



Supplement of

Catchment-scale assessment of drought impact on environmental flow in the Indus Basin, Pakistan

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Table S1. Kurtosis and Skewness results for precipitation data across different catchments of the Indus Basin

Catchment	Kurtosis	Skewness	Catchment	Kurtosis	Skewness
Yogo	2.928	1.559	Jhelum River at Mangla	3.512	1.820
Shatial Bridge	3.558	2.097	Dhoke Pattan	3.914	1.894
Hunza	3.388	1.835	Tarbela	3.698	1.989
Astore	3.312	1.798	Indus River at Attock	5.955	2.029
Gilgit	2.793	1.924	Swat	1.633	1.204
Chitral	3.853	1.837	Panjhora River	0.975	0.556
Bisham Qila	2.915	1.594	Swat River at Chakdara	4.054	2.007
Domel	4.113	2.098	Kabul River at Nowshehra	2.653	1.537
Kunhar	3.477	1.893	Bara River	2.676	1.127
Muzaffarabad	3.015	1.483	Kurram River	3.019	1.692
Siran River	2.597	1.728	Massan	2.500	1.703
Azad Pattan	1.223	1.312	Jhelum River at Jhangi	3.459	1.895
Jhelum	2.713	1.966	Indus River at Sehwan	5.559	1.984
Soan River	2.934	1.581			

Note: Following the Hair et al., (2010) and Bryne et al., (2010), the data is normal when skewness and kurtosis ranges between -2 to +2 and -7 to +7, respectively.

Table S2. Kurtosis and Skewness results for temperature data across different catchments of the Indus Basin

Catchment	Kurtosis	Skewness	Catchment	Kurtosis	Skewness
Yogo	-1.345	0.071	Jhelum River at Mangla	-1.169	-0.118
Shatial Bridge	-1.274	-0.131	Dhoke Pattan	-1.834	-0.301
Hunza	-1.321	-0.134	Tarbela	-1.343	-0.105
Astore	-1.252	-0.172	Indus River at Attock	-1.337	-0.180
Gilgit	-1.271	-0.131	Swat	-1.366	0.015
Chitral	-1.295	-0.205	Panjhora River	-1.278	-0.202
Bisham Qila	-1.328	-0.235	Swat River at Chakdara	-1.215	-0.210
Domel	-1.318	-0.108	Kabul River at Nowshehra	0.256	0.108
Kunhar	-1.306	-0.204	Bara River	-1.878	-0.089
Muzaffarabad	-1.427	-0.201	Kurram River	-1.225	-0.341
Siran River	-1.319	-0.412	Massan	-1.262	-0.354
Azad Pattan	-1.174	-0.133	Jhelum River at Jhangi	-1.291	-0.308
Jhelum	-1.176	-0.153	Indus River at Sehwan	-1.316	-0.379
Soan River	-1.144	-0.127			

Note: Following the Hair et al., (2010) and Bryne et al., (2010), the data is normal when skewness and kurtosis ranges between -2 to +2 and -7 to +7, respectively.

Table S3. Drought severity ranges.

Drought class	SPEI
Extreme drought	<-2.0
Severe drought	-2.0 – -1.5
Moderate drought	-1.5 – -1.0
Near Normal	-1.0 – 1.0
No drought	>1.0

References:

Byrne, B. M. (2010). Structural equation modeling with AMOS: Basic concepts, applications, and programming. New York: Routledge.

Hair, J., Black, W. C., Babin, B. J. & Anderson, R. E. (2010) Multivariate data analysis (7th ed.). Upper Saddle River, New Jersey: Pearson Educational International.