



*Supplement of*

## **Review article: A systematic review and future prospects of flood vulnerability indices**

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Table S1 - List of the reviewed papers.

Nº	Author(s)	Year	Study area country	Spacial scale	Region classification	Number of indicators	Reduction of indicators	Temporal dynamics	Normalization method	Aggregation method	Weighting method	Uncertainty and sensitivity analysis	Validation
1	Abbas and Routray	2014	Sudan	Household	Urban and rural	20	None	Before	Categorical scale	Linear	Equal weighting	No	Yes
2	Abbas et al.	2018	Pakistan	Household	Rural	15	None	Both	Min-Max	Linear	PCA – weighted by factor scores	No	No
3	Abebe et al.	2018	Canada	Neighborhood	Urban	7	None	Before	Unspecified	Bayesian Belief Network (BBN)	Equal weighting	Yes (sensitivity)	Yes
4	Ahmad and Afzal	2019	Pakistan	Household	Both	36	None	Both	None (All indicators in the same unit)	Geometric	Equal weighting	No	No
5	Amadio, Mysiak and Marzi	2019	Italy	Neighborhood	Both	7	None	Before	None (All indicators in the same unit)	Non-compensatory aggregation	Equal weighting	Yes (fuzzy)	No
6	Andrade et al.	2018	Brazil	Neighborhood	Urban	11	None	Before	Categorical scale	Linear	Equal weighting	No	No
7	Antwi et al.	2015	Ghana	Neighborhood	Rural	22	None	Before	Ranking	Linear	None (selected by authors)	No	No
8	Armenakis et al.	2017	Canada	Neighborhood	Urban	15	None	Before	Distance from the group leader	Linear	None (selected by authors)	No	Yes
9	Aroca-Jimenez et al.	2017	Spain	Neighborhood	Urban	46	PCA	Before	Other (to porcentage or per capita)	Linear	PCA – weighted by factor scores	No	No
10	Aroca-Jimenez et al.	2018	Spain	Neighborhood	Urban	28	PCA	Before	Other (to porcentage or per capita)	Linear	PCA – weighted by factor scores	No	No
11	Baeck et al.	2014	South Korea	Group of cities	Urban and rural	16	None	Both	Z-score	Linear	PCA – weighted by factor scores	No	Yes

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12	Balica et al.	2009	Romania, Germany and Cambodia	Various	Urban	66	None	Before	Distance from the group leader	Geometric	Equal weighting	No	No
13	Barros et al.	2015	Brazil	Neighborhood	Urban	13	None	Before	Min-Max	Linear	Equal weighting	No	No
14	Beringer and Kaewsuk	2018	Tailand	Household	Urban	48	None	Before	Min-Max	Linear	Equal weighting	No	No
15	Bertilsson et al.	2019	Brazil	Neighborhood	Urban	5	None	Both	None (All indicators in the same unit)	Geometric	Equal weighting	No	No
16	Carlier et al.	2018	France	City	Rural	17	PCA	After	Ranking	Linear	PCA – weighted by factor scores	No	No
17	Chakraborty and Mukhopadhyay	2019	India	Neighborhood	Both	16	None	Before	Ranking	Linear	Analytical Hierarchy Process (AHP)	No	Yes
18	Chaliha et al.	2012	India	Household	Rural	37	None	Both	Min-Max	Linear	Public opinion	No	No
19	Chen and Chen	2012	China	City	Urban	20	None	Before	Min-Max	Linear	Analytical Hierarchy Process (AHP)	No	No
20	Chen and Leandro	2019	Germany	Neighborhood	Urban	7	None	Before	Unspecified	Linear	None (selected by authors)	Yes (sensitivity)	No
21	Daksiya et al.	2017	Indonesia	Neighborhood	Urban	7	None	Before	Min-Max	Linear	PROMETHEE-MCDA technique	No	No
22	Dandapat and Panda	2017	India	Neighborhood	Urban and rural	17	None	Before	Min-Max	Linear	Analytical Hierarchy Process (AHP)	No	No

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23	De Brito et al.	2018	Brazil	Neighborhood	Urban	11	Based of experts opinon (Delphi survey)	Before	Functions	Linear	Analytical Hierarchy Process (AHP) and Analytical Network Process (ANP)	No	Yes
24	Debortoli et al.	2017	Brazil	City	Urban and rural	11	None	Before	Unspecified	Linear	None (selected by authors)	No	Yes
25	Erena and Worku	2019	Ethiopia	Household	Urban	24	None	Before	Min-Max	Geometric	Unequal weighting method	No	No
26	Feizizadeh and Kienberger	2017	Austria	Neighborhood	Urban and rural	17	None	Before	Min-Max	Linear	Analytical Hierarchy Process (AHP)	Yes	No
27	Fekete	2009	Germany	Neighborhood	Urban and rural	41	PCA	Before	Ranking	Linear	Equal weighting	No	Yes
28	Fernandez et al.	2016	Portugal	Neighborhood	Urban	13	PCA	Before	Z-score	Linear	Equal weighted and PCA – weighted by factor scores	Yes (sensitivity)	No
29	Frolova et al.	2017	Russia	City	Urban and rural	10	None	Before	Distance from the group leader	Linear	Expert opinion	No	No
30	Fujiki and Renard	2018	France	Neighborhood	Urban	20	PCA	Before	Z-score	Linear	PCA – weighted by factor scores	No	No
31	Garbutt et al.	2015	England	Neighborhood	Urban and rural	53	None	Before	Binary standard	Linear	Equal weighting	No	No
32	Gerrard	2018	United Kingdom	Neighborhood	Rural	27	None	Before	Z-score	Linear	Unspecified	No	No

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33	Ghosh and Kar	2018	India	Neighborhood	Urban and rural	12	None	Before	Ranking	Linear	Analytical Hierarchy Process (AHP)	No	No
34	Grosso et al.	2015	Portugal	Neighborhood	Urban and rural	39	PCA	Before	Division by total	Linear	PCA – weighted by factor scores	No	No
35	Gu et al.	2018	China	Neighborhood	Urban	18	None	Before	Unspecified	Linear	PCA – weighted by factor scores	No	No
36	Guo et al.	2014	China	City	Urban	16	None	Before	Unspecified	Geometric	Analytical Hierarchy Process (AHP) and entropy weight method	Yes	No
37	Hernández-Uribe et al.	2017	Mexico	Neighborhood	Urban	23	None	Before	Distance from the group leader	Geometric	Equal weighting	No	No
38	Ibrahim et al.	2017	Malaysia	City	Rural	6	None	Before	Unspecified	Linear	None (selected by authors)	No	No
39	Jamshed et al.	2019	Pakistan	Household	Rural	43	None	Both	Division by total	Linear	None method (select by authors)	No	No
40	Jha and Gundimeda	2019	India	District	Both	26	Yes	Before	Min-Max	Linear	Unspecified	No	No
41	Jung et al.	2014	South Korea	City	Urban and rural	11	PCA	Before	Z-score	Linear	Delphi technique	No	No
42	Kablan et al.	2017	Ivory Coast	Neighborhood	Urban	13	None	Before	Min-Max	Linear	Unequal weighting method	No	No

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43	Kirby et al.	2019	Netherland	District	Both	25	Yes	Before	Min-Max	Linear	PCA – weighted by factor scores	No	No
44	Koks et al.	2015	Netherland	Neighborhood	Urban and rural	10	None	Before	Distance from the group leader	Linear	Equal weighting	No	No
45	Komi et al.	2016	Togo	City	Urban and rural	37	None	Before	Z-score	Linear	Analytical Hierarchy Process (AHP)	No	No
46	Kotzee and Reyers	2016	South Africa	City	Urban and rural	24	Pearson's correlation	Before	Min-Max	Linear	PCA – weighted by factor scores	No	No
47	Kubal et al.	2009	Germany	Neighborhood	Urban	16	None	Before	Binary standard	Linear	Hot Spot analysis	No	No
48	Lee and Choi	2018	South Korea	Neighborhood	Urban and rural	9	None	Before	Min-Max	Linear and geometric	Equal weighting	No	No
49	Lee and Choi	2019	South Korea	District	Both	6	None	Before	Min-Max	Linear and geometric	Equal weighting	No	No
50	Li et al.	2013	China	City	Urban	12	None	Before	Min-Max	Linear	Analytical Hierarchy Process (AHP)	No	No
51	Lianxiao and Morimoto	2019	Japan	Neighborhood	Urban	11	None	Before	Min-Max	Linear	Entropy method	No	No
52	Liu and Li	2016	China	Household	Rural	8	None	Before	Min-Max	Linear	PCA – weighted by factor scores	No	No
53	Liu et al.	2018	China	Household	Rural	12	None	Before	None (All indicators in the same unit)	Linear	Equal weighting	No	No

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54	Lotfata and Ambinakudige	2019	United States	Neighborhood	Both	15	None	Before	Ranking	Linear	Unspecified	No	No
55	Mavhura et al.	2017	Zimbabwe	Neighborhood	Rural	17	PCA	Before	Unspecified	Linear	Equal weighting	No	No
56	Miguez and Veról	2017	Brazil	Neighborhood	Urban	5	None	After	None (All indicators in the same unit)	Linear	Analytical Hierarchy Process (AHP)	No	No
57	Müller	2013	Chile	Neighborhood	Urban	12	None	Before	Distance from the group leader	Linear	Public opinion	No	No
58	Müller et al.	2011	Chile	Neighborhood	Urban	10	None	Before	Division by total	Linear	Public opinion	Yes (sensitivity)	No
59	Munyai, Musyoki and Nethengwe	2019	South Africa	Household	Rural	14	None	Before	Distance from the group leader	Geometric	Equal weighting	No	No
60	Mwale et al.	2015	Malawi	Neighborhood	Rural	37	None	Before	Unspecified	Linear	Public opinion	No	No
61	Nahiduzzaman et al.	2015	Saudi Arabia	Neighborhood	Urban	8	None	Before	Unspecified	Linear	Unspecified	No	No
62	Nasiri et al.	2019	Malaysia	District	Urban	25	None	Before	Unspecified	Linear	Analytical Hierarchy Process (AHP)	No	No
63	Nazeer and Bork	2019	Pakistan	District	Both	18	None	Before	Min-Max	Linear and geometric	Division by variance and PCA – weighted by factor scores	Yes	No
64	Nelson et al.	2015	United States	Neighborhood	Urban	38	PCA	Before	Z-score	Linear	PCA – weighted by factor scores	No	No
65	Nguyen and Nguyen	2019	Vietnamita	Neighborhood	Both	24	None	Before	Min-Max	Linear	Equal weighting	No	No

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66	Ni et al.	2010	China	Neighborhood	Urban and rural	9	None	Before	Min-Max	Linear	Unspecified	No	Yes
67	Okazawa et al.	2011	Global	State	Urban and rural	11	None	Both	Distance from the group leader	Linear	Division by Max	No	No
68	Papathomou-Köhle, Schlägl and Fuchs	2019	Austria	Household	Urban	27	Yes	Before	Z-score	Linear	Division by total	No	No
69	Peng	2018	Taiwan	Neighborhood	Urban and rural	19	None	Before	None (All indicators in the same unit)	Linear	Analytical Hierarchy Process (AHP) and Delphi technique	No	No
70	Quezada-Hofflinger et al.	2017	Peru	Neighborhood	Urban	20	PCA	Before	None (All indicators in the same unit)	Linear	PCA – weighted by factor scores	No	No
71	Rahman et al.	2016	Saudi Arabia	Neighborhood	Urban	8	None	Before	Distance from the group leader	Linear	Equal weighting	No	No
72	Rana and Routray	2018	Pakistan	Neighborhood	Urban	34	None	Before	None (All indicators in the same unit)	Linear	None (selected by authors)	No	No
73	Remo et al.	2015	United States	Various	Urban and rural	17	PCA	Before	Min-Max	Linear	PCA – weighted by factor scores	No	No
74	Reyes-Olvera and Gutiérrez-González	2016	Mexico	City	Urban and rural	10	None	Before	None (All indicators in the same unit)	Linear	PCA – weighted by factor scores	No	No
75	Rezende et al.	2019	Brazil	Neighborhood	Urban	9	None	Before	Categorical scale	Linear	None (selected by authors)	No	Yes

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76	Roder and Sofia	2017	Italy	Neighborhood	Urban and rural	16	PCA	Before	Z-score	Linear	PCA – equal weighting	No	No
77	Rogelis et al.	2016	Colombia	Neighborhood	Urban and rural	29	PCA	Both	Min-Max	Linear	PCA – equal weighting	Yes (sensitivity)	No
78	Roncancio and Nardocci	2016	Brazil	Neighborhood	Urban	24	PCA	Before	Z-score	Linear	PCA – equal weighting	No	No
79	Ronco et al.	2015	Switzerland	Neighborhood	Urban and rural	14	None	Before	Unspecified	Linear	Public opinion	No	No
80	Sam et al.	2017	India	Household	Rural	30	None	Before	Min-Max	Linear	Equal weighting	No	No
81	Schuster-Wallace et al.	2018	Canada	Neighborhood	Urban	8	None	Before	Distance from the group leader	Linear	Public opinion	No	No
82	Shah et al.	2018	Pakistan	City	Urban and rural	35	None	Before	None (All indicators in the same unit)	Geometric	Expert opinion	No	No
83	Shiau et al.	2012	Taiwan	Neighborhood	Urban and rural	5	None	Before	None (All indicators in the same unit)	Geometric	Division by total	No	No
84	Tapsell et al.	2002	United States	Neighborhood	Urban and rural	7	None	Before	Z-score	Linear	Equal weighting	No	No
85	Tate et al.	2016	United States	Neighborhood	Urban	12	None	After	Min-Max	Geometric	Division by total	No	No
86	Török	2018	Romania	Neighborhood	Urban and rural	28	PCA	Before	Z-score	Linear	PCA – weighted by factor scores	No	No

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87	Wu et al.	2015	China	Group of cities	Urban and rural	9	None	Before	Min-Max	Linear	Analytical Hierarchy Process (AHP) and expert scoring method	No	Yes
88	Xiong et al.	2019	China	City	Both	25	None	Before	Min-max	Linear	Analytical Hierarchy Process (AHP)	No	No
89	Yang et al.	2018	China	Neighborhood	Urban and rural	15	None	Before	Distance from the group leader	Fuzzy Comprehensive Evaluation Method (FCEM)	Delphi technique	No	No
90	Yang et al.	2018	China	Neighborhood	Urban and rural	16	None	Before	Distance from the group leader	Shannon entropy methods	Delphi technique	No	No
91	Yoon et al.	2014	South Korea	Group of cities	Urban and rural	15	None	Before	Unspecified	Linear	Unspecified	No	No
92	Zachos et al.	2016	United States	Neighborhood	Urban and rural	15	None	Before	Ranking	Linear	Division by total	No	No
93	Zeng et al.	2016	China	Neighborhood	Rural	15	None	Before	Min-Max	Linear	Analytical Hierarchy Process (AHP) and entropy weight method	No	No
94	Zhang and You	2014	China	City	Urban and rural	36	PCA	Before	Min-Max	Linear	Equal weighting	Yes (sensitivity)	No
95	Zhang et al.	2018	China	Neighborhood	Urban	9	None	Before	Unspecified	Non-parametric DEA method	PCA – weighted by factor scores	No	No