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Marine and Freshwater Research

Supplementary Material

Reconciliation of water conflicts? Coalition and contradiction in managing rivers in the Brahmaputra basin

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Literature review methods

Table S1. A new narrative literature review methods adapted from Xu et al. (2021) and Tang and Xu (2023)

Methodological framework of scoping studies (Arksey and O'Malley, 2005)	**Methods**	**Implementation**
1.Identifying the research question	Clearly articulate the research question based on research goals. Consider the population, intervention and outcomes of interest to establish an effective search strategy.	**Goal**: Understand the landscape of each riparian nation's interests of managing the Brahmaputra and developing hydropower **Research question**: What is known from the existing literature about collaboration and conflicts in (**outcome**) water management and hydropower development (**intervention**) of the Brahmaputra (**population**)?
2.Identifying relevant studies	Choose bibliographic databases, web-based search engines (e.g. Google Scholar) or grey literature sources (e.g. organisation websites and thesis repositories)	Web of Science (WoS) Core Collection (1900-present) including: Science Citation Index Expanded (SCI-EXPANDED) --1900-present; Social Sciences Citation Index (SSCI) --1900-present; Arts & Humanities Citation Index (A&HCI) --1975-present; Conference Proceedings Citation Index- Science (CPCI-S) --1990-present; Conference Proceedings Citation Index- Social Science & Humanities (CPCI-SSH) --1990-present; Emerging Sources Citation Index (ESCI) --2015-present; Current Chemical Reactions (CCR-EXPANDED) --1985-present; and Index Chemicus (IC) --1993-present
3. Study selection	Boolean operators (use OR, AND, NOT, quotation marks, wildcards and brackets	("yarlung tsangpo" OR "brahmaputra" OR "Siang River" OR "Dihang River" OR "Luit,Dilao") AND (hydropower OR dam OR hydroelectric* OR hydro-electricity OR waterpower OR reservoir)
4. Charting the data	Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Page et al., 2021)	Export searching results (n=185) from WoS, screen and review papers manually (Figure 1)
5. Collating, summarizing, and reporting the results		Retrieving papers (n=60) cited the included studies (n=58) and in total included 116 full-text articles

Table S2. Mapping results

Table S2a. China (Map 1)

Mainstem dams

Dams	Longitude	Latitude
Zangmu/Zam Dam (built)	92°31'1.45"E	29°10'53.71"N
Jiacha Dam (built)	92°32'53.24"E	29° 8'16.00"
Jiexu Dam (built)	92°26'54.86"E	29°15'1.11"N
Dagu Dam (under construction)	92°23'21.18"E	29°14'6.23"N
Bayu Dam (planned)	92°19'21.48"E	29°13'37.90"N
Lengda Dam (approved)	92°39'28.06"E	29° 7'22.44"N
Zhongda Dam (approved)	92°48'50.86"E	29° 3'46.29"N
Langzhen Dam (planned)	93° 3'13.78"E	29° 2'44.44"N
Motuo Dam (planned)	95°11'10.42"E	29°45'31.13"N

Niyang River Catchment (case study: A main-tributary catchment)

Dams	Longitude	Latitude
Jiaxing Dam (planned)	92°55'2.32"E	30° 1'53.98"N
Jideng Dam (planned)	93° 3'34.60"E	29°59'58.90"N
Duobu Dam (built)	94° 8'44.47"E	29°44'33.56"N
Baiba Dam (planned)	93°46'7.05"E	29°48'51.16"N
Gongri Dam (planned)	93°54'20.49"E	29°46'59.51"N
Nixi Dam (planned)	94°15'27.97"E	29°44'24.16"N
Binghu Dam Stage 1 (built)	94°25'16.05"E	29°48'2.24"N
Binghu Dam Stage 2 (planned)	94°25'3.31"E	29°47'51.68"N
Binghu Dam Stage 3 (planned)	94°24'48.40"E	29°47'22.93"N
Binghu Dam Stage 4 (Bayi-Stage 3) (built)	94°23'33.66"E	29°43'2.58"N
Binghu Dam Stage 5 (Bayi-Stage 2) (built)	94°23'26.57"E	29°42'49.93"N
Binghu Dam Stage 6 (built)	94°23'26.87"E	29°42'44.02"N
Binghu Dam Stage 7 (Bayi-Stage 1) (built)	94°23'27.17"E	29°42'30.43"N
Laohuzui Dam (built)	93°39'31.21"E	29°53'30.20"N
Xueka Dam (built)	93°40'55.94"E	29°58'5.51"N
606 Dam (built)	93°53'42.81"E	29°59'55.81"N

Main-tributary dams

Dams	Longitude	Latitude
Yalung River Dam (built)	91°53'56.67"E	28°54'30.45"N
Zhikong Dam (built)-Lhasa River	91°52'35.27"E	29°58'1.93"N
Pangduo Dam (built) -Lhasa River	91°21'6.93"E	30°10'55.29"N
Ngari Dam (built)-Senge Zangbu River	80° 9'22.69"E	32°31'29.50"N
Laluo Dam (built)-Saiqu Qu (River)	88°32'4.66"E	28°52'58.63"N
Manla Dam (built)-Nyang Qu (River)	89°49'59.66"E	28°50'44.29"N

Woka Dam Stage 3 (built)-Daximu Qu (River)	92°12'27.44"E	29°17'15.26"N
Woka Dam Stage 2 (built)-Daximu Qu (River)	92°13'22.45"E	29°16'32.86"N
Woka Dam Stage 1 (built)-Daximu Qu (River)	92°12'27.45"E	29°15'1.58"N
Jiangga Dam (built)-Jiangga Xiong Qu (River)	89° 9'17.75"E	28°48'44.84"N
Hutoushang Dam (built)-Jiequ Qu (River)	91° 5'37.08"E	29°54'34.33"N
Kaze Dam (built)-Pangbo Qu (River)	91°10'21.98"E	29°53'49.75"N
Jiangxiong Dam (built)	91° 6'19.73"E	29° 8'0.20"N
Shankouqing Dam (built)	90°55'54.17"E	29°10'32.64"N
Dareduo Dam (built)	90°49'49.14"E	29°10'6.17"N
Zuopu Dam (built)	91°15'22.98"E	29° 4'38.22"N

Major irrigation zones and weirs

Three major irrigation zones in Tibet	**Range**	
Rikeze-Manla Irrigation Zone	R_M Irrigation Zone in the 'kmz' file	
Shangnan-Yalung Irrigation Zone	S_Y Irrigation Zone in the 'kmz' file	
Lahsa-Moda Irrigation Zone	L_M Irrigation Zone in the 'kmz' file	
Lhasa Weirs (Three cascade weirs) (built)	91° 5'34.82"E	29°38'32.26"N
Shangnan-Yalung Weir(built)	91°47'19.85"E	29° 8'32.98"N

Table S2b. India (Map 2)

Mainstem dams

Dams	**Longitude**	**Latitude**
Dihang Dam (planned)	95° 1'3.58"E	28°11'26.67"N

Main-tributary dams

Dams	**Longitude**	**Latitude**
Ranganadi Hydel Project Stage I (built)	93°49'0.73"E	27°20'32.90"N
Lohit Dam (planned)	96°19'38.62"E	27°53'18.76"N
Subansiri Dam (built)	94°15'32.18"E	27°33'6.69"N
Ranganadi Hydel Project Stage 1 (built)	93°49'0.73"E	27°20'32.90"N
Dibang Dam (planned)	95°46'24.99"E	28°20'8.80"N
Umiam Dam (built)	91°54'0.87"E	25°39'33.60"N
Umiam-Umtru Stage 1 Dam (built)	91°48'41.00"E	26° 0'24.00"N
Umiam-Umtru Stage 2 Dam (built)	91°51'37.25"E	25°42'47.99"N
Umiam-Umtru Stage 3 Dam (built)	91°47'20.07"E	25°47'6.18"N

Umiam-Umtru Stage 4 Dam (built)	91°44'36.47"E	25°50'17.45"N
Umiam-Umtru Stage 5 Dam (planned)	91°46'53.80"E	25°53'44.78"N
Umiam-Umtru Stage 6 Dam (planned)	91°46'19.41"E	25°55'21.99"N
Rangit Dam (built)	88°17'32.08"E	27°17'42.00"N
Umswai Dam (planned)	92°11'36.43"E	25°55'4.21"N
Doyang Dam (built)	94°15'38.92"E	26°13'46.47"N
Kopili Stage 1 (built)	92°37'59.79"E	25°31'41.50"N
Kopili Extension Stage 2 (under construction)	92°43'21.12"E	25°35'14.51"N
Lower Kopili Dam (planned)	92°47'42.46"E	25°56'18.70"N
Amreng Dam (planned)	92°49'15.41"E	25°44'18.34"N
Umrong Dam (built)	92°42'45.60"E	25°31'42.31"N
Lower Teesta Stage 3 (built)	88°26'35.02"E	27° 0'4.66"N
Lower Teesta Stage 5 (built)	88°27'22.33"E	26°55'33.76"N
Teesta Dam (built)	88°35'27.63"E	26°45'14.69"N
Teesta Barrage (built)	89° 3'8.46"E	26°10'44.72"N
Champamati Barrage (built)	90°21'56.53"E	26°35'28.98"N

Table S2c. Bhutan (tributary dams only) (Map 3)

Main-tributary dams

Dams	**Longitude**	**Latitude**
Tala Dam (built)	89°35'43.28"E	27° 2'9.72"N
Chhukha Dam (built)	89°31'51.70"E	27° 6'36.39"N
Punatsangchhu-Stage 2 (under construction)	89°57'8.62"E	27°18'47.80"N
Punatsangchu-Stage 1 (under construction)	89°54'16.50"E	27°25'16.15"N
Kurichhu Dam (built)	91°12'13.59"E	27°12'59.57"N
Dagachhu Dam (built)	89°55'11.72"E	27° 2'11.67"N
Basochhu Stage 2 (built)	89°55'16.59"E	27°20'22.40"N
Basochhu Stage 1 (built)	89°53'47.10"E	27°20'9.83"N
Mangdecchu Dam (under construction)	90°32'2.98"E	27°22'4.39"N
Nikachhu Dam (built)	90°29'36.18"E	27°29'16.96"N
Kholongchhu Dam (under construction)	91°29'41.56"E	27°36'28.94"N

Assessment results of Highly valued ecosystem services provided by the Brahmaputra River

Table S3. Summary of highly valued ecosystem services provided by the Brahmaputra River. A full assessment table is the Table C1 at Appendix-C. The valuation of ecosystem services is rated from '+' (low) to '+++++' (high).

Ecosystem services		China	India	Bangladesh	Bhutan
Provisioning	Water Supply	++++	+++++	+++++	+++++
	Energy Development	+++++	+++++	++	+++++
	Irrigation and food	++++	+++++	+++++	+++
	Assisting in navigation and transport	+	++++	++++	+++
	Aquatic organisms for food and medicines	++	++++	+++++	+
Regulatory	Erosion control, and flood mitigation or regulation	++++	+++++	+++++	++++
Supporting	Carbon emissions reduction	+++++	+++++	+++++	+++++
	Biodiversity and ecosystem	+++++	+++++	+++++	++++
	Nutrient cycling	++	+++	+++++	+
	Poverty alleviation and contribution to regional development	+++++	+++++	+++++	+++++
Cultural	Recreation and tourism	+++	++++	++++	+++++
	Indigenous culture, ethnic minorities	+++++	+++++	+++++	+++++
	Geopolitical influences	+++++	+++++	+	+++
	Cultural governance	+++++	++++	++	++++

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