

**Table S1.** Summary of research studies on energy planning using GIS.

References	RE Technologies								Applications			Applied Technique	Location	
	Biomass/ Bioenergy	Geother- mal	Solar PV		Hydro power	Ocean/ Wave	Wind		Hydrogen Production	RE resource availability and energy poten- tials	Suitable loca- tion for the en- ergy infrastruc- ture facility			Electric network design
			Land- based	Offshore/ Floating			Land- based/ Onshore	Offshore/ Floating						
[95]								X		X	X		AHP-PROMETHEE-II	Egypt
[96]								X		X	X		DEMATEL	Taiwan
[97]			X							X	X		AHP-EQW-BWM	Algeria
[98]	X	X	X				X			X	X		ANP-Fuzzy-WLC	Eastern Regions, Iran
[99]						X				X	X		GIS-MCDA	Southwestern Black Sea
[100]							X			X	X		AHP	Knjazevac, Serbia
[101]			X							X	X		AHP	Algeria
[102]			X							X	X		GIS-MCDA	Sweden
[103]								X		X	X		AHP	Crete Island, Greece
[41]			X							X	X		AHP-WLC	Central Anatolia, Turkey
[34]												X	GIS-MILP	Milan
[104]			X							X	X		AHP	Ecuador
[105]		X								X	X		AHP	Changbai Mountain, China
[105]			X				X			X	X		AHP	India
[107]		X								X	X		GIS	Gulf of Suez, Egypt

**Table S1.** Summary of research studies on energy planning using GIS (cont'n.).

References	RE Technologies								Applications			Applied Technique	Location	
	Biomass/ Bioenergy	Geother- mal	Solar PV		Hydro power	Ocean/ Wave	Wind		Hydrogen Production	RE resource availability and energy poten- tials	Suitable loca- tion for the en- ergy infrastruc- ture facility			Electric network design
			Land- based	Offshore/ Floating			Land- based/ Onshore	Offshore/ Floating						
[108]							X			X	X		Fuzzy TOPSIS-Fuzzy COPRAS	Massachusetts
[109]					X					X	X		GIS	Estonia, Europe
[70]	X									X	X		GIS-MCDA	Mexico
[110]			X				X		X	X	X		FVIKOR-FTOPSIS	Iran
[111]					X					X	X		GIS	Ardebil Province, Iran
[71]			X							X	X		AHP	West Bengal, India
[112]			X							X	X		GIS-MCDA	Kuwait
[43]							X			X	X		AHP-WLC	Mauritius
[113]							X			X			GIS	China
[114]	X									X			GIS	Campania Region, South- ern Italy
[33]												X	GIS	Namanjavira, Mozam- bique
[15]								X		X	X		GIS	Portugal, Spain, & France
[11]			X							X	X		GIS-MCDA	French Guiana
[10]			X							X	X		GIS	Pakistan
[49]							X			X	X		AHP-TOPSIS	Eastern Macedonia & Thrace region, Greece

**Table S1.** Summary of research studies on energy planning using GIS (cont'n.).

References	RE Technologies								Applications			Applied Technique	Location	
	Biomass/ Bioenergy	Geother- mal	Solar PV		Hydro power	Ocean/ Wave	Wind		Hydrogen Production	RE resource availability and energy poten- tials	Suitable loca- tion for the en- ergy infrastruc- ture facility			Electric network design
			Land- based	Offshore/ Floating			Land- based/ Onshore	Offshore/ Floating						
[115]			X							X	X		AHP	Souss-Massa, Southern Morocco
[116]	X	X	X				X			X			GIS	Kwazulu-Natal province, South Africa
[74]							X		X	X	X		AHP	Adrar, Algeria
[77]			X							X	X		AHP	Mediterranean
[117]			X							X	X		GIS-OWA	Iran
[118]							X			X	X		GIS	Poland
[119]	X									X	X		GIS	Kuudestaan, South Osthrobos- nia, Finland
[120]							X			X	X		GIS-MCDA	Thrace, Greece
[72]	X		X				X			X			GIS-MCDM	Southern Spain
[121]			X						X	X	X		AHP	Algeria
[122]			X							X	X		AHP-Fuzzy VIKOR	Pakistan
[57]			X							X	X		GIS-MCA	Arizona, USA
[123]			X							X	X		AHP	Iran
[124]			X				X		X	X	X		GIS	Sistan & Baluchistan, Iran
[125]			X				X			X	X		AHP	Songkhla, Thailand
[126]			X				X			X	X		Fuzzy TOPSIS	Fars, Iran

**Table S1.** Summary of research studies on energy planning using GIS (cont'n.).

References	RE Technologies								Applications			Applied Technique	Location	
	Biomass/ Bioenergy	Geother- mal	Solar PV		Hydro power	Ocean/ Wave	Wind		Hydrogen Production	RE resource availability and energy poten- tials	Suitable loca- tion for the en- ergy infrastruc- ture facility			Electric network design
			Land- based	Offshore/ Floating			Land- based/ Onshore	Offshore/ Floating						
[127]					X					X	X		GIS	Kunhar River, Pakistan
[88]					X					X	X		TOPSIS	Iran
[14]						X		X					GIS	Portugal
[46]			X							X	X		AHP	Malatya Province, Tur- key
[128]							X			X	X		IT2-FAHP	Nigeria
[129]								X		X	X		GIS	China coast
[130]					X					X			GIS-MCDM	Gesso & Vermenagna Valleys
[131]			X							X	X		GIS-MCDM	China
[132]		X								X	X		GIS-Overlay	Egypt
[133]			X							X	X		GIS-MCDM	West Africa
[134]			X							X	X		AHP	Turkey
[135]			X							X	X		AHP	Eastern Morocco
[68]							X			X	X		GIS-MCDM	Iran
[136]	X									X			GIS	Poland
[53]								X		X	X		GIS	Canary Islands
[13]	X									X	X		GIS-Overlay	Boston, Massachusetts
[50]			X							X	X		AHP-TOPSIS	Haryana, India



**Table S1.** Summary of research studies on energy planning using GIS (cont'n.).

References	RE Technologies								Applications			Applied Technique	Location	
	Biomass/ Bioenergy	Geother- mal	Solar PV		Hydro power	Ocean/ Wave	Wind		Hydrogen Production	RE resource availability and energy poten- tials	Suitable loca- tion for the en- ergy infrastruc- ture facility			Electric network design
			Land- based	Offshore/ Floating			Land- based/ Onshore	Offshore/ Floating						
[66]			X				X			X	X		GIS-MCDA	Afghanistan
[80]							X			X	X		AHP-VIKOR-OCRA- TOPSIS-OWA	Andean Region, Ecuador
[36]					X					X	X		GIS	France
[75]			X							X	X		AHP-Fuzzy	Khuzestan Province, Iran
[137]	X									X			GIS	Kurdistan Province, Northwest Iran
[138]		X								X	X		Genetic Algorithm	Iran
[139]					X					X	X		GIS	Sakarya Basin, Turkey
[140]			X							X	X		AHP	Apeldoorn, The Nether- lands
[40]			X							X	X		AHP	Sub-Saharan Africa
[141]					X					X	X		GIS	Europe
[81]							X			X	X		AHP	Saudi Arabia
[35]						X		X		X	X		AHP	Greece
[12]	X									X	X		AHP-WLC	Hervas, Spain
[142]	X									X			GIS	Northwest Europe

**Table S2.** *Reclassification values of exclusion criteria and constraints.*

Reclassification values for GHI.

<b>Global radiation (kWh/m<sup>2</sup>/day)</b>	<b>Score</b>	<b>Suitability rating</b>
0 – 3.56	0	Not suitable
> 3.56	1	Suitable

Reclassification values for wind speed.

<b>Wind speed (m/s)</b>	<b>Score</b>	<b>Suitability rating</b>
< 5.5	0	Not suitable
5.5 – 6.5	1	Suitable
≥ 6.5	2	Highly Suitable

Reclassification values for slope.<sup>7</sup>

<b>Slope (°)</b>		<b>Score</b>	<b>Suitability rating</b>
<b>Solar PV</b>	<b>Wind</b>		
0 - 1	0 - 5	4	Highly suitable
2 - 3	6 - 10	3	Moderately suitable
4 - 5	11 - 15	2	Marginally suitable
> 5	> 15	1	Not suitable

Reclassification values for aspect.

<b>Direction</b>	<b>Aspect (°)</b>	<b>Score</b>	<b>Suitability rating</b>
Flat	-1	4	Highly suitable
North	-1 – 22.5	1	Not suitable
Northeast	22.5 – 67.5	1	Not suitable
East	67.5 – 112.5	1	Not suitable
Southeast	112.5 – 157.5	2	Marginally suitable
South	157.5 – 202.5	4	Highly suitable
Southwest	202.5 – 247.5	3	Moderately suitable
West	247.5 – 292.5	1	Not suitable
Northwest	292.5 – 337.5	1	Not suitable
North	337.5 - 360	1	Not suitable

Reclassification values for electric networks.

<b>Distance (m)</b>	<b>Score</b>	<b>Suitability rating</b>
100 – 1,000	4	Highly suitable
1,000 – 3,000	3	Moderately suitable
3,000 – 5,000	2	Marginally suitable
<100 and > 5,000	1	Not suitable

Reclassification values for roads.

<b>Distance (m)</b>		<b>Score</b>	<b>Suitability rating</b>
<b>Solar PV</b>	<b>Wind</b>		
100 – 1,000	500 – 1,000	4	Highly suitable
1,000 – 3,000	1,000 – 3,000	3	Moderately suitable
3,000 – 5,000	3,000 – 5,000	2	Marginally suitable
< 100 and > 5,000	< 500 and > 5,000	1	Not suitable

Reclassification values for built-up areas.

<b>Distance (m)</b>		<b>Score</b>	<b>Suitability rating</b>
<b>Solar PV</b>	<b>Wind</b>		
500 – 1,000	1,000 – 1,500	4	Highly suitable
1,000 – 3,000	1,500 – 2,000	3	Moderately suitable
3,000 – 5,000	2,000 – 2,500	2	Marginally suitable
< 500 and > 5,000	< 1,000 and > 2,500	1	Not suitable

Reclassification values for water bodies.

<b>Distance (m)</b>	<b>Score</b>	<b>Suitability rating</b>
< 100	4	Highly suitable
100 – 300	3	Moderately suitable
300 – 500	2	Marginally suitable
> 500	1	Not suitable

Reclassification values for land use/land cover.

<b>Land use/land cover</b>	<b>Score</b>	<b>Suitability rating</b>
Annual crops	0	Not suitable
Brush/shrubs	1	Suitable
Fishpond	0	Not suitable
Grassland	1	Suitable
Inland water	0	Not suitable
Mangrove forest	0	Not suitable
Open forest	0	Not suitable
Open/barren land	1	Suitable
Perennial crops	0	Not suitable

**Table S3.** *Result of Holt-Winters Exponential Smoothing Method for Araceli.*

Month & Year	Forecasted Data				
	<i>Point Forecast</i>	<i>Lo.80</i>	<i>Hi.80</i>	<i>Lo.95</i>	<i>Hi.95</i>
January 2022	82.28796436	75.13730686	89.43862186	71.35197743	93.22395129
February 2022	100.7046188	93.38296002	108.0262775	89.50710801	111.9021295
March 2022	101.0131806	93.49308189	108.5332793	89.51218211	112.5141791
April 2022	112.816993	105.0704841	120.563502	100.9697299	124.6642561
May 2022	116.055811	108.0547397	124.0568823	103.8192284	128.2923936
June 2022	114.4947456	106.2110862	122.7784051	101.8259818	127.1635095
July 2022	104.5466649	95.9527764	113.1405535	91.40344661	117.6898833
August 2022	106.3622948	97.43112649	115.2934632	92.70325155	120.0213381
September 2022	109.4782819	100.1835273	118.7730365	95.26318146	123.6933824
October 2022	106.2531943	96.56939806	115.9369905	91.44310599	121.0632826
November 2022	109.4917326	99.39435604	119.5891092	94.04912776	124.9343375
December 2022	121.8799637	111.3454167	132.4145108	105.7687643	137.9911631
January 2023	85.69774015	74.32302404	97.07245626	68.30161306	103.0938672
February 2023	104.1143946	92.27363119	115.9551579	86.00550969	122.2232794
March 2023	104.4229564	92.09475831	116.7511544	85.56860447	123.2773083
April 2023	116.2267688	103.3905917	129.0629459	96.59552996	135.8580076
May 2023	119.4655868	106.1016985	132.8294751	99.02728343	139.9038902
June 2023	117.9045214	103.9939653	131.8150776	96.63016165	139.1788812
July 2023	107.9564407	93.48099471	122.4318867	85.81815647	130.094725
August 2023	109.7720706	94.71420527	124.829936	86.74305285	132.8010884
September 2023	112.8880577	97.23089338	128.545222	88.94249126	136.8336241
October 2023	109.6629701	93.39023529	125.9357049	84.77596984	134.5499703
November 2023	112.9015084	95.99749928	129.8055176	87.04905738	138.7539595
December 2023	125.2897395	107.7392813	142.8401977	98.44862999	152.130849
January 2024	89.10751594	70.55765739	107.6573745	60.73795543	117.4770764
February 2024	107.5241703	88.31084464	126.7374961	78.13992439	136.9084163
March 2024	107.8327322	87.94156169	127.7239026	77.41181209	138.2536522
April 2024	119.6365446	99.0535785	140.2195107	88.15761443	151.1154747
May 2024	122.8753626	101.5870494	144.1636758	90.31769709	155.4330281
June 2024	121.3142972	99.30745896	143.3211355	87.6577425	154.9708519
July 2024	111.3662165	88.62802513	134.1044079	76.59115371	146.1412793
August 2024	113.1818464	89.6998014	136.6638915	77.26915764	149.0945352
September 2024	116.2978335	92.05974137	140.5359256	79.22887046	153.3667965
October 2024	113.0727459	88.06670131	138.0787904	74.82930094	151.3161908
November 2024	116.3112842	90.52565236	142.0969161	76.8755634	155.747005
December 2024	128.6995153	102.1229156	155.276115	88.05411356	169.344917

**Table S3.** *Result of Holt-Winters Exponential Smoothing Method for Araceli (cont'n.).*

Month & Year	Forecasted Data				
	<i>Point Forecast</i>	<i>Lo.80</i>	<i>Hi.80</i>	<i>Lo.95</i>	<i>Hi.95</i>
January 2025	92.51729173	64.84138339	120.1932001	50.1906425	134.843941
February 2025	110.9339461	82.45349579	139.4143965	67.3768561	154.4910362
March 2025	111.242508	81.94644656	140.5385693	66.43804845	156.0469675
April 2025	123.0463204	92.92379903	153.1688417	76.97789944	169.1147413
May 2025	126.2851384	95.32551638	157.2447604	78.93648247	173.6337943
June 2025	124.724073	92.91690672	156.5312393	76.07920998	173.368936
July 2025	114.7759923	82.11102494	147.4409597	64.81923574	164.7327489
August 2025	116.5916222	83.05877416	150.1244703	65.30755667	167.8756878
September 2025	119.7076093	85.2969692	154.1182493	67.08107669	172.3341419
October 2025	116.4825217	81.18433825	151.7807051	62.49860867	170.4664347
November 2025	119.72106	83.52573419	155.9163858	64.36508611	175.0770339
December 2025	132.1092911	95.00736887	169.2112133	75.36679765	188.8517845
January 2026	95.92706752	57.64332607	134.210809	37.37713754	154.4769975
February 2026	114.3437219	75.14115925	153.5462846	54.38857614	174.2988677
March 2026	114.6522837	74.52161143	154.7829561	53.27771676	176.0268507
April 2026	126.4560962	85.38815753	167.5240348	63.64810403	189.2640883
May 2026	129.6949142	87.68067853	171.7091498	65.43968565	193.9501427
June 2026	128.1338488	85.16440608	171.1032915	62.41775714	193.8499404
July 2026	118.1857681	74.25232393	162.1192123	50.99536344	185.3761727
August 2026	120.001398	75.0952689	164.9075271	51.3234001	188.6793959
September 2026	123.1173851	77.229994	169.0047761	52.9386765	193.2960936
October 2026	119.8922975	73.01516973	166.7694252	48.1999173	191.5846776
November 2026	123.1308358	75.25559511	171.0060765	49.91197358	196.349698
December 2026	135.5190669	86.63743161	184.4007021	60.76105697	210.2770768
January 2027	99.33684331	49.19854593	149.4751407	22.65693455	176.0167521
February 2027	117.7534977	66.59735211	168.9096433	39.51692444	195.990071
March 2027	118.0620595	65.87989451	170.2442246	38.25632496	197.8677941
April 2027	129.865872	76.64960461	183.0821393	48.47861436	211.2531296
May 2027	133.10469	78.8463226	187.3630573	50.12367792	216.085702
June 2027	131.5436246	76.23524175	186.8520074	46.95675246	216.1304967
July 2027	121.5955439	65.22930968	177.9617781	35.39082769	207.8002601
August 2027	123.4111738	65.97932915	180.8430184	35.57674708	211.2456005
September 2027	126.5271608	68.0220211	185.0323006	37.05127091	216.0030508
October 2027	123.3020732	63.71602572	182.8881208	32.17307752	214.431069
November 2027	126.5406116	65.86611339	187.2151098	33.74697422	219.3342489
December 2027	138.9288427	77.15841854	200.6992668	44.45913122	233.3985541

**Table S3.** Result of Holt-Winters Exponential Smoothing Method for Araceli (cont'n.).

Month & Year	Forecasted Data				
	Point Forecast	Lo.80	Hi.80	Lo.95	Hi.95
January 2028	102.7466191	39.64945069	165.8437875	6.24782738	199.2454108
February 2028	121.1632735	56.95928818	185.3672588	22.97175138	219.3547956
March 2028	121.4718353	56.15364173	186.7900289	21.57627871	221.3673919
April 2028	133.2756477	66.83591857	199.7153769	31.66485047	234.886445
May 2028	136.5144658	68.94593586	204.0829957	33.17731674	239.8516148
June 2028	134.9534004	66.24886498	203.6579357	29.8788809	240.0279198
July 2028	125.0053197	55.15763278	194.8530066	18.18250084	231.8281385
August 2028	126.8209496	55.82302226	197.8188769	18.23898981	235.4029094
September 2028	129.9369366	57.78173552	202.0921378	19.58507933	240.288794
October 2028	126.711849	53.39239483	200.0313032	14.5794203	238.8442778
November 2028	129.9503874	55.4597535	204.4410212	16.0267939	243.8739808
December 2028	142.3386184	66.66992965	218.0073072	26.61334544	258.0638915
January 2029	106.1563949	29.09446531	183.2183245	-11.69965602	224.0124458
February 2029	124.5730493	46.32263614	202.8234624	4.899369603	244.246729
March 2029	124.8816111	45.43590761	204.3273146	3.379892585	246.3833296
April 2029	136.6854235	56.03767196	217.3331751	13.34533112	260.0255159
May 2029	139.9242416	58.06773203	221.7807511	14.73551339	265.1129697
June 2029	138.3631762	55.2912455	221.4351068	11.31562178	265.4107305
July 2029	128.4150955	44.12112608	212.7090648	-0.501405863	257.3315968
August 2029	130.2307254	44.70814421	215.7533065	-0.564775533	261.0262263
September 2029	133.3467124	46.58898991	220.1044349	0.662225843	266.031199
October 2029	130.1216248	42.12227392	218.1209757	-4.461768511	264.7050181
November 2029	133.3601632	44.11273842	222.6075879	-3.131994393	269.8523207
December 2029	145.7483942	55.24649087	236.2502976	7.337677182	284.1591113
January 2030	109.5661707	17.60749193	201.5248494	-31.07249205	250.2048334
February 2030	127.9828251	34.75963989	221.2060103	-14.58973338	270.5553835
March 2030	128.2913869	33.79734866	222.7854251	-16.22477357	272.8075474
April 2030	140.0951993	44.32400054	235.8663981	-6.374209652	286.5646083
May 2030	143.3340173	46.27938877	240.3886459	-5.0982281	291.7662628
June 2030	141.7729519	43.42866184	240.117242	-8.631660607	292.1775645
July 2030	131.8248713	32.18472457	231.4650179	-20.56158292	284.2113254
August 2030	133.6405012	32.69833883	234.5826635	-20.73721411	288.0182164
September 2030	136.7564882	34.5061864	239.00679	-9.62185374	293.1348302
October 2030	133.5314006	29.96687007	237.0959311	-24.85688074	291.919682
November 2030	136.7699389	31.88512433	241.6547536	-23.63754266	297.1774206
December 2030	149.15817	42.94704921	255.3692908	-13.27772186	311.5940619

**Table S3.** Result of Holt-Winters Exponential Smoothing Method for Balabac.

Month & Year	Forecasted Data				
	Point Forecast	Lo.80	Hi.80	Lo.95	Hi.95
January 2022	79.82432659	75.08019769	84.56845549	72.56880755	87.07984563
February 2022	82.60502004	77.74743977	87.46260032	75.1759921	90.03404799
March 2022	83.91925485	78.93001889	88.90849081	76.28887691	91.54963279
April 2022	93.06419909	87.92475045	98.20364774	85.20409068	100.9243075
May 2022	94.32688167	89.01854273	99.63522061	86.20847784	102.4452855
June 2022	93.9055345	88.40971148	99.40135751	85.50039852	102.3106705
July 2022	88.06558253	82.36393692	93.76722815	79.34566805	96.78549702
August 2022	92.70122686	86.77581177	98.62664196	83.63908649	101.7633672
September 2022	92.73776848	86.57113082	98.90440614	83.30671003	102.1688269
October 2022	90.26403569	83.83928698	96.68878441	80.43823045	100.0898409
November 2022	92.8794413	86.18030124	99.57858135	82.63399071	103.1248919
December 2022	91.07066139	84.08147905	98.05984373	80.38162941	101.7596934
January 2023	90.98846037	83.44186491	98.53505583	79.44693859	102.5299821
February 2023	93.76915382	85.91335767	101.62495	81.75475038	105.7835573
March 2023	95.08338863	86.90420221	103.262575	82.57440246	107.5923748
April 2023	104.2283329	95.71212595	112.7445398	91.20391833	117.2527474
May 2023	105.4910154	96.62469671	114.3573342	91.93115109	119.0508798
June 2023	105.0696683	95.84066081	114.2986757	90.95511937	119.1842172
July 2023	99.22971631	89.62593068	108.8335019	84.54199366	113.917439
August 2023	103.8653606	93.87516684	113.8555544	88.5866777	119.1440436
September 2023	103.9019023	93.51410146	114.2897031	88.01513188	119.7886726
October 2023	101.4281695	90.63196627	112.2243727	84.91680152	117.9395374
November 2023	104.0435751	92.82855068	115.2585995	86.89167539	121.1954748
December 2023	102.2347952	90.5908819	113.8787084	84.42696654	120.0426238
January 2024	102.1525941	89.84562517	114.4595631	83.33070932	120.974479
February 2024	104.9332876	92.186139	117.6804362	85.43820614	124.4283691
March 2024	106.2475224	93.0506553	119.4443895	86.06465585	126.430389
April 2024	115.3924667	101.7366253	129.048308	94.50765958	136.2772737
May 2024	116.6551492	102.5313428	130.7789556	95.05465139	138.2556471
June 2024	116.2338021	101.6332877	130.8343164	93.90424231	138.5633618
July 2024	110.3938501	95.30811695	125.4795832	87.32221221	133.465488
August 2024	115.0294944	99.45024896	130.6087399	91.20309458	138.8558943
September 2024	115.066036	98.98518847	131.1468836	90.47250198	139.6595701
October 2024	112.5923033	96.00195493	129.1826516	87.21955503	137.9650515
November 2024	115.2077089	98.1001406	132.3152771	89.04394101	141.3714767
December 2024	113.3989289	95.76659029	131.0312676	86.43259404	140.3652639

*Table S3. Result of Holt-Winters Exponential Smoothing Method for Balabac (cont'n.).*

Month & Year	Forecasted Data				
	Point Forecast	Lo.80	Hi.80	Lo.95	Hi.95
January 2025	113.3167279	94.95504908	131.6784068	85.23496344	141.3984924
February 2025	116.0974214	97.20196631	134.9928765	87.19931661	144.9955262
March 2025	117.4116562	97.97508109	136.8482313	87.68597975	147.1373326
April 2025	126.5566004	106.5717076	146.5414933	95.99234433	157.1208565
May 2025	127.819283	107.2790128	148.3595533	96.4056505	159.2329155
June 2025	127.3979358	106.2953594	148.5005123	95.12433016	159.6715415
July 2025	121.5579839	99.88629624	143.2296715	88.41399781	154.7019699
August 2025	126.1936282	103.9461421	148.4411143	92.16903432	160.2182221
September 2025	126.2301698	103.4003095	149.0600301	91.31491145	161.1454282
October 2025	123.756437	100.3377329	147.1751411	87.94061985	159.5722542
November 2025	126.3718426	102.3579263	150.385759	89.64572682	163.0979584
December 2025	124.5630627	99.94766178	149.1784637	86.91705564	162.2090698
January 2026	124.4808617	99.08137863	149.8803448	85.63570448	163.3260189
February 2026	127.2615552	101.2524769	153.2706334	87.48410256	167.0390078
March 2026	128.57579	101.9509541	155.2006258	87.85661737	169.2949626
April 2026	137.7207342	110.4740657	164.9674027	96.05055065	179.3909178
May 2026	138.9834168	111.1089242	166.8579094	96.35305914	181.6137744
June 2026	138.5620696	110.0538415	167.0702977	94.96249719	182.161642
July 2026	132.7221176	103.5743194	161.8699159	88.14440707	177.2998282
August 2026	137.357762	107.5646325	167.1508915	91.79310242	182.9224215
September 2026	137.3943036	106.9501524	167.8384548	90.83399226	183.9546149
October 2026	134.9205708	103.8197753	166.0213663	87.35600873	182.4851329
November 2026	137.5359764	105.7729794	169.2989734	88.95866444	186.1132884
December 2026	135.7271965	103.2965035	168.1578896	86.12873158	185.3256614
January 2027	135.6449955	102.3805655	168.9094254	84.77143999	186.518551
February 2027	138.4256889	104.485964	172.3654139	86.51935889	190.332019
March 2027	139.7399237	105.1194826	174.3603649	86.79252811	192.6873194
April 2027	148.884868	113.578348	184.191388	94.88820533	202.8815306
May 2027	150.1475506	114.1496457	186.1454555	95.0935059	205.2015952
June 2027	149.7262034	113.031662	186.4207447	93.60674522	205.8456616
July 2027	143.8862514	106.4898748	181.282628	86.6934289	201.079074
August 2027	148.5218958	110.4185362	186.6252553	90.24783605	206.7959555
September 2027	148.5584374	109.7429964	187.3738784	89.19534311	207.9215316
October 2027	146.0847046	106.5521315	185.6172776	85.62485147	206.5445577
November 2027	148.7001102	108.4454007	188.9548197	87.13584471	210.2643757
December 2027	146.8913303	105.9095249	187.8731357	84.21506756	209.567593



**Table S3.** Result of Holt-Winters Exponential Smoothing Method for Balabac (cont'n.).

Month & Year	Forecasted Data				
	Point Forecast	Lo.80	Hi.80	Lo.95	Hi.95
January 2028	146.8091293	104.9470907	188.6711678	82.78666608	210.8315924
February 2028	149.5898227	106.9934626	192.1861829	84.44431158	214.7353338
March 2028	150.9040575	107.568472	194.2396431	84.62799871	217.1801163
April 2028	160.0490018	115.9693295	204.1286741	92.6349605	227.463043
May 2028	161.3116843	116.4831052	206.1402634	92.75228893	229.8710798
June 2028	160.8903372	115.3080712	206.4726031	91.17827721	230.6023971
July 2028	155.0503852	108.7096914	201.391079	84.17840988	225.9223605
August 2028	159.6860295	112.5822046	206.7898544	87.64694596	231.7251131
September 2028	159.7225712	111.8509489	207.5941934	86.50924282	232.9358995
October 2028	157.2488384	108.6047883	205.8928884	82.85418365	231.6434931
November 2028	159.864244	110.4431706	209.2853173	84.2812347	235.4472532
December 2028	158.0554641	107.852806	208.2581221	81.27712416	234.833804
January 2029	157.973263	106.8462545	209.1002716	79.78125104	236.165275
February 2029	160.7539565	108.8384443	212.6694687	81.35603228	240.1518807
March 2029	162.0681913	109.3596595	214.7767231	81.45744828	242.6789343
April 2029	171.2131355	117.7071008	224.7191703	89.3827169	253.0435542
May 2029	172.4758181	118.1678286	226.7838076	89.41891557	255.5327207
June 2029	172.0544709	116.940106	227.1688359	87.7643236	256.3446183
July 2029	166.214519	110.2893882	222.1396498	80.6844122	251.7446258
August 2029	170.8501633	114.1099057	227.590421	84.07342765	257.626899
September 2029	170.8867049	113.3269884	228.4464214	82.85671506	258.9166948
October 2029	168.4129721	110.0294929	226.7964514	79.12314591	257.7027984
November 2029	171.0283777	111.8168595	230.239896	80.47217517	261.5845803
December 2029	169.2195978	109.1757914	229.2634043	77.3905202	261.0486755
January 2030	169.1373968	108.1270876	230.1477061	75.83018077	262.4446129
February 2030	171.9180903	110.0688398	233.7673408	77.3278243	266.5083562
March 2030	173.2323251	110.5399227	235.9247275	77.3525695	269.1120807
April 2030	182.3772693	118.8375302	245.9170084	85.20162415	279.5529145
May 2030	183.6399519	119.2487168	248.031187	85.16205596	282.1178478
June 2030	183.2186047	117.9717391	248.4654703	83.43213489	283.0050746
July 2030	177.3786528	111.2720466	243.485259	76.27732312	278.4799824
August 2030	182.0142971	115.043864	248.9847302	79.59185826	284.4367359
September 2030	182.0508387	114.2125159	249.8891615	78.30107706	285.8006004
October 2030	179.5771059	110.8668534	248.2873584	74.4938429	284.6603689
November 2030	182.1925115	112.6063119	251.7787111	75.76960298	288.6154201
December 2030	180.3837316	109.9175895	250.8498737	72.61506713	288.1523961

**Table S3.** Result of Holt-Winters Exponential Smoothing Method for Cuyo.

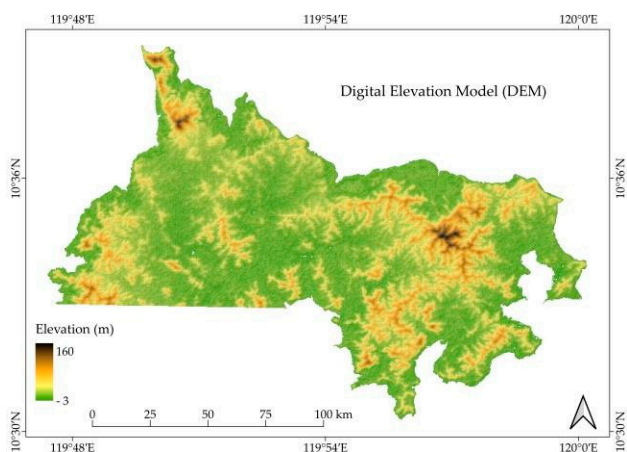
Month & Year	Forecasted Data				
	Point Forecast	Lo.80	Hi.80	Lo.95	Hi.95
January 2022	592.5745403	556.2806235	628.868457	537.0677846	648.081296
February 2022	608.7865109	571.6246593	645.9483625	551.9523634	665.6206585
March 2022	608.9881202	570.8190657	647.1571747	550.6135887	667.3626516
April 2022	685.6771666	646.3589429	724.9953903	625.5451326	745.8092006
May 2022	724.6623011	684.0520193	765.2725829	662.5542347	786.7703675
June 2022	720.3085132	678.2639256	762.3531007	656.0068654	784.6101609
July 2022	683.3202897	639.7011015	726.9394779	616.6104981	750.0300813
August 2022	700.925399	655.5943115	746.2564865	631.5974833	770.2533146
September 2022	717.2508546	670.0743469	764.4273624	645.1006122	789.401097
October 2022	668.0916923	618.9405626	717.242822	592.9215263	743.2618584
November 2022	683.8672033	632.6169028	735.1175037	605.4866326	762.2477739
December 2022	671.5179405	618.0487353	724.9871458	589.7438478	753.2920333
January 2023	643.5331875	585.7996155	701.2667594	555.2373086	731.8290663
February 2023	659.7451581	599.6461141	719.8442022	567.831602	751.6587143
March 2023	659.9467674	597.3736971	722.5198377	564.2495146	755.6440202
April 2023	736.6358138	671.4844422	801.7871854	636.9953894	836.2762382
May 2023	775.6209483	707.7911231	843.4507735	671.8841827	879.357714
June 2023	771.2671604	700.6626646	841.8716561	663.2869023	879.2474184
July 2023	734.2789369	660.8072831	807.7505907	621.913739	846.6441348
August 2023	751.8840462	675.4562615	828.3118309	634.9978362	868.7702562
September 2023	768.2095018	688.7399121	847.6790916	646.6712525	889.7477512
October 2023	719.0503395	636.4563569	801.6443222	592.7337435	845.3669356
November 2023	734.8258505	649.0277682	820.6239327	603.609007	866.0426939
December 2023	722.4765877	633.3973853	811.5557902	586.2417039	858.7114716
January 2024	694.4918347	600.3400701	788.6435993	550.4991365	838.4845328
February 2024	710.7038053	613.1845432	808.2230675	561.5609641	859.8466466
March 2024	710.9054146	609.9456798	811.8651495	556.5008245	865.3100047
April 2024	787.594461	683.1234445	892.0654775	627.8198291	947.3690929
May 2024	826.5795955	718.5285152	934.6306758	661.3297285	991.8294626
June 2024	822.2258076	710.5277777	933.9238374	651.3984125	993.0532027
July 2024	785.2375841	669.8274942	900.647674	608.7330831	961.7420851
August 2024	802.8426934	683.6570958	922.0282909	620.5640517	985.1213351
September 2024	819.168149	696.1451547	942.1911433	631.0207154	1007.315583
October 2024	770.0089868	643.0881688	896.9298047	575.9003462	964.1176273
November 2024	785.7844977	654.9068021	916.6621933	585.6243351	985.9446602
December 2024	773.435235	638.5428987	908.3275713	567.1352092	979.7352607

**Table S3.** *Result of Holt-Winters Exponential Smoothing Method for Cuyo (cont'n.).*

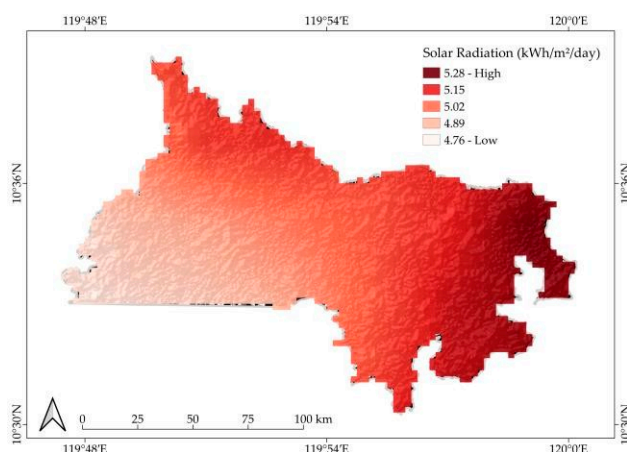
Month & Year	Forecasted Data				
	<i>Point Forecast</i>	<i>Lo.80</i>	<i>Hi.80</i>	<i>Lo.95</i>	<i>Hi.95</i>
January 2025	745.4504819	604.9784885	885.9224752	530.6171071	960.2838567
February 2025	761.6624526	617.1069214	906.2179837	540.5838456	982.7410595
March 2025	761.8640618	613.1688107	910.559313	534.4542995	989.2738241
April 2025	838.5531082	685.6630723	991.4431441	604.7279763	1072.37824
May 2025	877.5382427	720.3994141	1034.677071	637.215143	1117.861342
June 2025	873.1844548	711.7438258	1034.625084	626.2823191	1120.08659
July 2025	836.1962313	670.4017424	1001.99072	582.6354416	1089.757021
August 2025	853.8013406	683.6018317	1024.00085	593.503654	1114.099027
September 2025	870.1267962	695.4719613	1044.781631	603.0152766	1137.238316
October 2025	820.967634	641.8079791	1000.127289	546.9665868	1094.968681
November 2025	836.7431449	653.0299491	1020.456341	555.7780578	1117.708232
December 2025	824.3938822	636.0791607	1012.708604	536.3913688	1112.396395
January 2026	796.4091291	602.0959594	990.7222988	499.2327809	1093.585477
February 2026	812.6210998	613.6443559	1011.597844	508.3124304	1116.929769
March 2026	812.822709	609.1352468	1016.510171	501.3096176	1124.3358
April 2026	889.5117554	681.067099	1097.956412	570.7231633	1208.300348
May 2026	928.4968899	715.2492032	1141.744577	602.3626968	1254.631083
June 2026	924.143102	706.0471611	1142.239043	590.5941439	1257.69206
July 2026	887.1548785	664.1660465	1110.143711	546.1228893	1228.186868
August 2026	904.7599878	676.8341907	1132.685785	556.177562	1253.342414
September 2026	921.0854435	688.1791477	1153.991739	564.8860023	1277.284885
October 2026	871.9262812	633.9964726	1109.85609	508.0440401	1235.808522
November 2026	887.7017921	644.7059559	1130.697628	516.0717303	1259.331854
December 2026	875.3525294	627.2486312	1123.456428	495.9103611	1254.794698
January 2027	847.3677763	592.885557	1101.849996	458.1708075	1236.564745
February 2027	863.579747	603.9313316	1123.228162	466.4817632	1260.677731
March 2027	863.7813562	598.925271	1128.637441	458.7189287	1268.843784
April 2027	940.4704026	670.3656219	1210.575183	527.3807881	1353.560017
May 2027	979.4555372	704.0614678	1254.849607	558.2766537	1400.634421
June 2027	975.1017492	694.3782156	1255.825283	545.7721535	1404.431345
July 2027	938.1135257	652.0207558	1224.206296	500.5723917	1375.65466
August 2027	955.718635	664.2172469	1247.220023	509.9057332	1401.531537
September 2027	972.0440907	675.0950799	1268.993101	517.8997691	1426.188412
October 2027	922.8849284	620.4496562	1225.320201	460.350094	1385.419763
November 2027	938.6604393	630.7006209	1246.620258	467.6765406	1409.644338
December 2027	926.3111766	612.7888705	1239.833483	446.820187	1405.802166

**Table S3.** Result of Holt-Winters Exponential Smoothing Method for Cuyo (cont'n.).

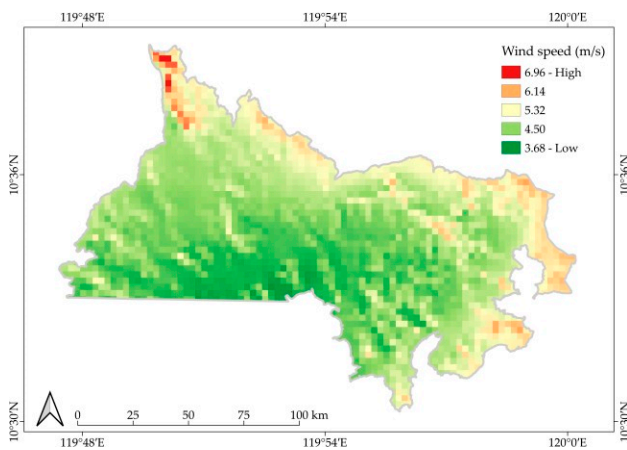
Month & Year	Forecasted Data				
	Point Forecast	Lo.80	Hi.80	Lo.95	Hi.95
January 2028	898.3264235	578.0700868	1218.58276	408.5366228	1388.116224
February 2028	914.5383942	588.6642913	1240.412497	416.1569617	1412.919827
March 2028	914.7400034	583.210619	1246.269388	407.7095641	1421.770443
April 2028	991.4290498	654.2071932	1328.650907	475.6927255	1507.165374
May 2028	1030.414184	687.4629805	1373.365388	505.9155796	1554.912789
June 2028	1026.060396	677.3432768	1374.777516	492.7435845	1559.377208
July 2028	989.072173	634.5528673	1343.591479	446.8816832	1531.262663
August 2028	1006.677282	646.3198098	1367.034755	455.558087	1557.796477
September 2028	1023.002738	656.7714002	1389.234076	462.9002409	1583.105235
October 2028	973.8435756	601.7029486	1345.984203	404.7036004	1542.983551
November 2028	989.6190865	611.5340135	1367.70416	411.3878658	1567.850307
December 2028	977.2698238	593.2054086	1361.334239	389.8939884	1564.645659
January 2029	949.2850707	558.149115	1340.421026	351.0942472	1547.475894
February 2029	965.4970414	568.3288118	1362.665271	358.0806512	1572.913432
March 2029	965.6986506	562.4635988	1368.933703	349.0038564	1582.393445
April 2029	1042.387697	633.0515233	1451.723871	416.3620422	1668.413352
May 2029	1081.372832	665.9014793	1496.844184	445.9642309	1716.781432
June 2029	1077.019044	655.3786932	1498.659394	432.1757743	1721.862313
July 2029	1040.03082	612.1878832	1467.873757	385.7015134	1694.360127
August 2029	1057.635929	623.5570437	1491.714815	393.769562	1721.502297
September 2029	1073.961385	633.6134091	1514.309361	400.5072715	1747.415499
October 2029	1024.802223	578.1522309	1471.452215	341.7100076	1707.894438
November 2029	1040.577734	587.5930114	1493.562456	347.7973843	1733.358083
December 2029	1028.228471	568.87651	1487.580432	325.7102704	1730.746672
January 2030	1000.243718	533.4977398	1466.989696	286.4173439	1714.070092
February 2030	1016.455689	543.2915745	1489.619803	292.8136227	1740.097754
March 2030	1016.657298	537.042835	1496.271761	283.1502749	1750.164321
April 2030	1093.346344	607.2495183	1579.44317	349.9254024	1836.767286
May 2030	1132.331479	639.7204695	1624.942488	378.9479533	1885.715004
June 2030	1127.977691	628.8208684	1627.134513	364.5832079	1891.372174
July 2030	1090.989467	585.2553881	1596.723547	317.5359382	1864.442997
August 2030	1108.594577	596.2519795	1620.937174	325.0341916	1892.154962
September 2030	1124.920032	605.9378352	1643.902229	331.2052554	1918.634809
October 2030	1075.76087	550.1081663	1601.413574	271.8444336	1879.677306
November 2030	1091.536381	559.1824361	1623.890326	277.3712806	1905.701481
December 2030	1079.187118	540.1013663	1618.27287	254.7266074	1903.647629



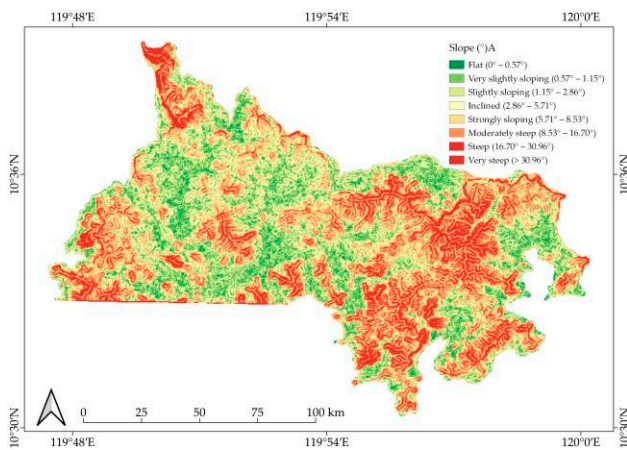
(a)



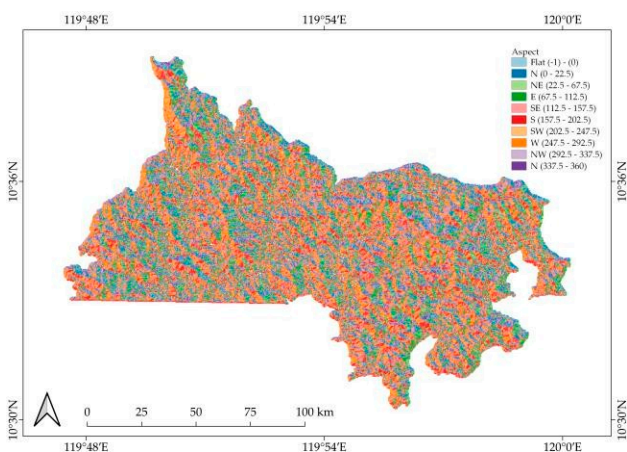
(b)



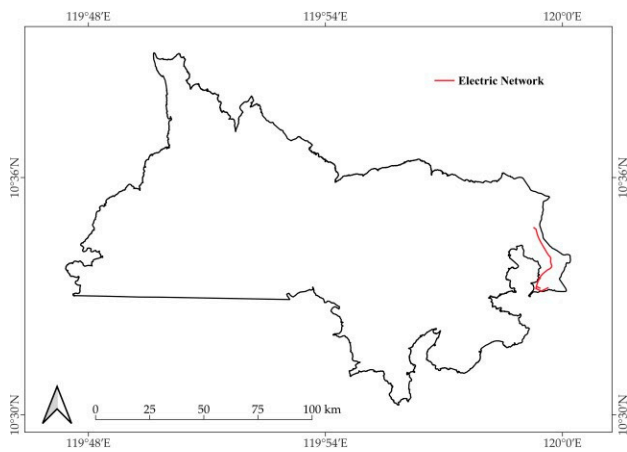
(c)



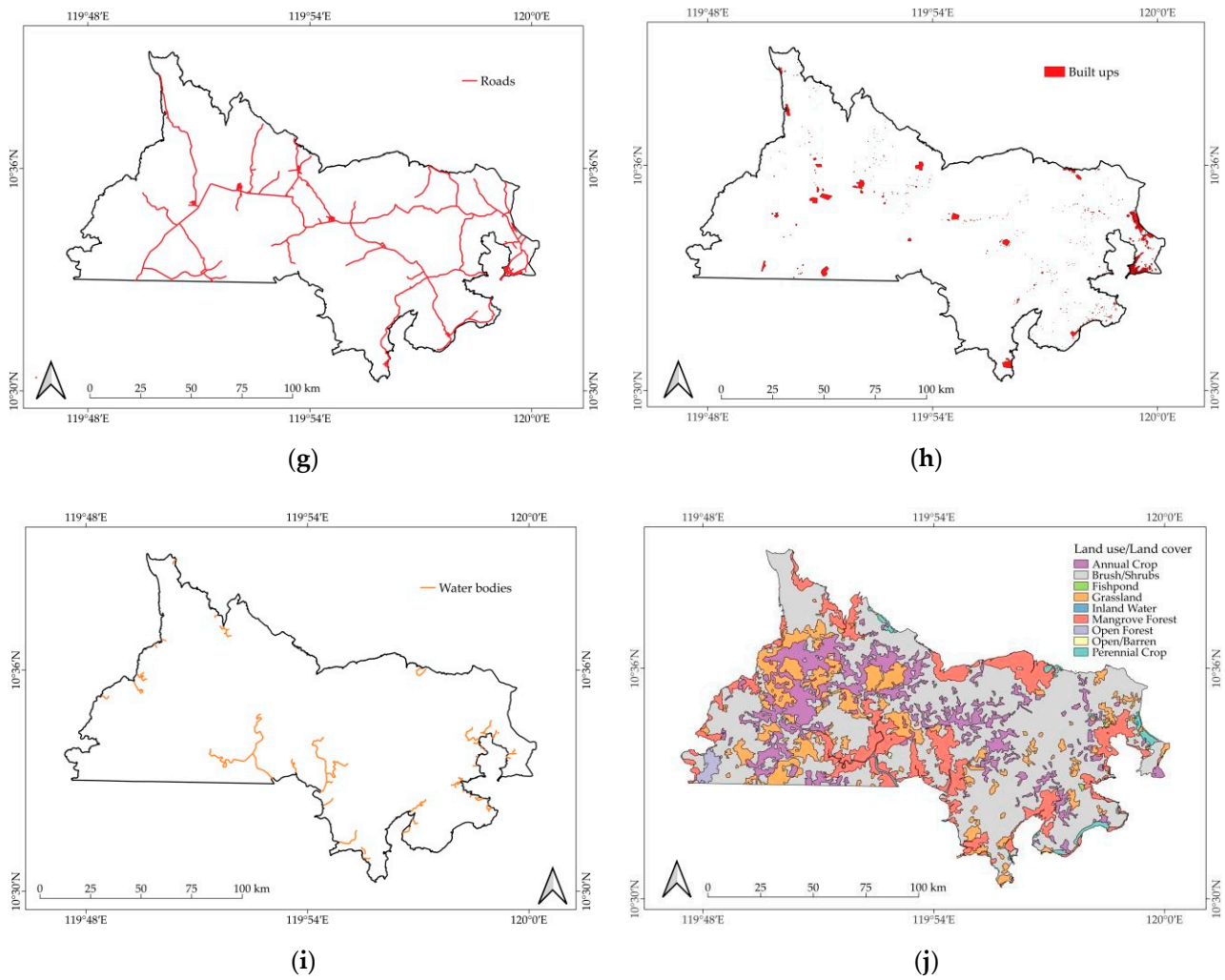
(d)



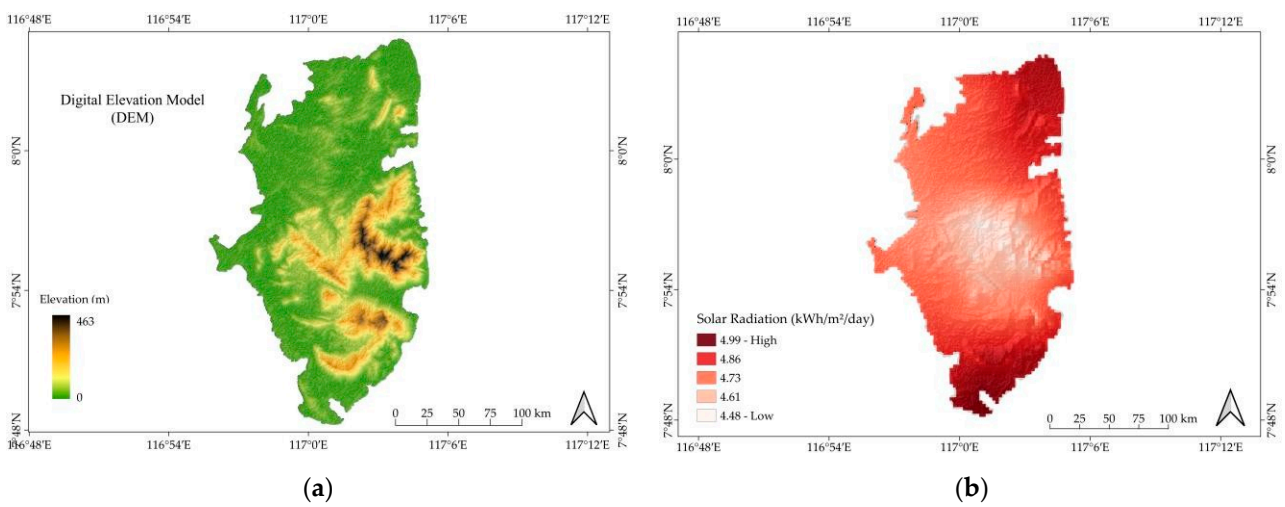
(e)



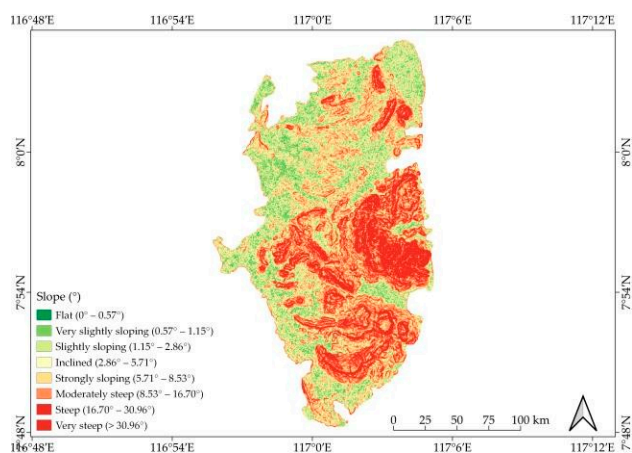
(f)



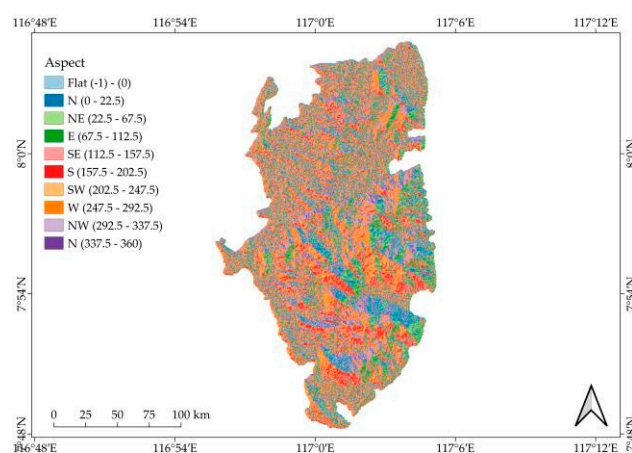
**Figure S1.** GIS maps before the application of exclusion criteria and constraints. Araceli: a) DEM; b) GHI; c) wind speed; d) slope; e) aspect; f) electric network; g) roads; h) built-ups; i) water bodies; j) land use/land cover.



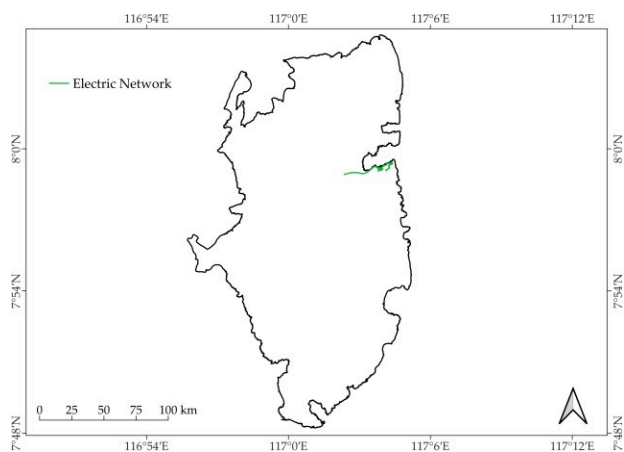




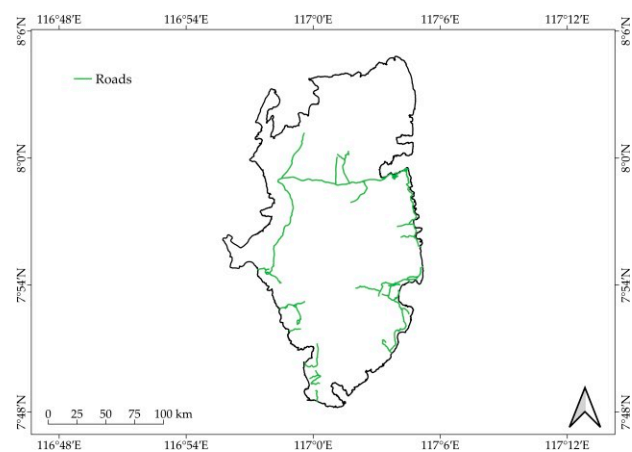
(c)



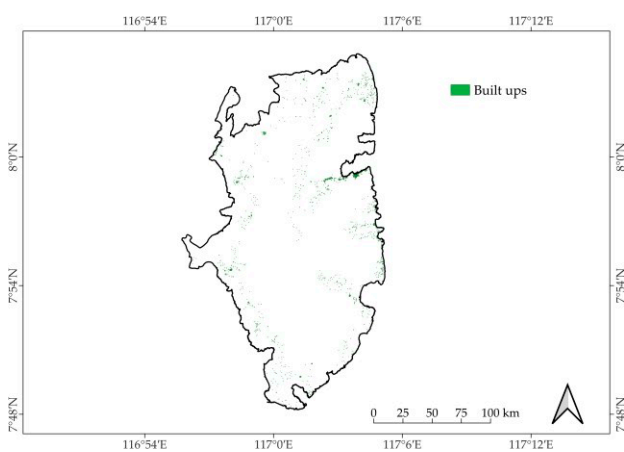
(d)



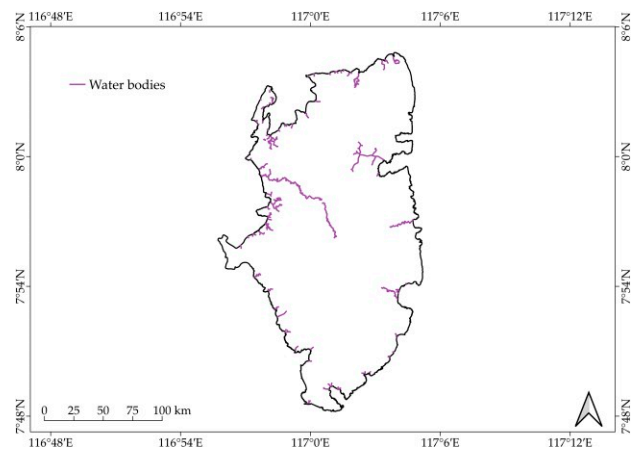
(e)



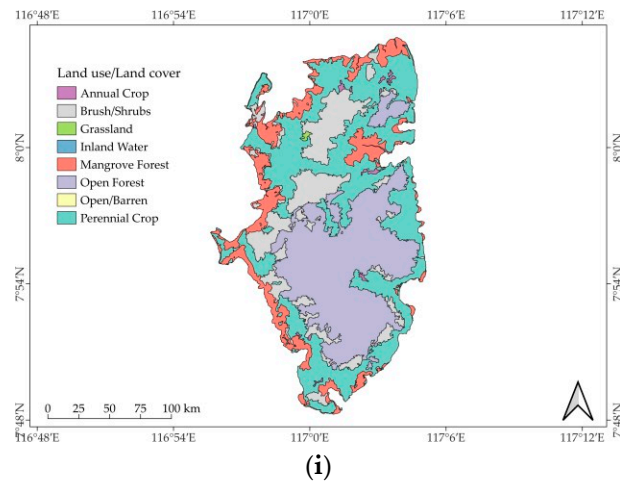
(f)



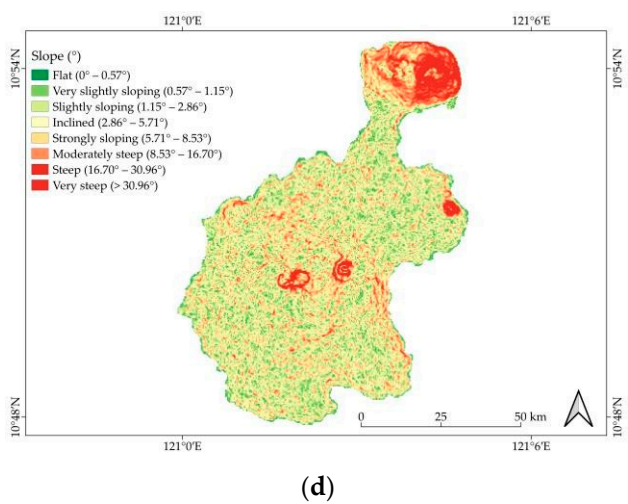
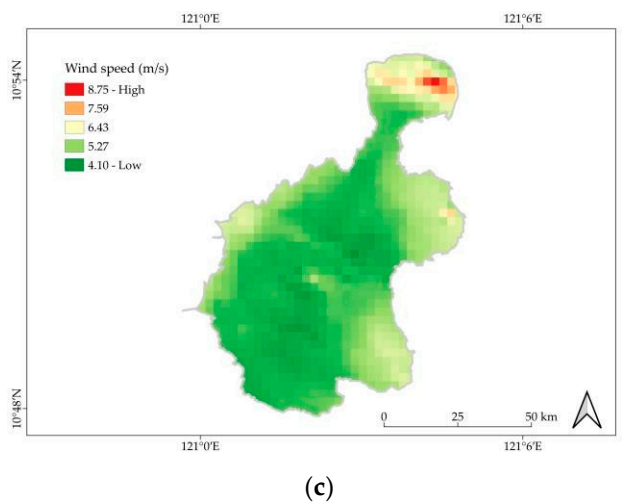
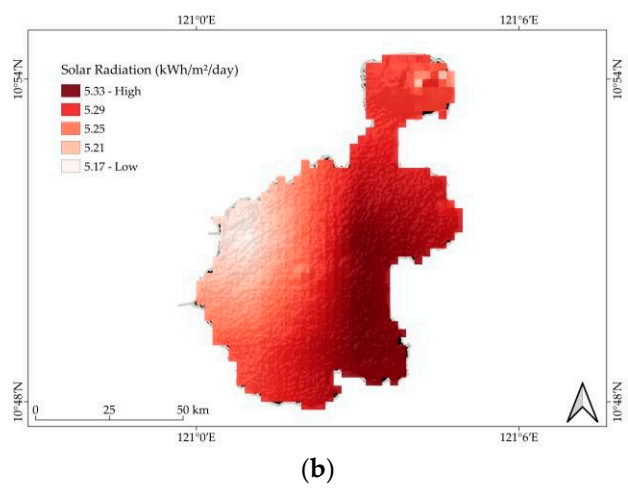
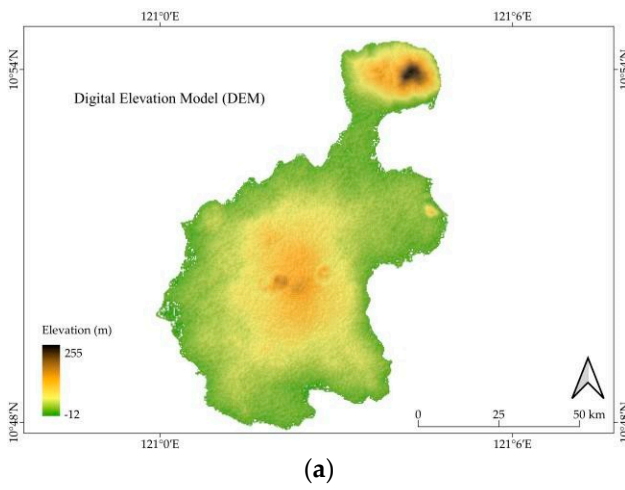
(g)



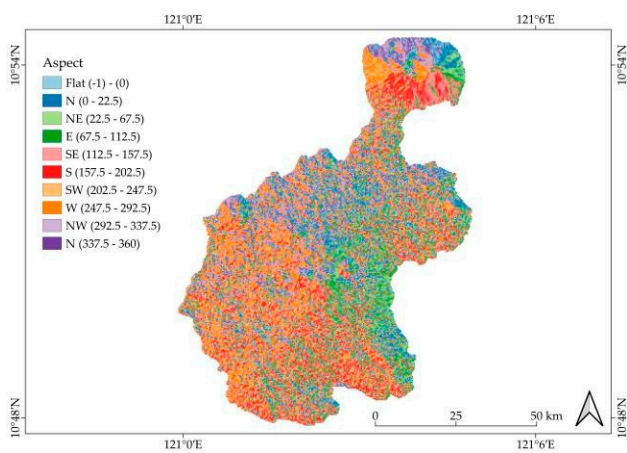
(h)



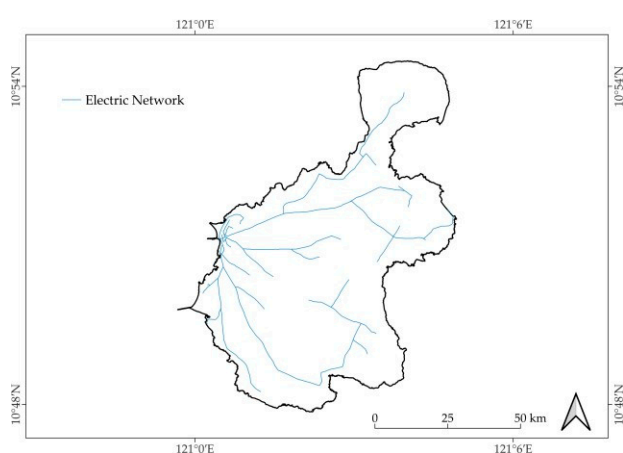
**Figure S2.** Balabac: a) DEM; b) GHI; c) slope; d) aspect; e) electric network; f) roads; g) built-ups; h) water bodies; i) land use/land cover.



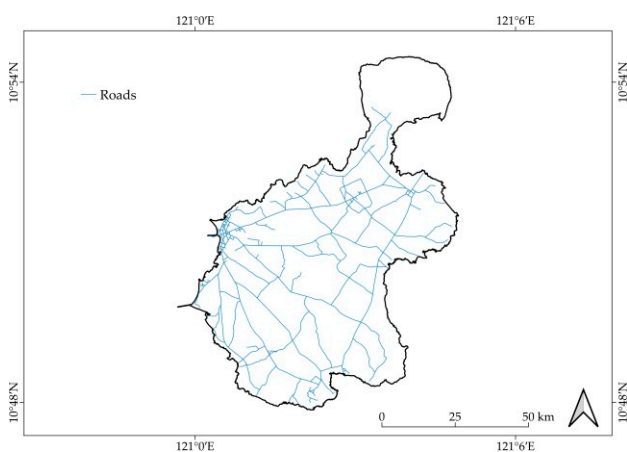




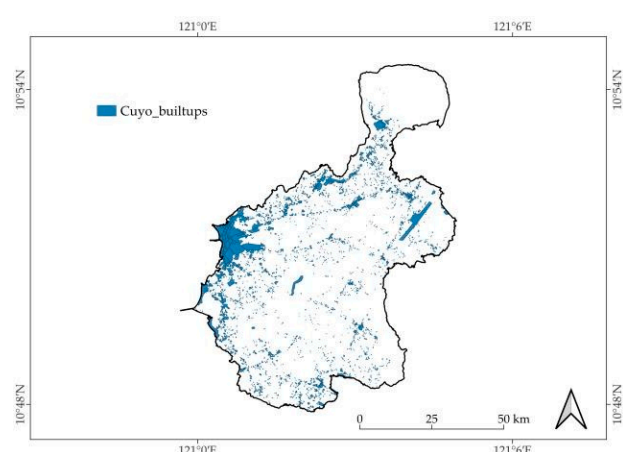
(e)



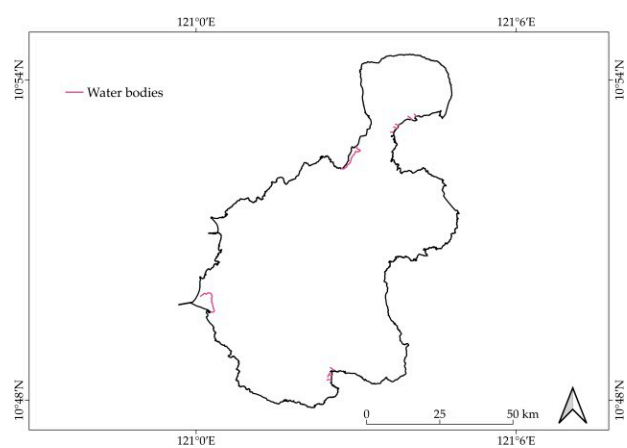
(f)



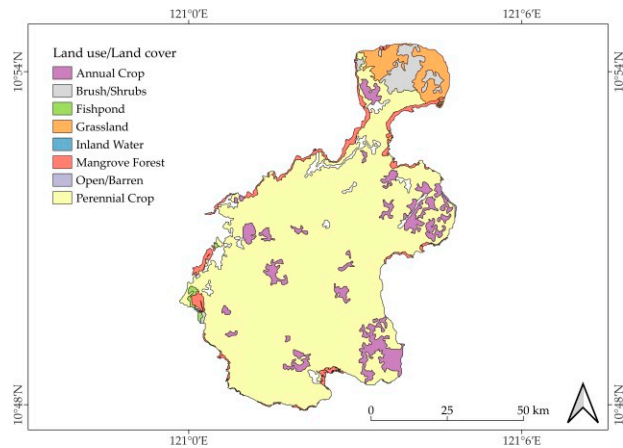
(g)



(h)

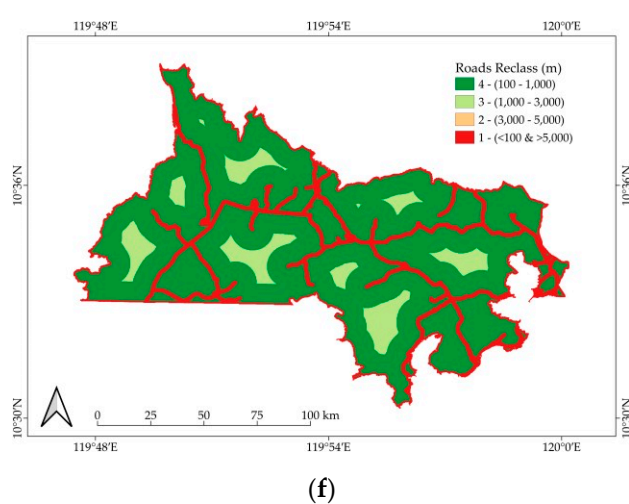
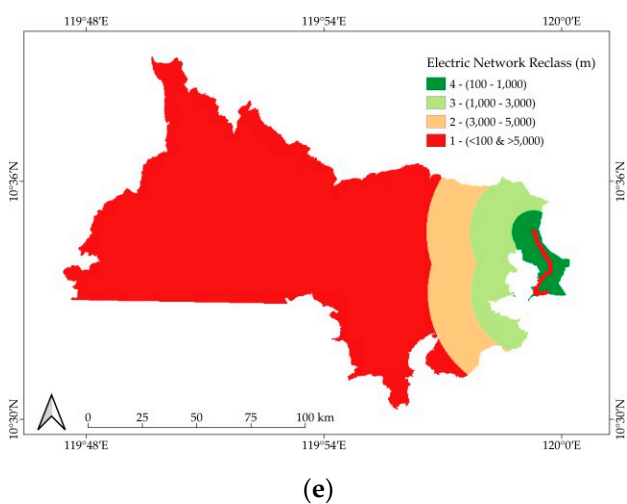
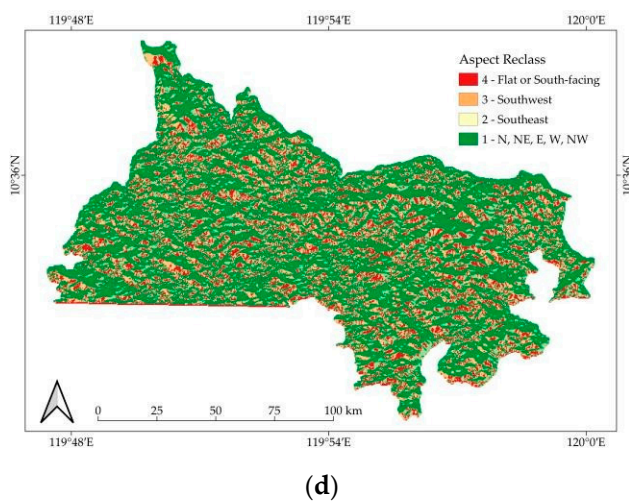
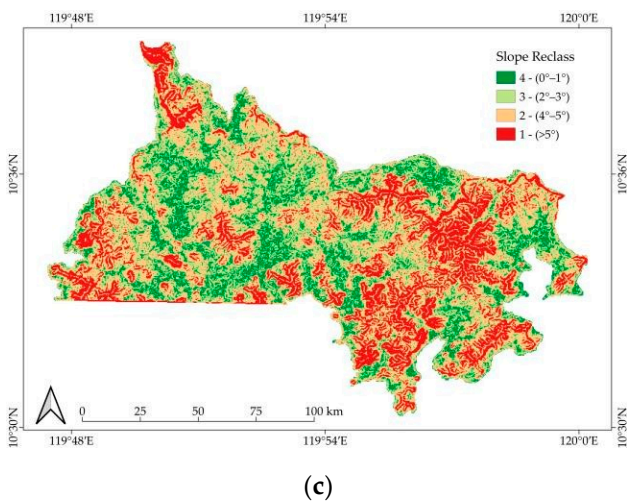
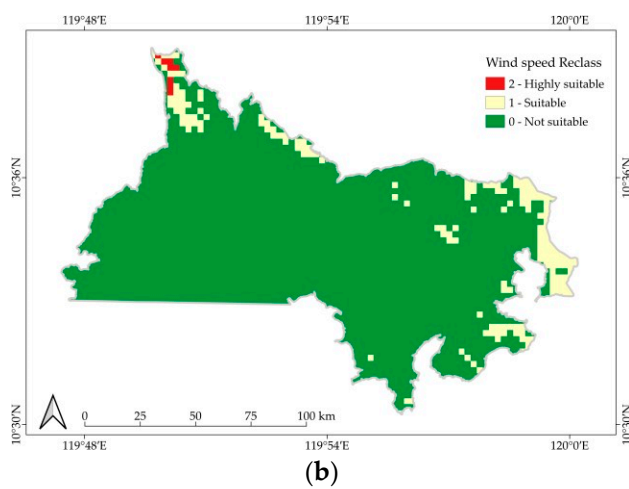
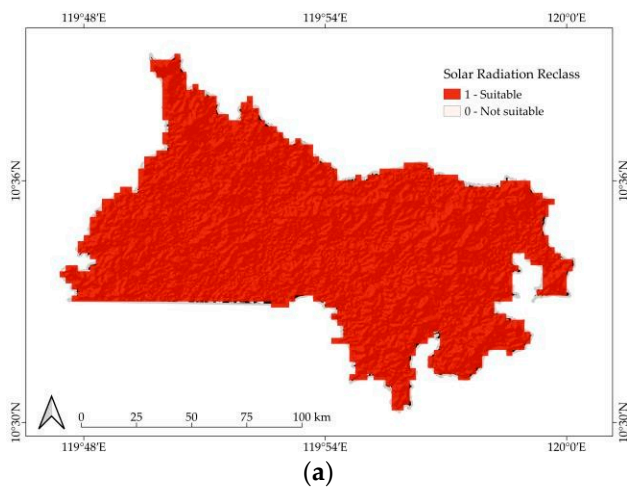


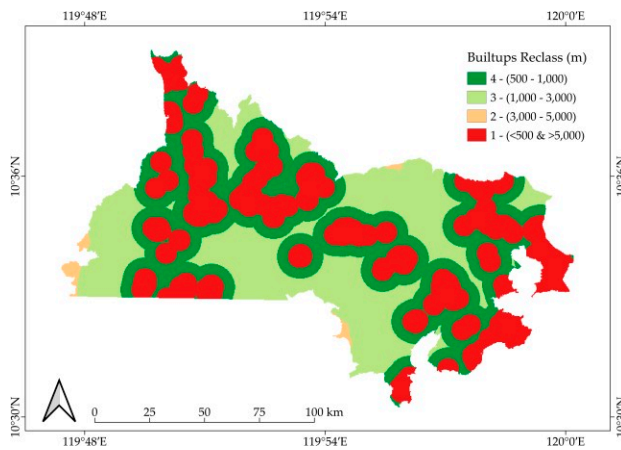
(i)



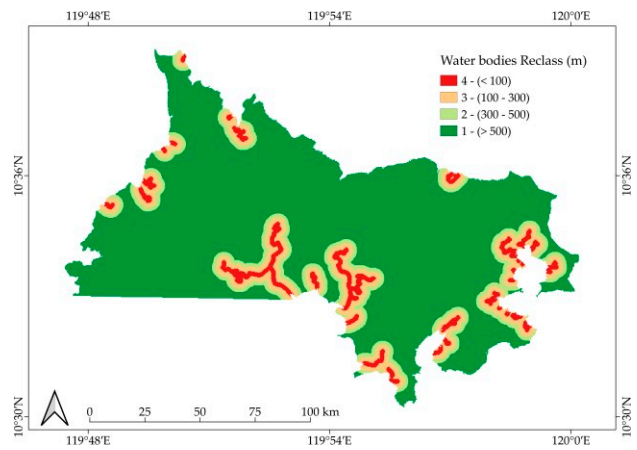
(j)

**Figure S3.** Cuyo: a) DEM; b) GHI; c) wind speed; d) slope; e) aspect; f) electric network; g) roads; h) built-ups; i) water bodies; j) land use/land cover.

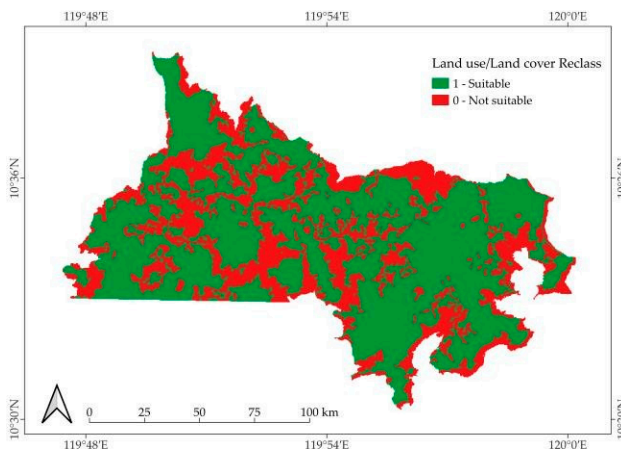




(g)

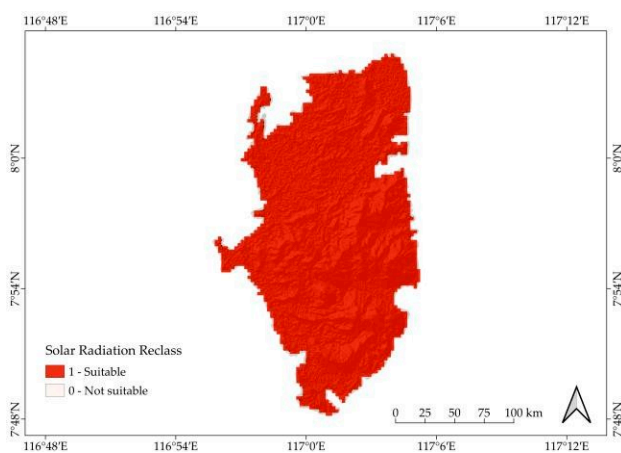


(h)

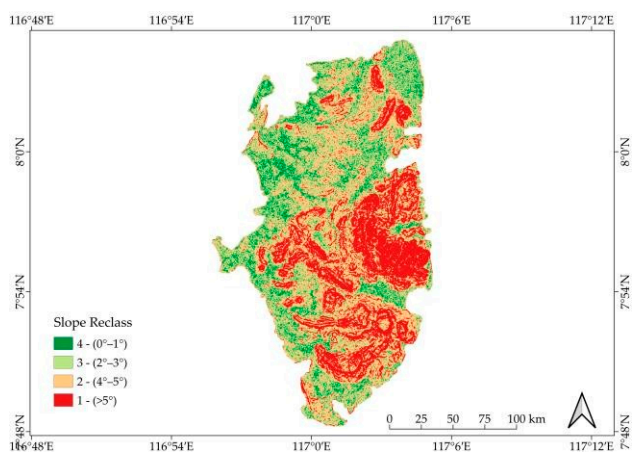


(i)

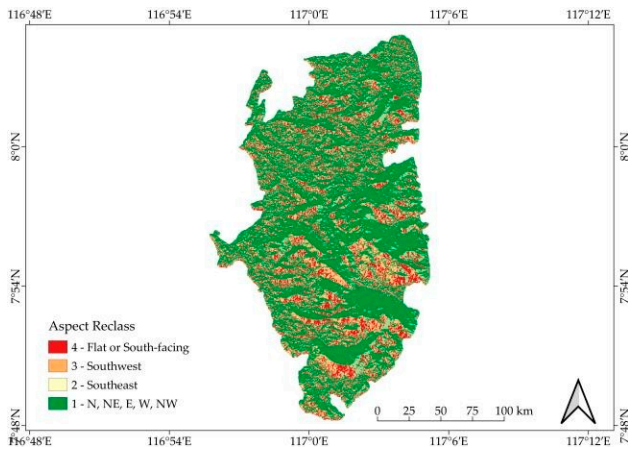
**Figure S4.** GIS reclassification maps. Reclassification of datasets in Araceli: a) GHI; b) wind speed; c) slope; d) aspect; e) electric network; f) roads; g) builtups; h) water bodies; and i) land use/land cover.



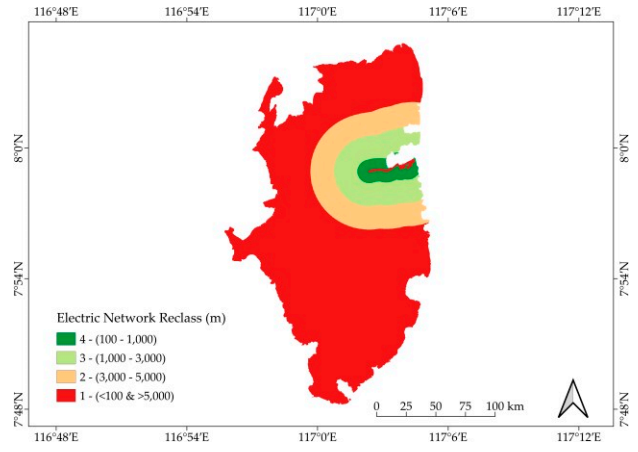
(a)



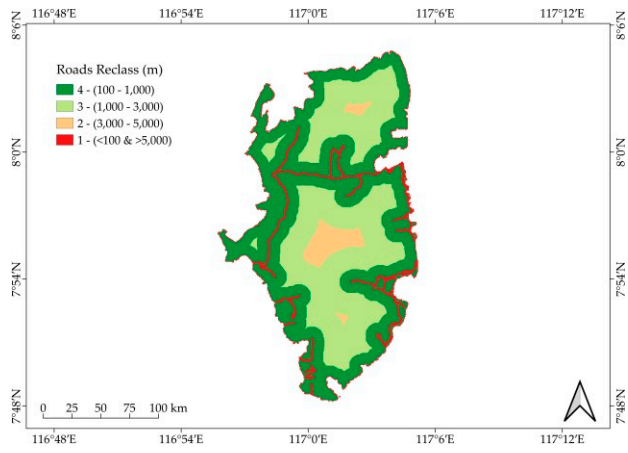
(b)



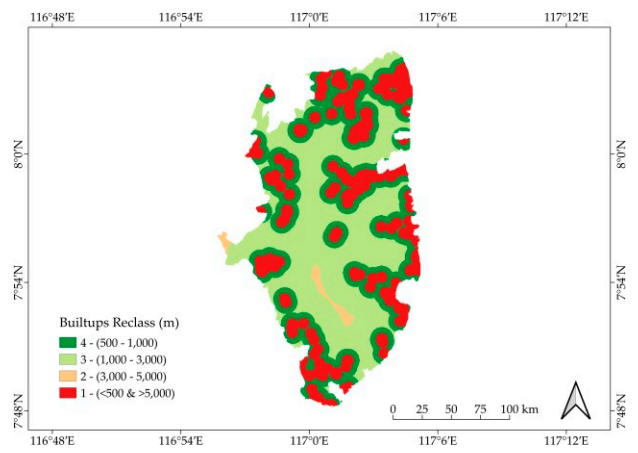
(c)



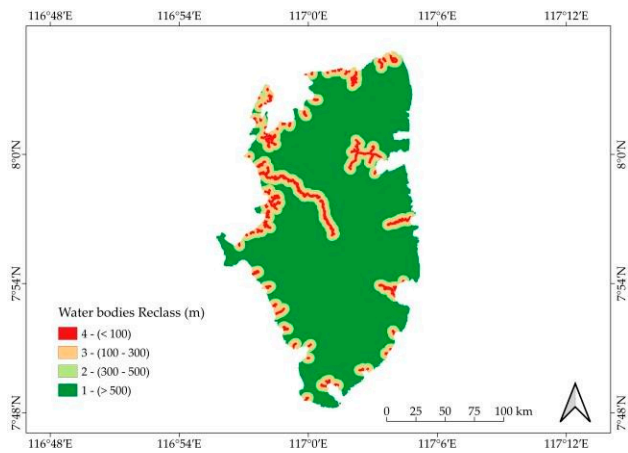
(d)



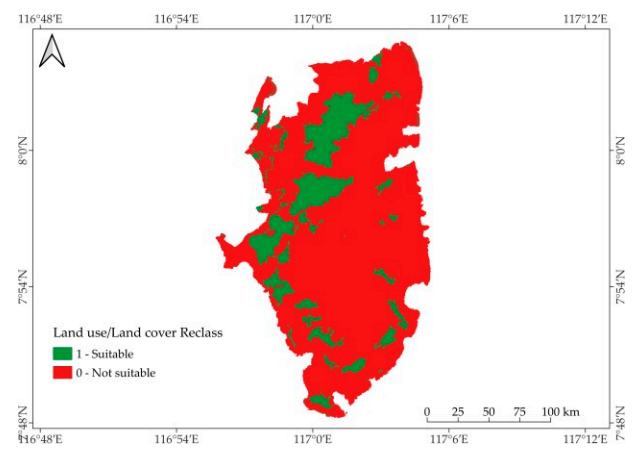
(e)



(f)



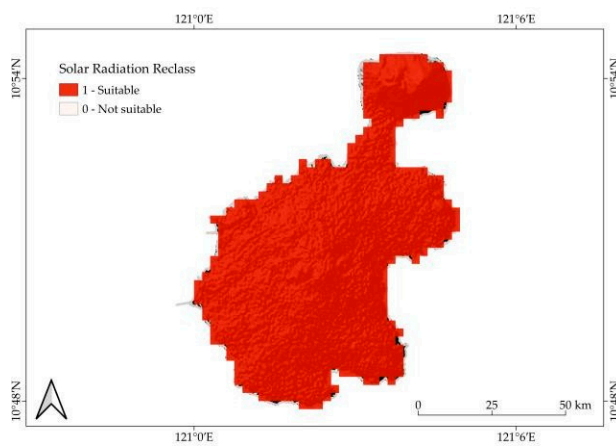
(g)



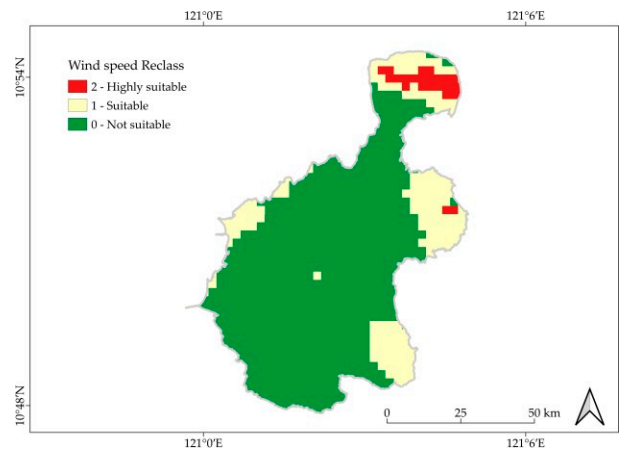
(h)

**Figure S5.** Reclassification of datasets in Balabac: a) GHI; b) slope; c) aspect; d) electric network; e) roads; f) built ups; g) water bodies, and h) land use/land cover.

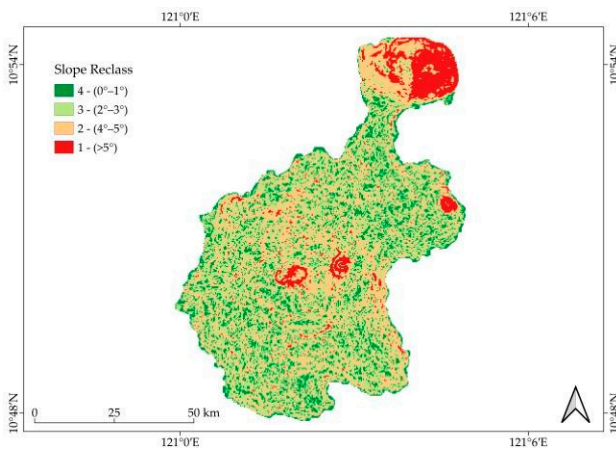




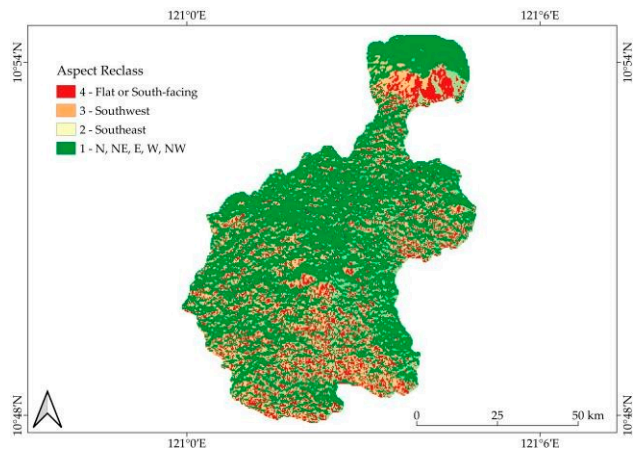
(a)



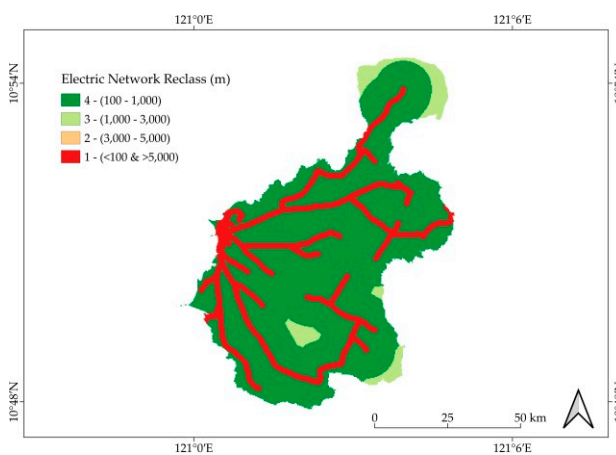
(b)



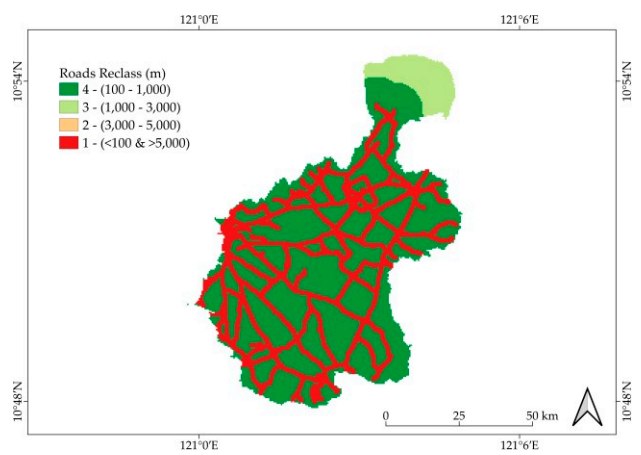
(c)



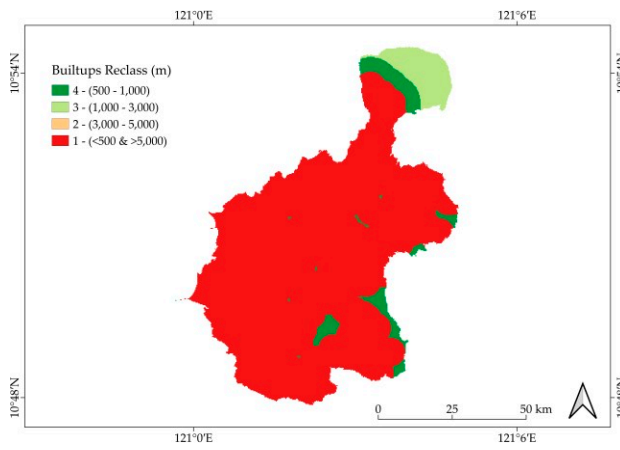
(d)



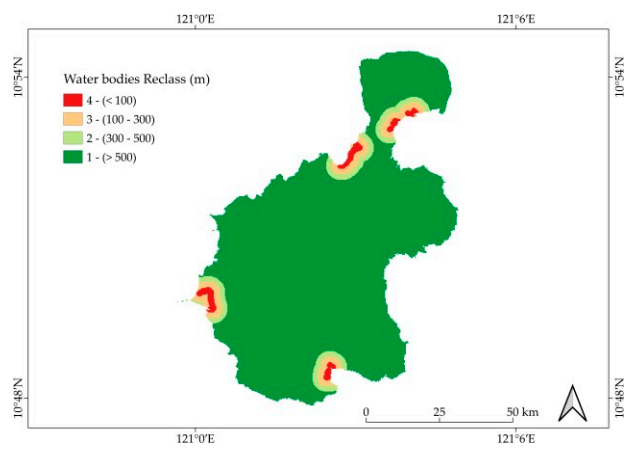
(e)



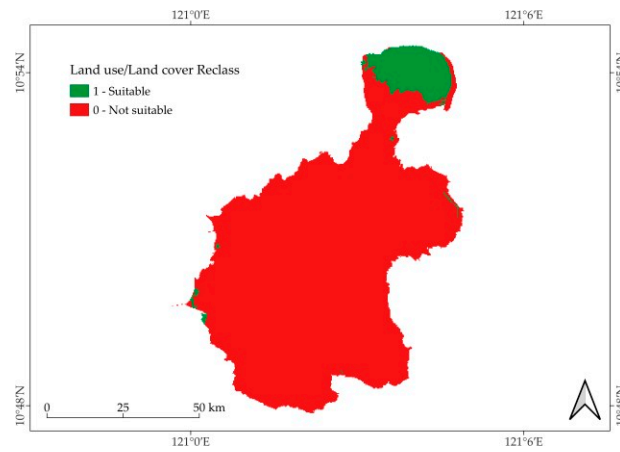
(f)



(g)



(h)



(i)

**Figure S6.** Reclassification of datasets in Cuyo: a) GHI; b) wind speed; c) slope; d) aspect; e) electric network; f) roads; g) builtups; h) water bodies; and i) land use/land cover.