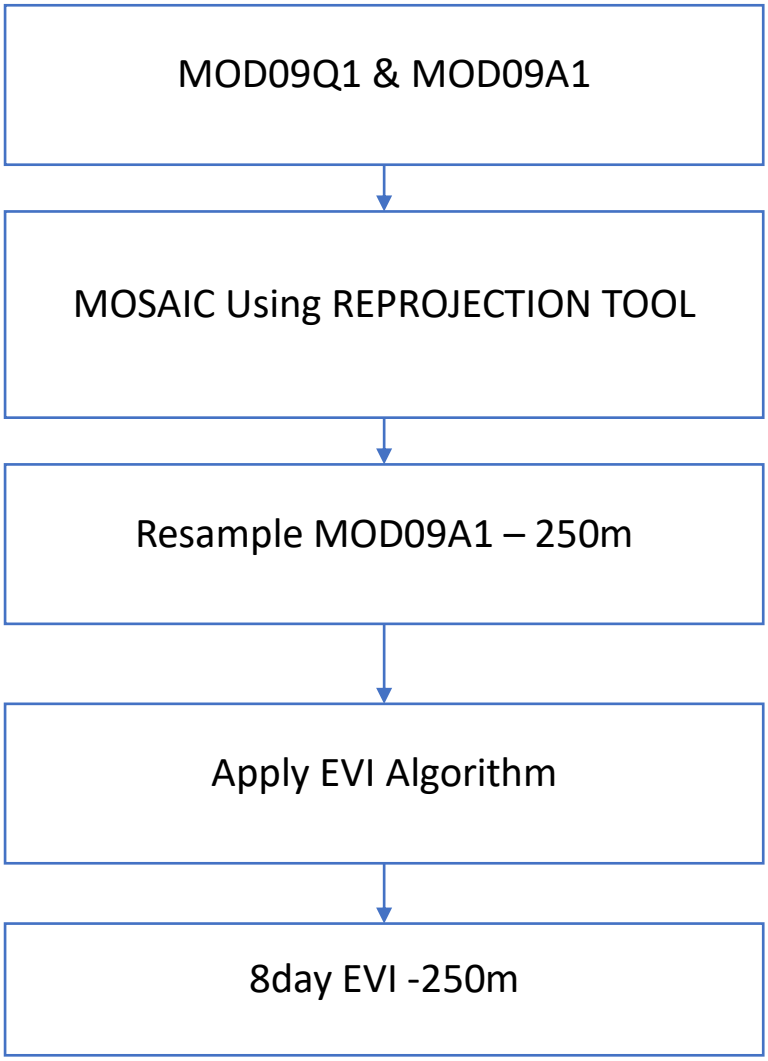
Supplemental Information

Enhancing drought monitoring and assessment capability in India through high-resolution (250m) data

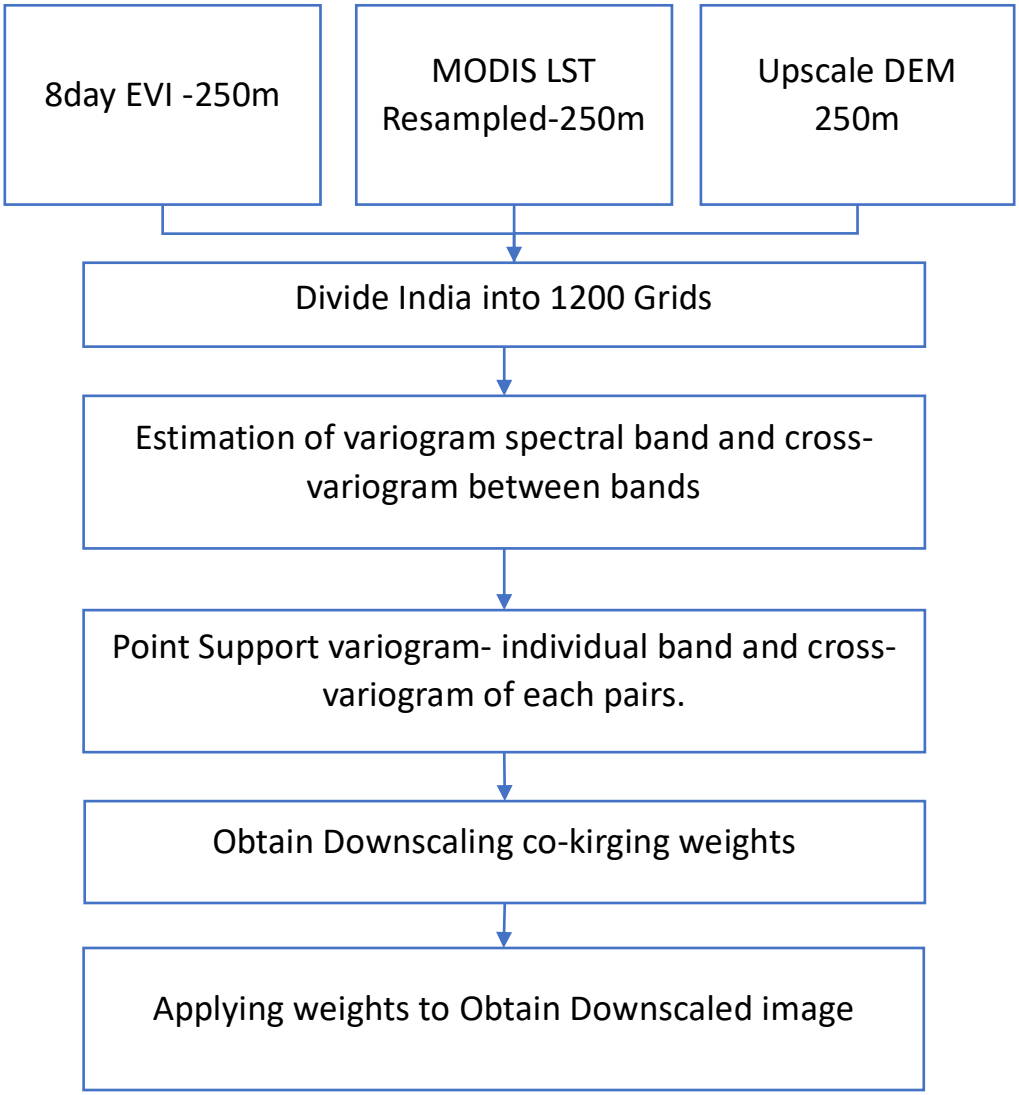
Anukesh Krishnankutty Ambika[1] and Vimal Mishra[1,2]

[1]Earth Sciences, Indian Institute of Technology (IIT) Gandhinagar
[2]Civil Engineering, Indian Institute of Technology (IIT) Gandhinagar
Correspondence to: vmishra@iitgn.ac.in

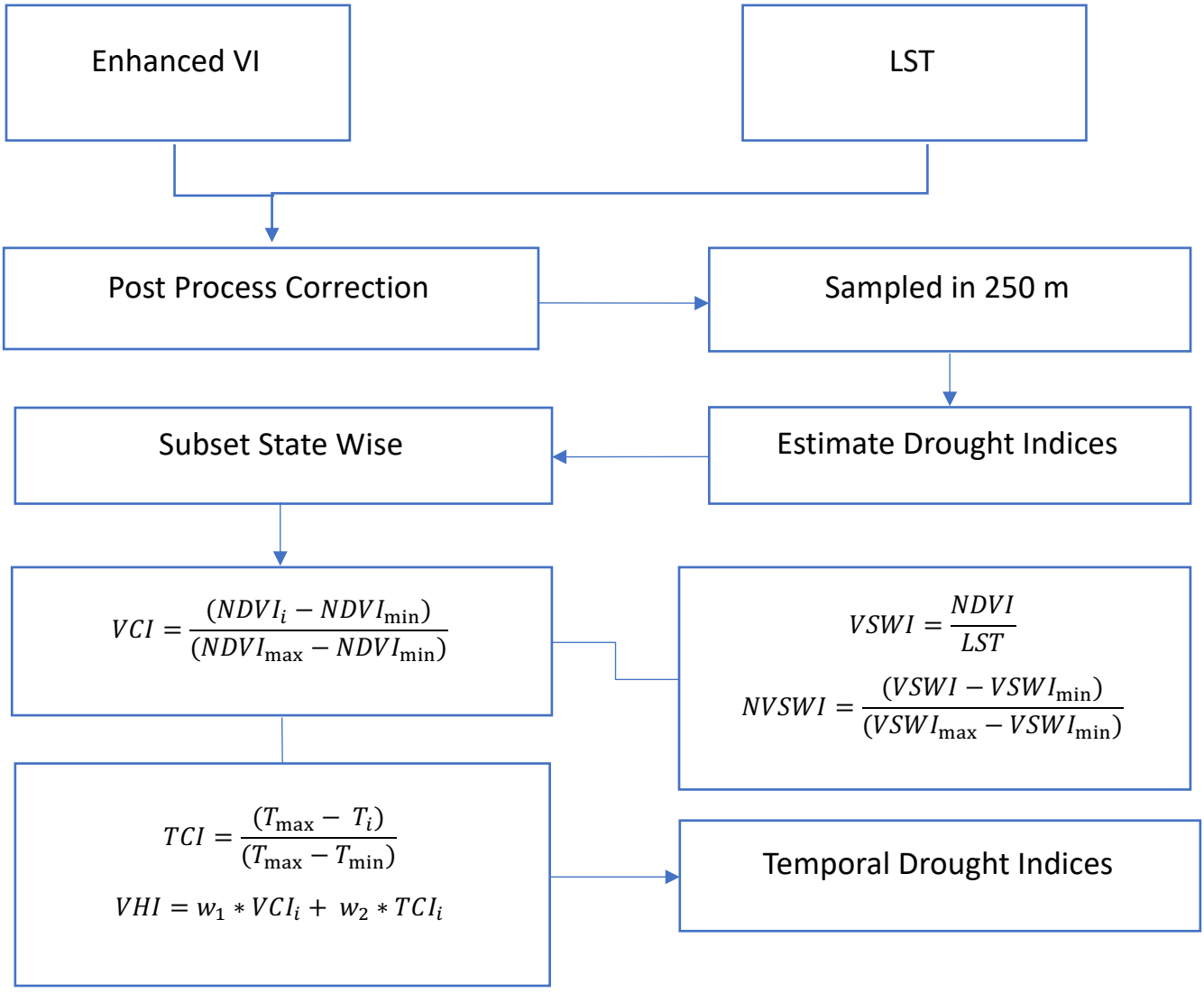
a. Development of 8-day EVI data from MODIS



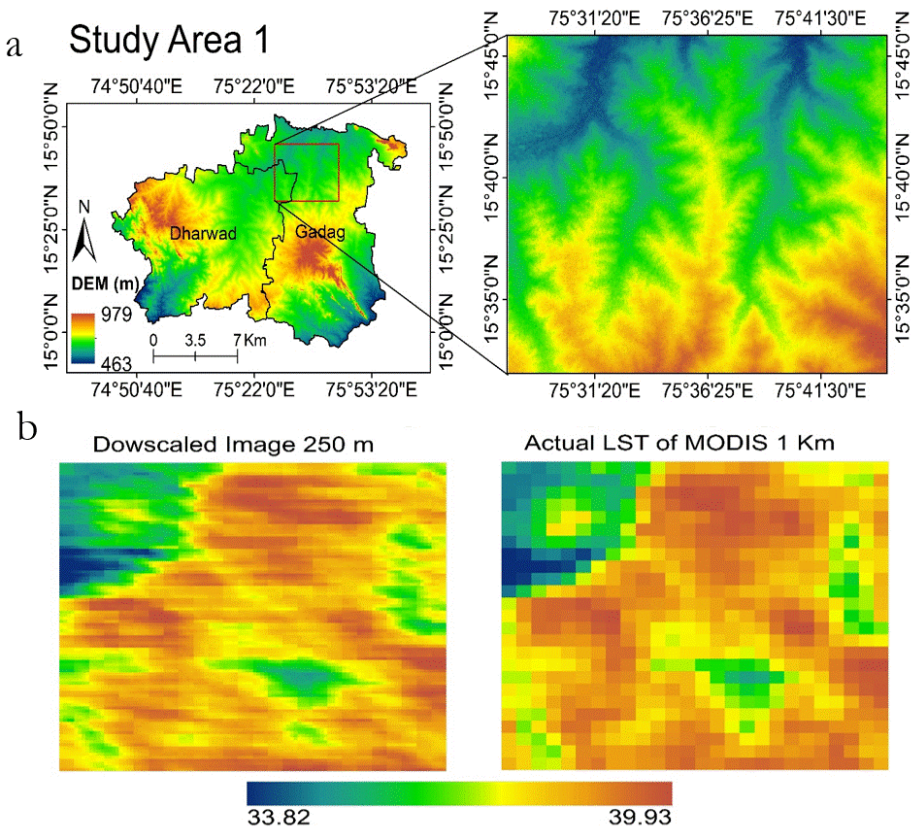
b. Downscaling of LST using Elevation and Vegetation Index



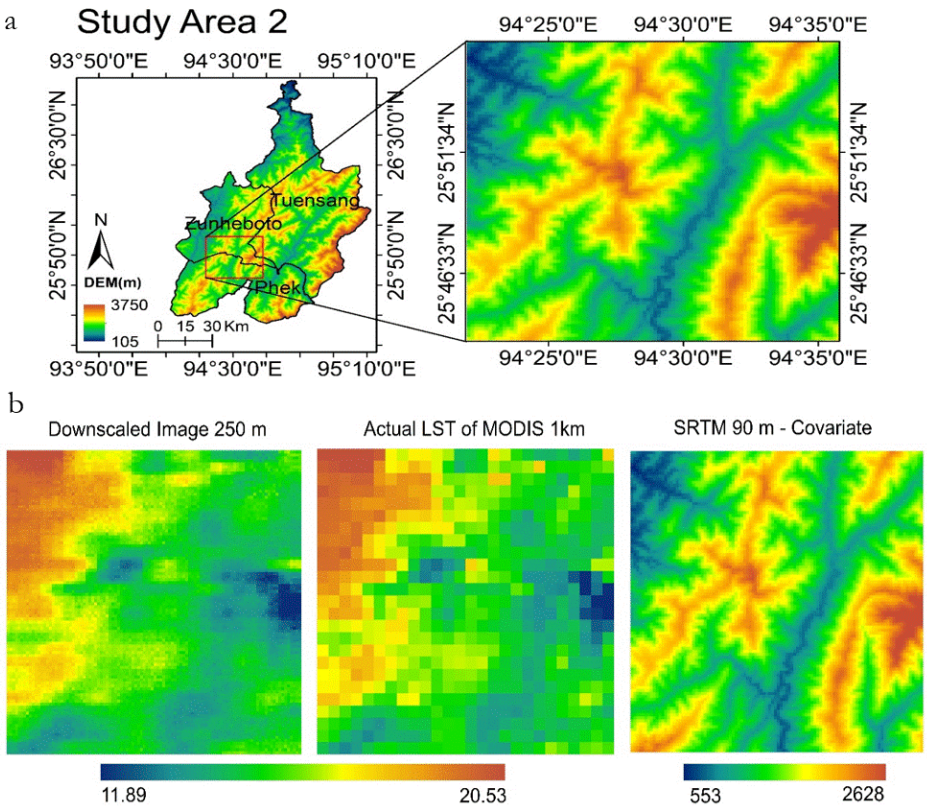
c. Drought Indices obtained from the developed data set (250 m)



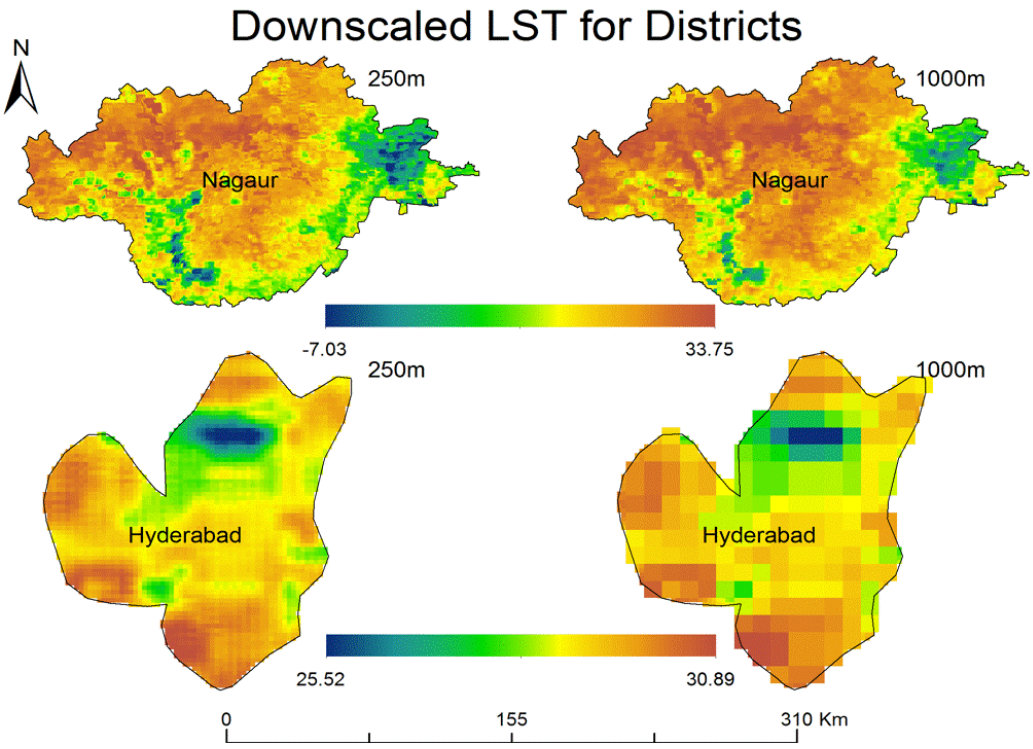
Supplemental Figure. S1 (a) Methodology to derive the 8-day Enhanced Vegetation Index using MODIS data at 250 m, (b) the derived EVI, and DEM were used as a covariate to downscale the LST at 250 m using co-kriging method, and (c) all the drought indices used for the this study and their respective equation and methodology.



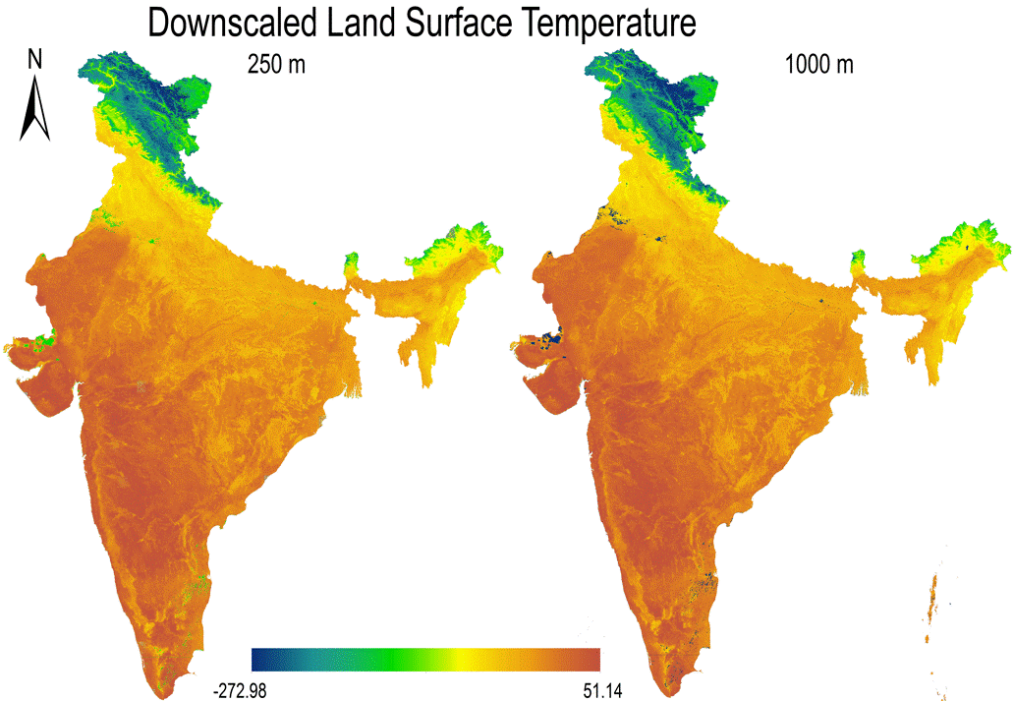
Supplemental Figure. S2 (a,b) Downscaled land surface temperature (LST) using one covariate.



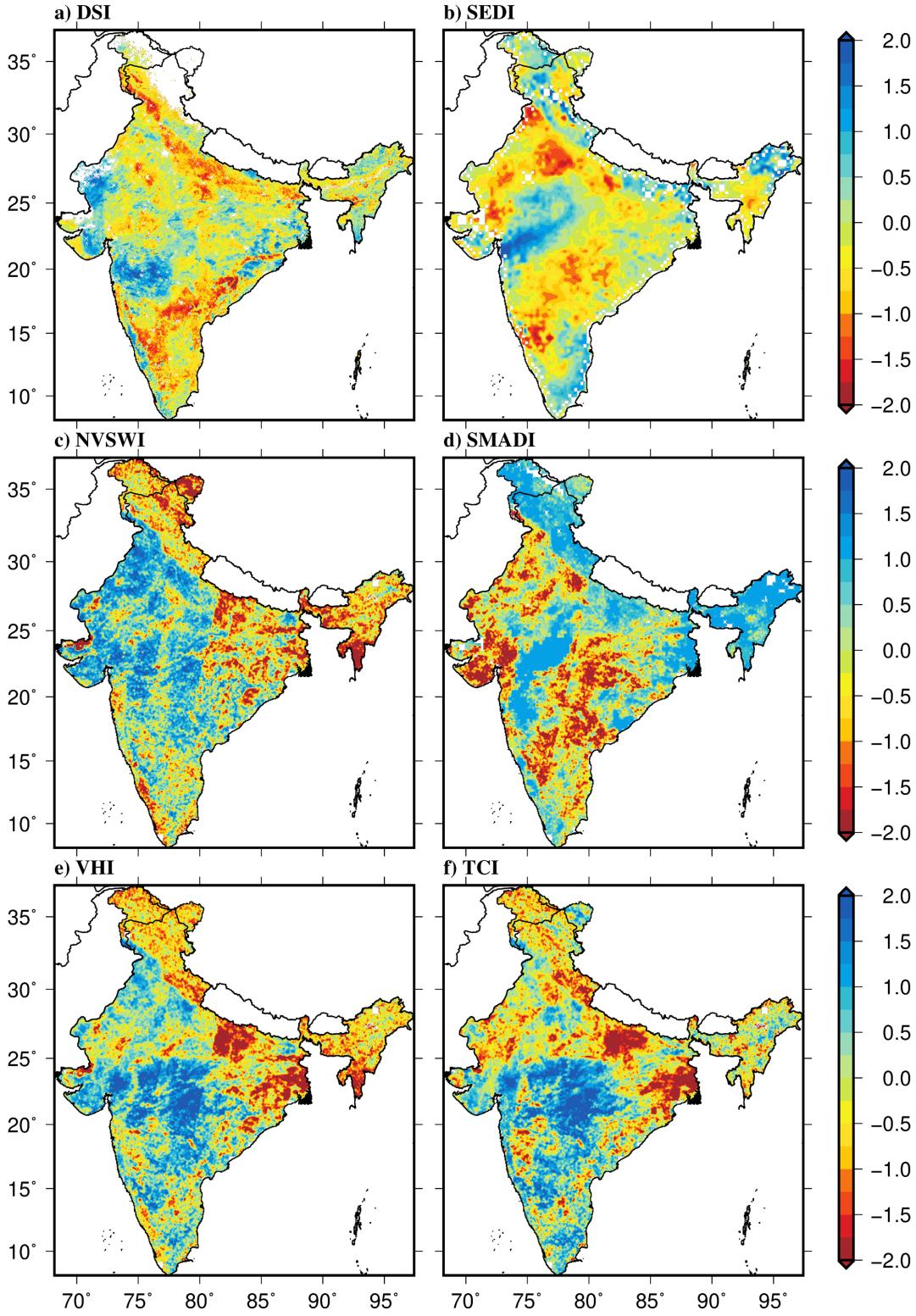
Supplemental Figure. S3 (a,b) Downscale land surface temperature (LST) using two covariate.



Supplemental Figure. S4 Downscaled land surface temperature (LST) for different districts.



Supplemental Figure. S5 Downscaled land surface temperature for Indian region.



Supplemental Figure. S6: (a-f) Drought calculated using different indices like DSI (0.05º), SEDI (0.25º), Normalized vegetation Supply Water Index (NVWSI; 250m), Soil Moisture Agricultural Drought Index (SMADI; 250m), Vegetation Health Index (VHI; 250m) and Temperature Condition Index (TCI; 250m) for March 2002. Here, the drought severity

classifications are identified as incipient drought (between -0.5 and -0.59), mild drought (between -0.6 and -0.89), moderate drought (between -0.9 and -1.19), severe drought (between -1.2 and -1.49), and extreme drought (between -1.5 and less).

Table S1 Comparison of downscaled image with low resolution LST data (using structural similarity index (SSIM) and image quality index (IQI)) for different District.

District	**SSIM**	**IQI**	**Mean LST 1000 m**	**Mean LST 250 m**	**Standard Deviation 1000 m**	**Standard Deviation 250 m**
Bid	0.6355	0.9834	309.316	309.3256	1.7174	1.7235
Chhindwara	0.457	0.8328	302.108	301.9113	2.0875	2.4841
Dahod	0.6793	0.9799	302.3051	302.3202	1.7827	1.7969
Dantewada	0.4727	0.9496	301.6199	301.6294	1.7793	1.8352
Deoria	0.4343	0.9231	294.5311	294.5188	0.972	0.9791
Dharmapuri	0.4521	0.9316	307.6259	307.5642	2.6672	2.8207
Jodhpur	0.5743	0.9916	300.7065	300.7222	2.5058	2.5028
JyotibaPhuleNagar	0.5759	0.5199	293.5417	293.5444	0.5762	0.8845
KanpurDehat	0.51	0.9336	294.1824	294.1996	0.6557	0.6713
Korba	0.6583	1.0044	300.0886	300.0634	2.3378	2.3546
Mayurbhanj	0.4046	0.1689	301.1366	299.1852	2.777	7.3476
Moga	0.4351	0.807	290.5933	290.5928	0.3541	0.3568
Nalgonda	0.4849	0.9657	306.5121	306.5027	2.0534	2.0668
Tamenglong	0.6191	0.9655	293.6116	293.6255	1.8266	1.8666
WestSiang	0.4095	0.8452	286.8918	287.0161	5.9567	6.8847

Table S2 Comparison of downscaled image with low resolution LST data (using structural similarity index (SSIM) and image quality index (IQI)) for different Taluka.

Taluka	SSIM	IQI	Mean LST 1000m	Mean LST 250 m	Standard Deviation 1000 m	Standard Deviation 250 m
Akbarpur	0.4594	0.839	293.9572	293.9771	0.3265	0.3448
Bid	0.6886	0.9856	309.2127	309.2075	1.3216	1.3077
Chhindwara	0.5771	0.934	301.6687	301.667	1.6729	1.6231
Dahod	0.6659	0.98	302.7302	302.8663	1.9344	1.9337
Hasanpur	0.5881	0.8711	293.4693	293.4881	0.6676	0.6451
Itanagar	0.5382	0.9553	288.9401	288.9563	2.6436	2.7279
Khandar	0.1444	0.2812	297.4817	297.2222	1.592	2.9346
Korba	0.6564	0.9821	300.0072	300.0377	2.3483	2.3434
Nalgonda	0.4166	0.9429	306.7878	306.764	1.7861	1.819
Osiyan	0.5759	0.9858	300.5638	300.5611	2.1641	2.1504
Palakkodu	0.5524	0.8731	307.7145	307.508	2.113	2.355
Panchpir	0.4165	0.805	300.4412	299.8214	2.9343	3.6049
Rapar	0.5349	0.9382	302.9154	302.9363	1.5821	1.6031
Salempur	0.4439	0.8696	293.9901	293.9717	0.8193	0.8025
Tamenglong	0.6249	0.9562	293.9336	293.9508	1.2255	1.2387