



Figure S1. Gully erosion conditioning factors of the study catchment tributary to the Inda Shawit River: a) Elevation, b) Slope, c) Slope aspect, d) Slope length and steepness factor (LS), e) Geomorphons, f) Convergence Index (CI), g) Topographic Wetness Index (TWI), h) Drainage density, i) Stream Power Index (SPI), j) Distance to residential areas, k) Distance to pathways, l) Distance to river, m) Land use land cover (LULC), n) Normalized Difference Vegetation Index (NDVI), o) Soil types, p) Bedrock.

Table S1. Spatial coverage and distribution of gully heads among all conditioning factors.

Conditioning Factors	Class	Area coverage	Gully heads	Share of Gully heads
Elevation	< 1463	60 %	62	11 %
	1463 - 1575	19 %	208	38 %

Conditioning Factors	Class	Area coverage	Gully heads	Share of Gully heads
	> 1575	21 %	275	51 %
Slope degree	< 5	49 %	44	8 %
	5 - 10	10 %	34	6 %
	10 - 15	10 %	50	9 %
	15 - 20	10 %	90	17 %
	20 - 25	10 %	128	23 %
	25 - 30	6 %	98	18 %
	30 - 35	3 %	72	13 %
	> 35	1 %	29	5 %
Slope aspect	Flat	1 %	0	0 %
	North	8 %	41	8 %
	Northeast	4 %	26	5 %
	East	2 %	18	3 %
	Southeast	4 %	12	2 %
	South	12 %	57	10 %
	Southwest	26 %	143	26 %
	West	26 %	217	40 %
Slope length and steepness (LS)	Northwest	15 %	31	6 %
	< 15	27 %	140	26 %
	15 - 35	16 %	99	18 %
	35 - 55	16 %	74	14 %
	55 - 75	16 %	112	21 %
Curvature / landforms	> 75	25 %	120	22 %
	Flat	2 %	0	0 %
	Summit	1 %	0	0 %
	Ridge	12 %	36	7 %
	Shoulder	6 %	2	0 %
	Spur	16 %	141	26 %
	Slope	33 %	218	40 %
	Hollow	14 %	98	18 %
	Footslope	4 %	1	0 %
	Valley	13 %	48	9 %
Convergence Index (CI)	Depression	1 %	1	0 %
	< (-35)	10 %	34	6 %
	-35 - (-15)	19 %	81	15 %
	-15 - 0	%	138	25 %
	0 - 20	27 %	212	39 %
	20 - 40	15 %	68	12 %
Land use land cover (LULC)	> 40	7 %	12	2 %
	Uncultivated land	34 %	349	64 %
	Residential	3 %	2	0 %
	Erosion Protection terraces	11 %	135	25 %
	Cropland	42 %	37	7 %
	Mixed Cropland and Plantation	6 %	0	0 %
Normalized Difference Vegetation Index (NDVI)	Badlands	4 %	22	4 %
	Water bodies	0 %	0	0 %
	Wetlands	0 %	0	0 %
	Bare soil	0 %	0	0 %
	Light green leavy vegetation	1 %	0	0 %

Conditioning Factors	Class	Area coverage	Gully heads	Share of Gully heads
	Medium green leavy vegetation	70 %	528	97 %
	Dense green leavy vegetation	29 %	17	3 %
Bedrock	Granitoid	32 %	28	5 %
	Quartzite, Phyllite, graphitic Schist	68 %	517	95 %
Soil type	Eutric leptosol	6 %	103	19 %
	Eutric cambisol	93 %	442	81 %
	Lithic leptosol	1 %	0	0 %
Drainage Density	< 0.68	41 %	12	2 %
	0.68 - 1.96	32 %	107	20 %
	1.96 - 3.59	20 %	233	43 %
	> 3.59	8 %	193	35 %
Distance to river	< 510	27 %	13	2 %
	510 - 1140	21 %	27	5 %
	1140 - 1770	19 %	101	19 %
	1770 - 2430	17 %	218	40 %
	> 2430	16 %	187	34 %
Stream Power Index (SPI)	< -374 k	0 %	1	0 %
	-374 k - (-100.5 k)	0 %	1	0 %
	-100.5 k - (-26.5 k)	0 %	1	0 %
	-26.5 k - 1.25 k	93 %	528	97 %
	1.25 k - 13.6 k	5 %	14	3 %
	13.6 k - 38.3 k	1 %	0	0 %
	38.3 k - 72.2 k	0 %	0	0 %
	> 72.2 k	0 %	0	0 %
Topographic Wetness Index (TWI)	< 5.5	29 %	366	67 %
	5.5 - 8.5	53 %	156	29 %
	8.5 - 11	12 %	17	3 %
	11 - 13.5	5 %	6	1 %
	> 13.5	1 %	0	0 %
Distance to pathways	< 5	11 %	112	21 %
	5 - 10	6 %	39	7 %
	10 - 15	6 %	33	6 %
	15 - 20	5 %	22	4 %
	20 - 25	6 %	39	7 %
	25 - 50	20 %	116	21 %
	50 - 100	22 %	123	23 %
	100 - 200	15 %	56	10 %
	> 200	9 %	6	1 %
Distance to residential areas	< 5	3 %	2	0 %
	5 - 10	1 %	0	0 %
	10 - 15	1 %	1	0 %
	15 - 20	1 %	1	0 %
	20 - 25	2 %	4	1 %
	25 - 50	8 %	28	5 %
	50 - 100	16 %	124	23 %
	100 - 200	24 %	214	39 %
	> 200	44 %	172	32 %

Table S2. Distribution of gully heads among all differences between Models B and C. I) Areas not susceptible in both models, II) Areas not susceptible in Model C but B, III) Areas classified moderate in Model B or will classify moderate in Model C, IV) Areas not susceptible in Model B but in C and V) Areas susceptible in both models.

Conditioning Factors	Class	I	II	III	IV	V	Σ
Elevation	< 1463	30	21	2	9	0	62
	1463 - 1575	11	79	4	51	63	208
	> 1575	8	56	1	91	120	276
Slope degree	< 5	28	11	1	4	0	44
	5 - 10	5	15	0	11	3	34
	10 - 15	5	16	1	14	14	50
	15 - 20	5	24	0	25	37	91
	20 - 25	3	29	3	38	55	128
	25 - 30	1	26	1	43	27	98
	30 - 35	2	20	0	10	40	72
	> 35	0	15	1	6	7	29
Slope aspect	flat	0	0	0	0	0	0
	North	4	4	1	5	27	41
	Northeast	2	6	0	5	13	26
	East	1	4	0	9	4	18
	Southeast	2	6	0	4	0	12
	South	4	17	1	18	17	57
	Southwest	12	38	2	24	67	143
	West	22	70	1	78	47	218
Slope length and steepness (LS)	Northwest	2	11	2	8	8	31
	< 15	13	29	1	51	47	141
	15 - 35	11	32	1	30	25	99
	35 - 55	6	17	3	28	20	74
	55 - 75	6	33	0	25	48	112
Curvature / land-forms	> 75	13	45	2	17	43	120
	Flat	0	0	0	0	0	1
	Summit	0	0	0	0	0	0
	Ridge	8	6	1	14	8	37
	Shoulder	0	2	0	0	0	2
	Spur	10	51	1	43	36	141
	Slope	11	54	4	60	89	218
	Hollow	10	28	1	30	29	98
	Footslope	1	0	0	0	0	1
	Valley	9	15	0	4	20	48
	Depression	0	0	0	0	1	1
Convergence Index (CI)	< (-35)	5	15	0	3	11	34
	-35 - (-15)	10	15	1	21	34	81
	-15 - 0	9	38	3	23	65	138
	0 - 20	17	63	2	77	54	213
	20 - 40	5	24	1	19	19	68
	> 40	3	1	0	8	0	12
Land use land cover (LULC)	Uncultivated land	7	80	0	119	144	350
	Residential	0	0	2	0	0	2
	Erosion protection terraces	6	53	5	32	39	135
	Cropland	22	15	0	0	0	37
	Mixed cropland and plantation	0	0	0	0	0	0
	Badlands	14	8	0	0	0	22
Normalized Difference Vegetation Index (NDVI)	Water bodies	0	0	0	0	0	0
	Wetlands	0	0	0	0	0	0
	Bare soil	0	0	0	0	0	0
	Light green leavy vegetation	0	0	0	0	0	0
	Medium green leavy vegetation	41	150	6	151	181	529
	Dense green leavy vegetation	8	6	1	0	2	17
Bedrock	Granitoid	16	9	1	2	0	28
	Quartzite, phyllite, graphitic Schist	33	147	6	149	183	518
Soil type	Eutric leptosol	0	0	0	0	0	0
	Eutric cambisol	2	40	0	21	41	104
	Lithic leptosol	47	116	7	130	142	442
Drainage density	< 0.68	6	0	2	4	0	12
	0.68 - 1.96	38	4	4	62	0	108

Conditioning Factors	Class	I	II	III	IV	V	Σ
Distance to river	1.96 - 3.59	5	78	1	54	95	233
	> 3.59	0	74	0	31	88	193
	< 510	9	1	1	2	0	13
	510 - 1140	15	11	0	1	0	27
	1140 - 1770	11	35	3	35	17	101
	1770 - 2430	9	53	2	61	93	218
	> 2430	5	56	1	52	73	187
Stream Power Index (SPI)	< -374 k	0	1	0	0	0	1
	-374 k - (-100.5 k)	0	0	0	0	1	1
	-100.5 k - (-26.5 k)	0	1	0	0	0	1
	-26.5 k - 1.25 k	47	152	7	144	179	529
	1.25 k - 13.6 k	2	2	0	7	3	14
	13.6 k - 38.3 k	0	0	0	0	0	0
	38.3 k - 72.2 k	0	0	0	0	0	0
	> 72.2 k	0	0	0	0	0	0
Topographic Wetness Index (TWI)	< 5.5	12	110	5	105	135	367
	5.5 - 8.5	27	37	2	46	44	156
	8.5 - 11	7	7	0	0	3	17
	11 - 13.5	3	2	0	0	1	6
	> 13.5	0	0	0	0	0	0
Distance to pathways	< 5	11	31	2	36	32	112
	5 - 10	1	17	1	10	10	39
	10 - 15	1	10	1	8	13	33
	15 - 20	2	2	1	10	7	22
	20 - 25	4	8	1	10	16	39
	25 - 50	6	23	0	39	48	116
	50 - 100	18	34	0	30	41	123
	100 - 200	6	26	0	8	16	56
	> 200	0	5	1	0	0	6
Distance to residential areas	< 5	0	0	2	0	0	2
	5 - 10	0	0	0	0	0	0
	10 - 15	0	1	0	0	0	1
	15 - 20	1	0	0	0	0	1
	20 - 25	1	0	0	3	0	4
	25 - 50	2	0	2	18	6	28
	50 - 100	2	6	2	62	52	124
	100 - 200	12	9	0	68	125	214
	> 200	31	140	1	0	0	172

Table S3. Multicollinearity of gully erosion conditioning factors by measures of the variable inflation factor.

Conditioning Factors	Model A	Model B	Model C
Elevation	2.03	1.77	-
Slope degree	2.13	2.00	-
Slope aspect	1.08	1.07	-
Slope length and steepness (LS)	1.04	1.03	-
Curvature / landforms	2.66	2.63	-
Convergence Index (CI)	2.87	2.85	-
Normalized Difference Vegetation Index (NDVI)	1.18	1.16	-
Bedrock	1.70	1.66	-
Soil	1.37	1.34	-
Drainage density	1.41	1.24	-
Distance to river	1.09	1.09	-
Stream Power Index (SPI)	1.06	1.06	-
Topographic Wetness Index (TWI)	2.65	2.61	-
Land use land cover (LULC)	1.62	-	1.03
Distance to pathways	1.17	-	1.01
Distance to residential areas	1.17	-	1.04