

Supplementary Files: Table S1: Accuracy Assessment of LULC Maps for the Years 2007, 2008, 2010, 2015, and 2018.

Table S1. Accuracy Assessment of LULC Maps for the years 2007, 2008, 2010, 2015, and 2018.

Year	2007		2008		2010		2015		2018	
LULC Classes	UA (%)	PA (%)	UA (%)	PA (%)	UA (%)	PA (%)	UA (%)	PA (%)	UA (%)	PA (%)
BU	86%	99%	88%	93%	65%	92%	85%	95%	95%	98%
F	100%	99%	99%	96%	92%	99%	99%	100%	99%	100%
AG	87%	99%	80%	96%	100%	98%	90%	100%	99%	100%
RA	99%	68%	100%	97%	80%	38%	96%	89%	100%	98%
WB	100%	97%	100%	97%	100%	97%	100%	98%	100%	98%
BL	90%	97%	93%	96%	73%	75%	76%	63%	86%	92%
Overall Accuracy	97%		96%		86%		95%		97%	
Kappa Coefficient	0.96		0.95		0.83		0.94		0.96	

Note: BU—Built-Up area; F—Forest area; AG—Agricultural area; RA—Reconstructed area; WB—Water bodies; and BL—Barren Land; **Source:** Image accuracy assessment results retrieved from ENVI 5.3 software based on LULC images from 2007–2018.

Table-S2: Temporal distribution of LULC from 2007–2018.

Table S2: Temporal distribution of LULC from 2007–2018.

LULC Classes	2007		2008		2010		2015		2018	
	Area (km ²)	(%)	Area (km ²)	(%)	Area (km ²)	(%)	Area (km ²)	(%)	Area (km ²)	(%)
BU	40.54	12.74	37.41	11.75	53.23	16.72	58.84	18.49	59.13	18.58
F	125.71	39.49	174.73	54.90	148.63	46.70	130.45	40.98	139.25	43.75
AG	63.01	19.80	47.22	14.83	57.12	17.95	50.08	15.73	30.66	9.63
RA	2.01	0.63	3.36	1.06	8.32	2.61	10.83	3.40	16.29	5.12
WB	17.60	5.53	18.17	5.71	13.54	4.25	15.65	4.92	17.14	5.38
BL	69.43	21.81	37.41	11.75	37.46	11.77	52.45	16.48	55.83	17.54
Total	318.30	100.00	318.30	100.00	318.30	100.00	318.30	100.00	318.30	100.00

Note: BU—Built-Up area; FL—Forest area; AG—Agricultural area; RA—Reconstructed area; WB—Water bodies; and BL—Barren Land. **Source:** Image statistical results retrieve from ENVI 5.3 and ArcGIS 10.5 software based on LULC images from 2007–2018.

Table S-3. LULC change transition matrix from 2007–2018: Area (km²) and rate of change per year.

	LULC Classes	2018 Image						Row Total (2007)
		BU	F	AG	RA	WB	BL	
2007 Image	BU	23.70	1.36	14.24	0.87	0.70	2.49	43.36
	F	189.33	113.72	19.67	0.24	0.06	3.02	326.04
	AG	0.51	0.10	8.97	0.10	0.00	21.45	31.14
	RA	7.69	5.97	11.01	1.77	1.92	2.76	31.12
	WB	2.06	0.01	0.46	0.00	13.24	0.00	15.77
	BL	4.76	2.89	35.19	0.52	0.01	13.98	57.36
	Column Total (2018)	228.05	124.05	89.54	3.50	15.93	43.70	0
	Class Changes	204.35	10.33	80.57	1.73	2.69	29.72	0
	Image Difference	184.69	-201.99	58.40	-27.62	0.16	-13.66	0
	Rate of Change/year	18.58	0.94	7.32	0.16	0.24	2.70	

Table S4. LULC change transition matrix: 2008–2018: Area (km²) and rate of change per year.

	LULC Classes	2018 Image						Row Total (2008)
		BU	F	AG	RA	WB	BL	
2008 Image	BU	28.70	0.35	8.07	0.94	0.97	4.34	43.36
	F	222.66	67.65	25.78	0.12	0.72	9.11	326.04
	AG	1.90	0.18	10.21	0.11	0.01	18.73	31.14
	RA	10.35	2.85	5.48	1.87	2.43	8.14	31.12
	WB	0.72	0.00	0.48	0.00	14.44	0.13	15.77
	BL	6.99	1.87	29.44	0.89	0.02	17.97	57.18
	Column Total (2018)	271.32	72.90	79.46	3.93	18.59	58.42	0
	Class Changes	242.62	5.26	69.25	2.06	4.15	40.45	0
	Image Difference	227.96	-253.13	48.32	-27.19	2.82	1.24	0
	Rate of Change/year	24.26	0.53	6.92	0.21	0.41	4.04	

Table S5. LULC change transition matrix: 2010–2018: Area (km²) and rate of change per year.

	LULC Classes	2018 Image						Row Total (2010)
		BU	F	AG	RA	WB	BL	
2010 Image	BU	30.76	4.25	0.97	2.70	0.48	4.20	43.36
	F	0.81	127.48	7.09	186.94	0.32	3.41	326.05
	AG	0.70	0.63	26.70	0.29	0.00	2.81	31.13
	RA	11.12	7.27	1.57	3.53	0.24	7.38	31.11
	WB	2.51	0.46	0.02	0.07	12.50	0.22	15.77
	BL	7.32	8.54	20.76	1.87	0.00	18.86	57.35
	Column Total (2018)	53.22	148.63	57.11	195.40	13.54	36.88	0
	Class Changes	22.46	21.15	30.41	191.87	1.04	18.02	0
	Image Difference	9.86	-177.42	25.98	164.29	-2.23	-20.47	0
	Rate of Change/year	2.81	2.64	3.80	23.98	0.13	2.25	

Table S6. LULC change transition matrix: 2015–2018: Area (km²) and rate of change per year.

2015 Image	2018 Image						
	LULC Classes	BU	F	AG	RA	WB	BL
							Row Total (2015)
	BU	28.79	0.30	0.07	3.41	0.19	2.02
	F	1.81	120.93	0.21	5.97	0.02	3.46
	AG	0.75	4.22	28.27	1.58	0.00	16.87
	RA	2.76	0.00	0.19	6.88	0.21	1.56
	WB	0.46	186.63	0.00	0.60	13.13	0.01
	BL	8.79	13.96	2.40	14.58	2.22	33.44
	Column Total (2018)	43.36	326.04	31.14	33.02	15.77	57.36
	Class Changes	14.57	205.11	2.87	26.14	2.64	23.92
	Image Difference	8.58	193.64	-20.55	21.42	-185.06	-18.03
	Rate of Change/year	4.86	68.37	0.96	8.71	0.88	7.97

Note: BU—Built-Up area; F—Forest area; AG—Agricultural area; RA—Reconstruction area; WB—Water bodies; BL—Barren Land.

Supplementary files: Table S7 (a–h): Multiple Parameter-Based Risk Weight Calculation

Table S7a: Important places: risk category.

Important Places	Risk Category	Risk Weight
Yingxiuzhen	Very High Risk	5
Dabeiping	Very High Risk	5
Zipingpuzhen	Very High Risk	5
Dujiangyan	High Risk	4
Xujiashen	Medium Risk	3
Juyuanzhen	Low Risk	2
Zhongxingzhen	Low Risk	2
Puyangzhen	Medium Risk	3

Table S7b: Important places: buffer distance-based risk weight calculation.

Buffer Distance (km)	Risk Category	Buffer Risk Weight
5	Very High Risk	5
10	High Risk	4
15	Medium Risk	3
20	Low Risk	2
25	Very Low Risk	1

Table S7c: Geology-based risk weight calculation.

Gen_Geology	Zone	Risk_Geology_Weight
Q	Zone-IV	4
JTr	Zone-I	5
J	Zone-II	5
K	Zone-III	2

Table S7d: Masked_Vector_2018LULC_risk weight calculation.

SL. No.	Landuse Category	LULC_Risk_Geology_Weight
1	Built Up Land	5
2	Forest Land	4
3	Agricultural Land	2
4	Reconstruction Land	5
5	Water Bodies	3
6	Barren Land	1

Table S7e: Lineament density – 2018 (km/km²)_risk weight calculation.

Lineament Density (km/km ²)	Density Category	Density_Risk_Weight
0-1.56	Very Low Density	1
1.56-2.72	Low Density	2
2.72-3.76	Medium Density	3
3.76-4.89	High Density	4
4.89-8.27	Very High Density	5

Table S7f: Earthquake_Epicenter_Buffer_risk weight calculation.

Epicenter_Buffer Distance (km)	Risk Category	Buffer Risk Weight
5	Very High Risk	5
10	High Risk	4
15	Medium Risk	3
20	Low Risk	2
25	Very Low Risk	1

Table S7g: Fault_Buffer_risk weight calculation.

Fault Line_Buffer Distance (km)	Fault_Risk Category	Buffer Risk Weight
5	Very High Risk	5
10	High Risk	4
15	Medium Risk	3
20	Low Risk	2
25	Very Low Risk	1

Table S7h: LULC_risk category and weight calculation based on individual risk factor.

LULC_Category	Total_Weight_ClassRange	Risk Category
BL	1-5	Very Low Risk
FL	6-9	Low Risk
WB	10-13	Medium Risk
BU+RA	14-17	High Risk
AG	18-22	Very High Risk

Supplementary files: Figure S1 (a-f): Individual Risk Map Preparation

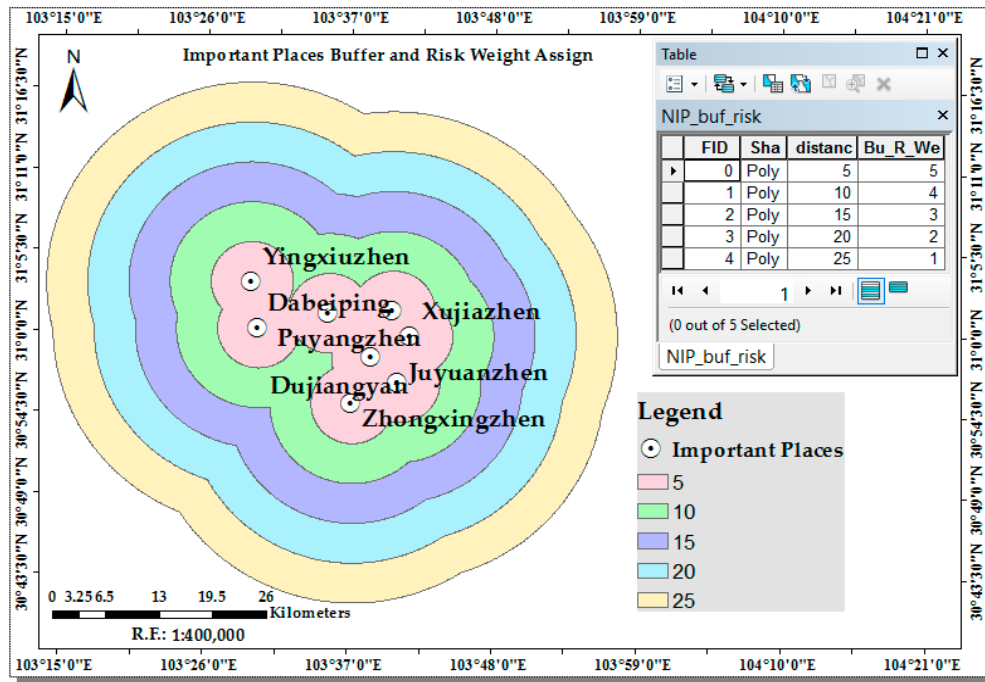


Figure S1a: Important places buffer distance map and risk weight assignment.

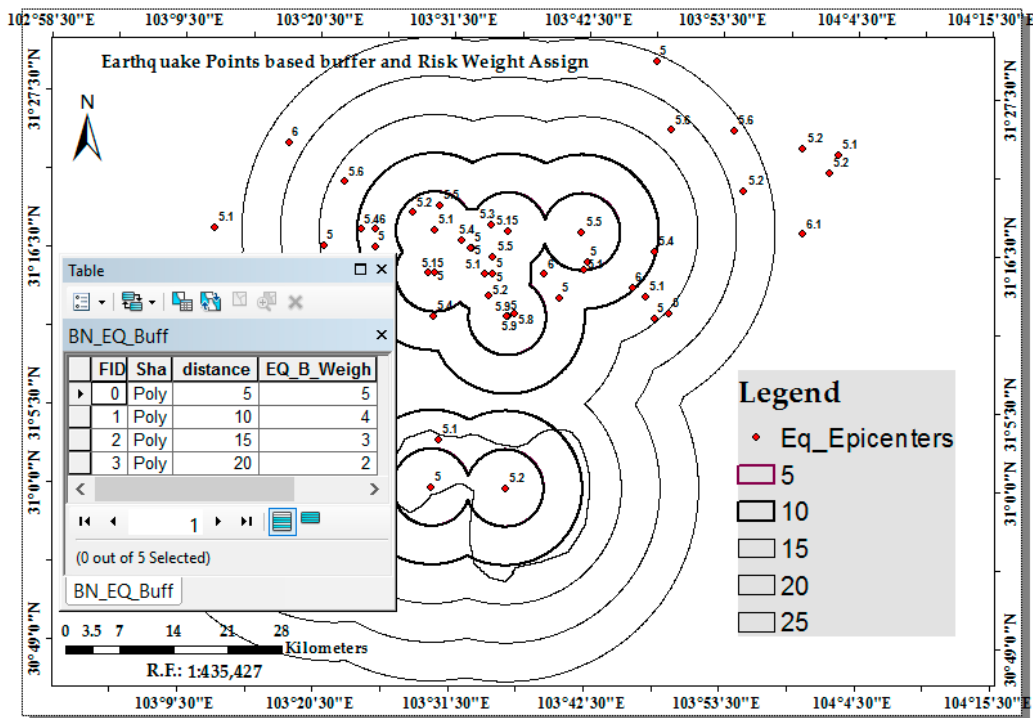


Figure S1b: Earthquake points-based buffer distance map and risk weight assignment.

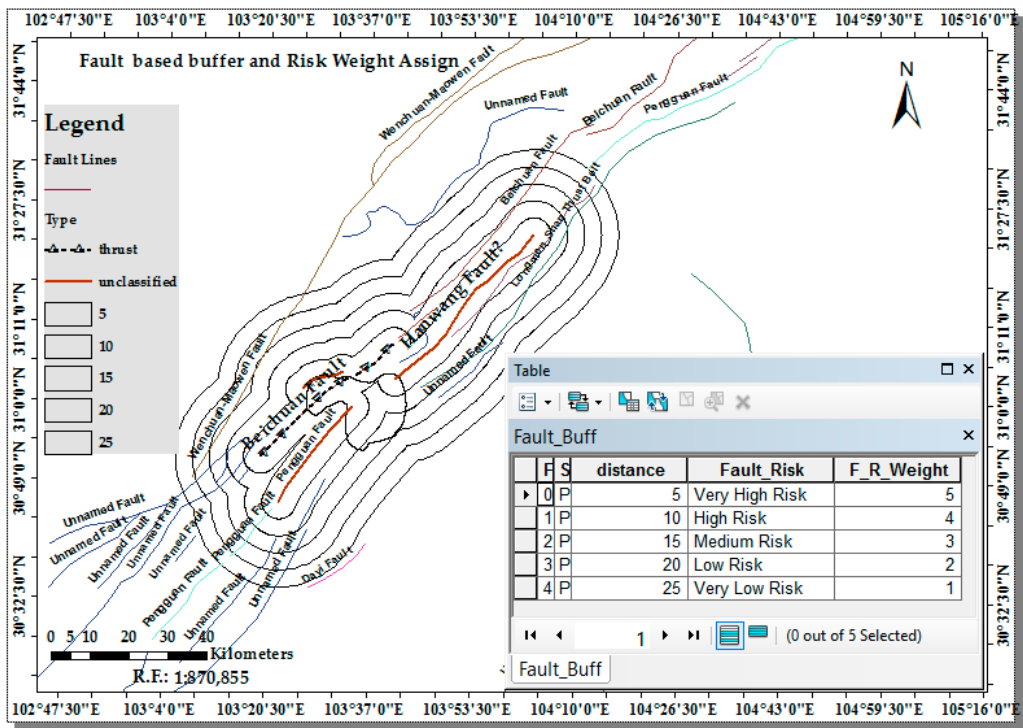


Figure S1c: Fault-based buffer distance map and risk weight assignment.

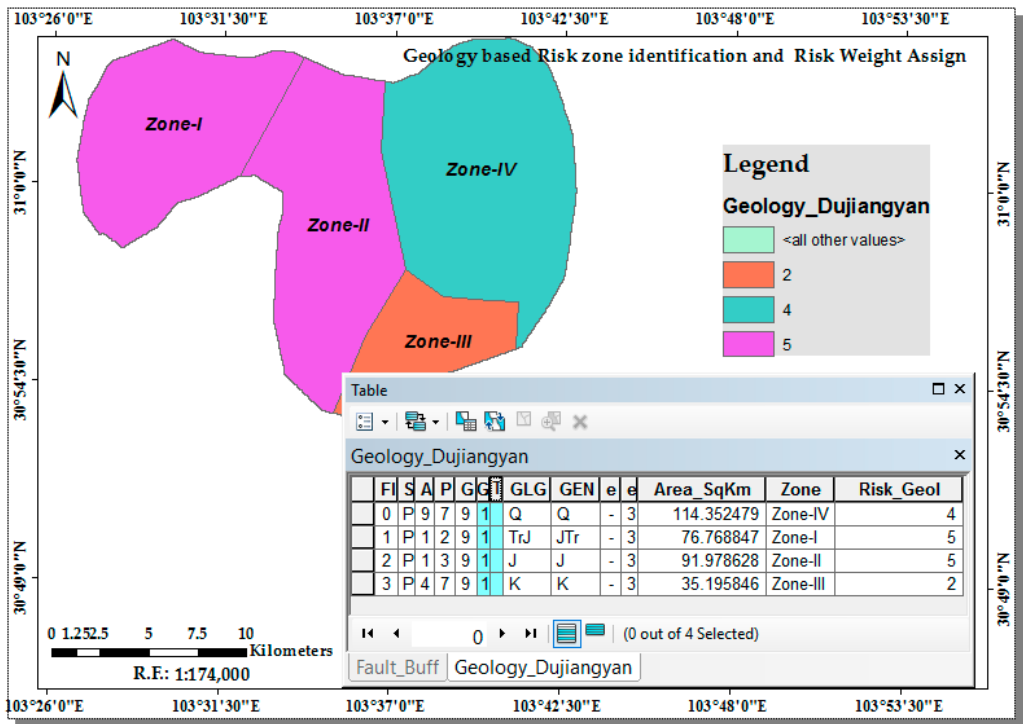


Figure S1d: Geology-based zone risk map and risk weight assignment.

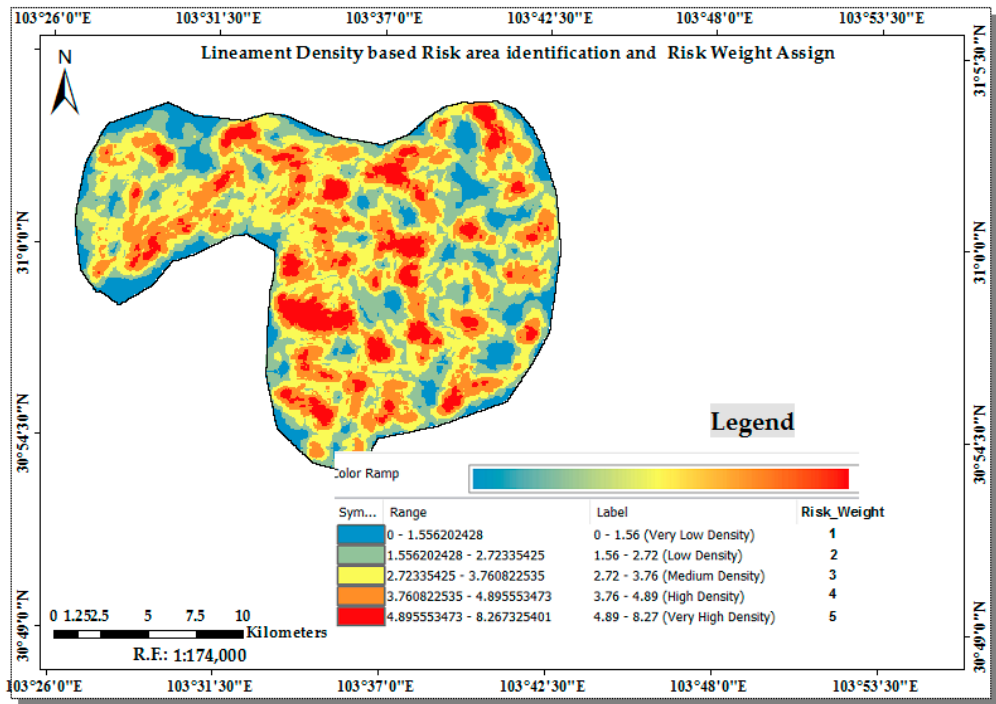


Figure S1e: Lineament density-based category map and risk weight assignment.

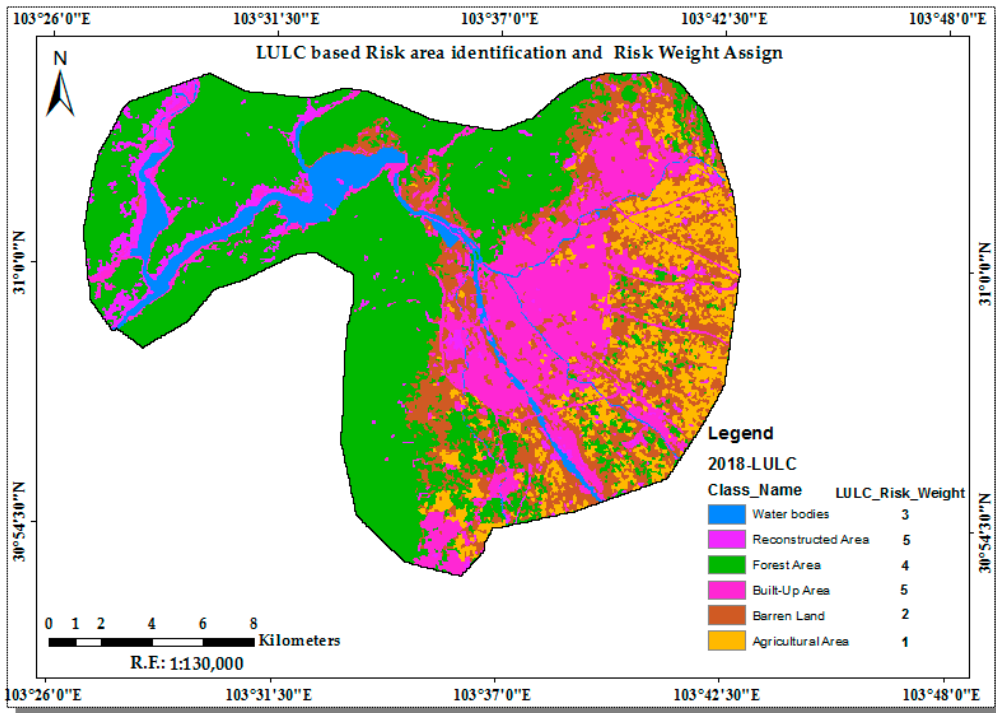


Figure S1f: LULC category map and risk weight assignment.