41240616232136E-02
79.165	10.7	-1.38093240313337E-02
79.015	10.315	1.56046887820829E-02
75.89	20.34	-7.23304451872744E-03
78.63	17.27	-6.19464889220315E-03
80.685	8.245	1.48266336274729E-02

80.835	8.63	-1.26347135545802E-02
79.94	15.85	-1.35640786318919E-02
79.97	15.33	-1.34136545159453E-02
80.07	10.87	-1.18547538512319E-02
78.715	13.12	-1.30574853127513E-02
83.46	14.32	-7.94462022349874E-03
84.76	15.705	-4.37381081891991E-03
79.765	16.4	-1.58602568972185E-02
79.465	16.98	-1.36314632461586E-02
78.94	16.56	-0.013679407760595
80.385	11.05	-9.8223099579217E-03
83.03	18.325	-1.29628440076606E-02
82.71	16.835	-1.04197876842861E-02
82.695	16.56	-9.80916019788871E-03
78.84	14.795	-1.02221745539683E-02
79.415	15.43	-1.37013185928426E-02
70.665	24.455	-0.012109046747533
72.35	23.545	-1.36365290669613E-02
71.475	24.19	-1.11498496796496E-02
82.19	18.85	-6.20858286870256E-03
79.455	17.11	-8.15957137481711E-03
83.025	18.56	-1.18354775588833E-02
71.555	23.745	-1.18545437902989E-02
79.02	25.76	-6.97669913162564E-03
80.705	24.85	-3.00884207403978E-03
79.46	21.79	-6.58343363318368E-03

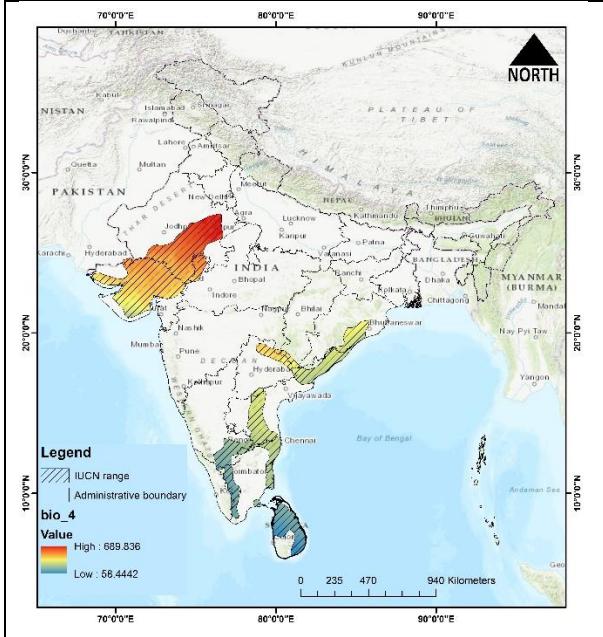
Figure S1. Representing the final set of variables maps used for the distribution modelling of *G. elegans*.



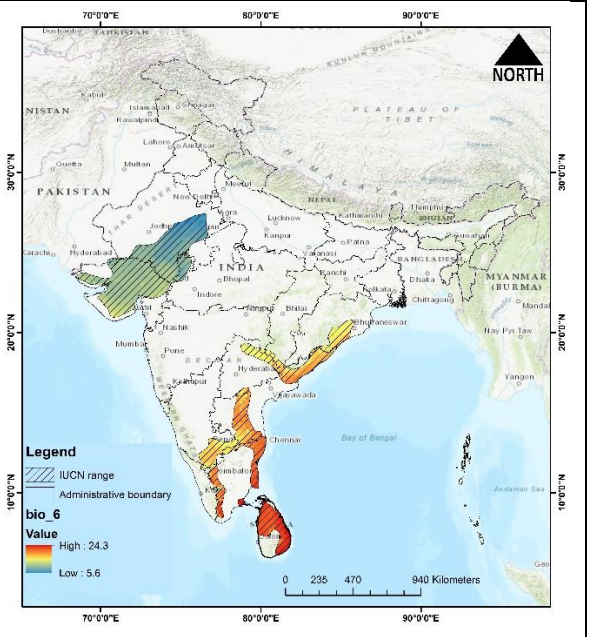
Aridity Index



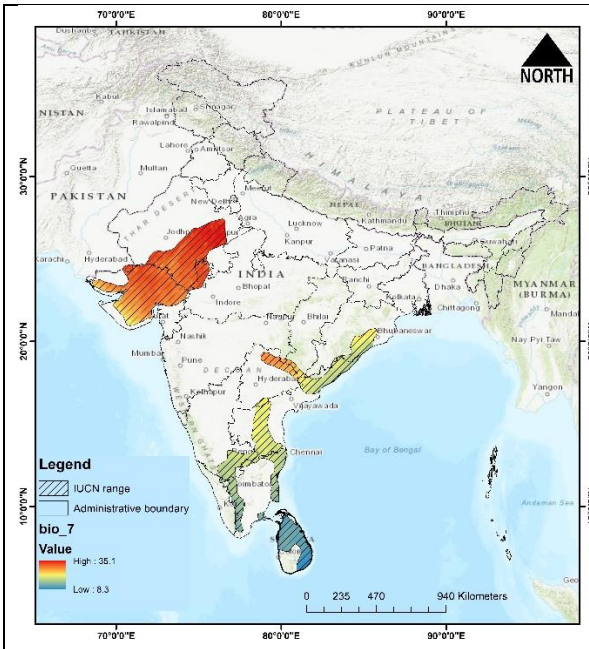
Aspect



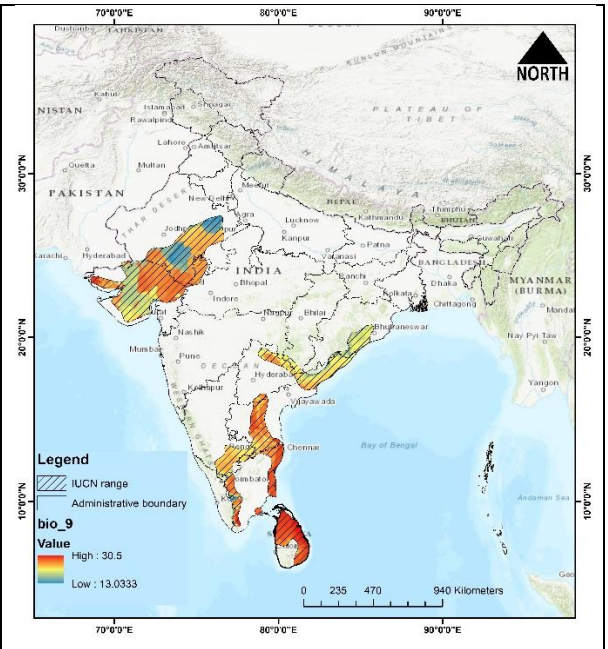
Bio_4 [Temperature Seasonality (Standard Deviation)]



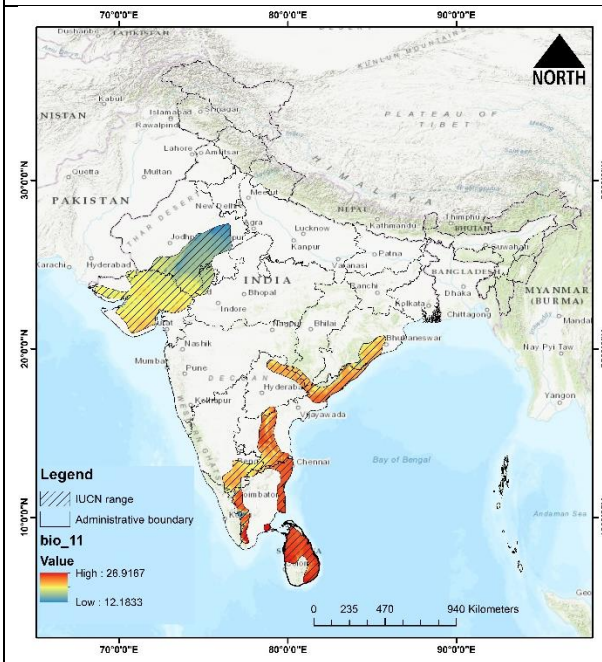
Bio_6 [Min Temperature of Coldest Month]



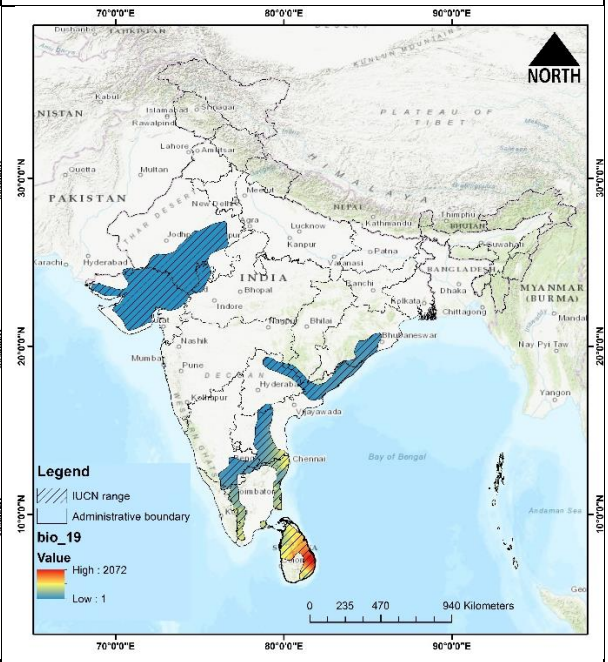
Bio_7 [Temperature Annual Range (BIO5-BIO6)]



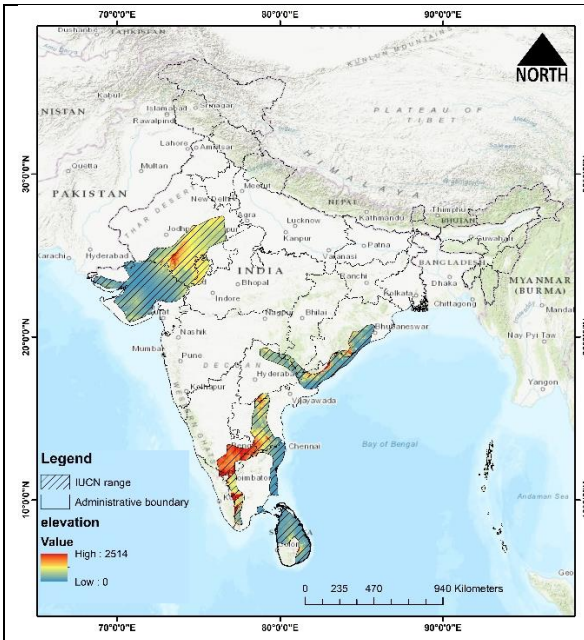
BIO_9 [Mean Temperature of Driest Quarter]



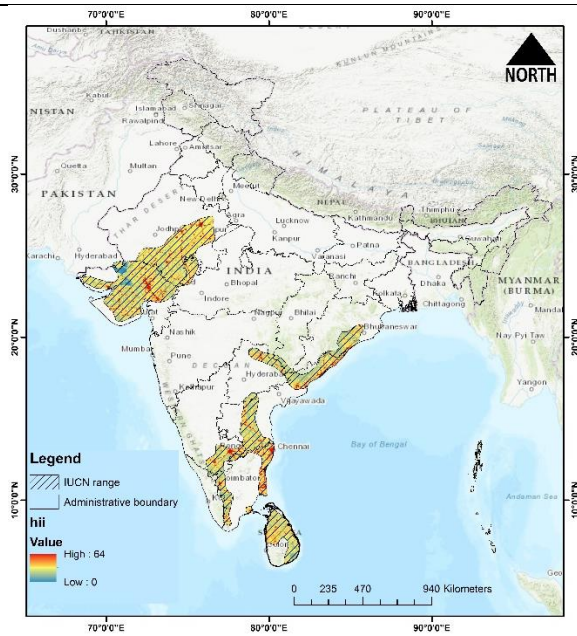
BIO_11 [Mean Temperature of Coldest Quarter]



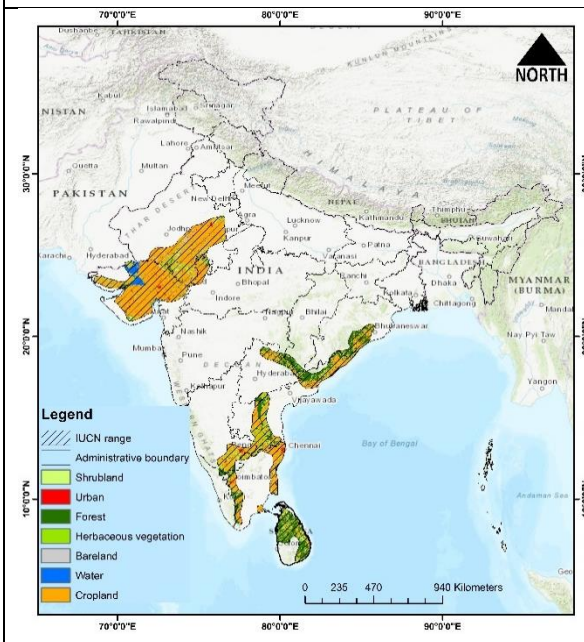
BIO_19 [Precipitation of Coldest Quarter]



Elevation



Human Influence Index [HII]



LULC [Landuse Landcover]