Supplementary information - Appendix

I.

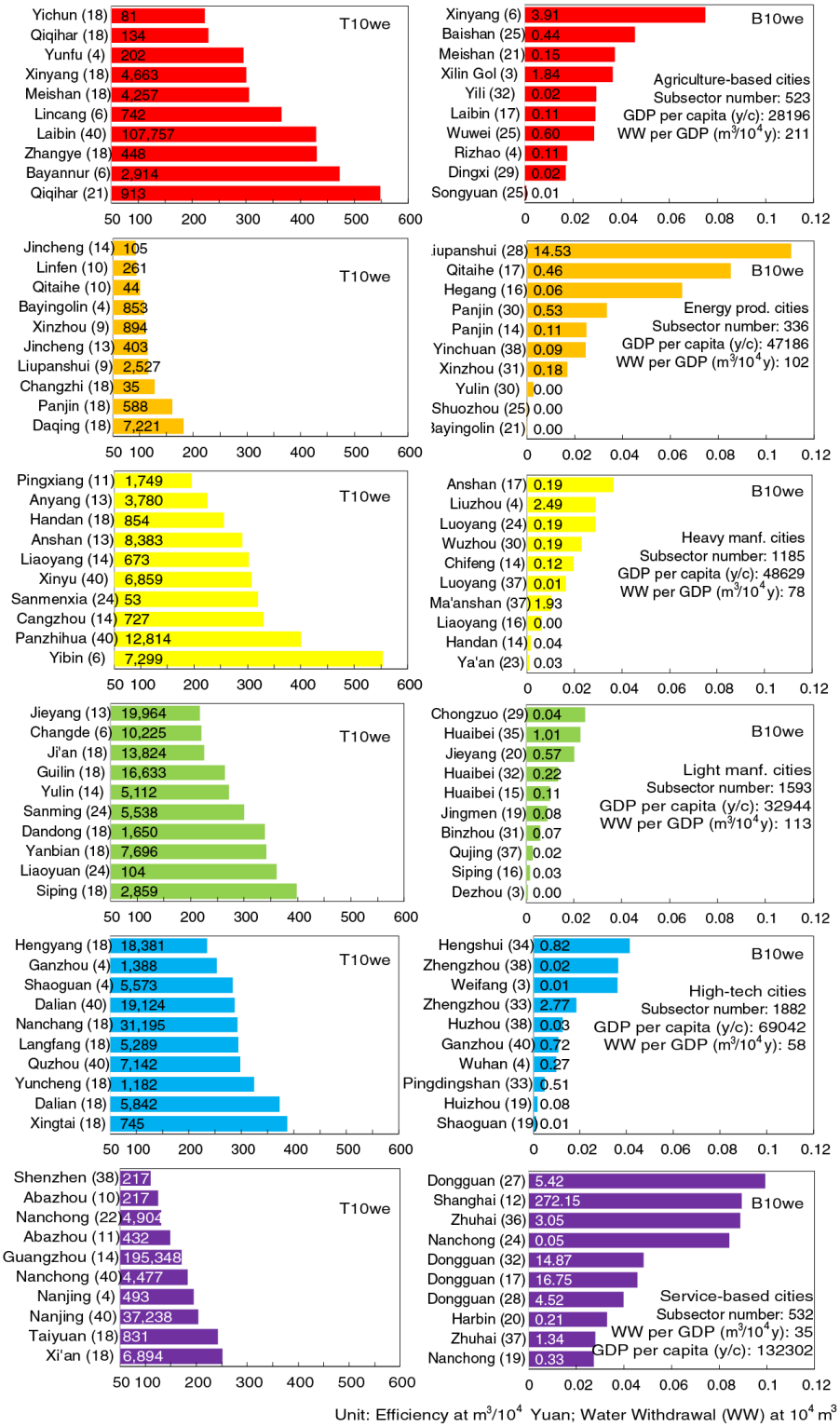

Fig. 1. Top-/bottom-ten sectors for water withdrawal efficiency (per industrial output) (T10we and B10we) and GDP statistics in each of six clusters. (Sectors were represented with codes in the parentheses near y-axis. Number on each bar shows water withdrawal (WW) of individual sector. For average GDP per capita and water withdrawal per GDP, we calculated the sum of the numerator and denominator respectively before division.)

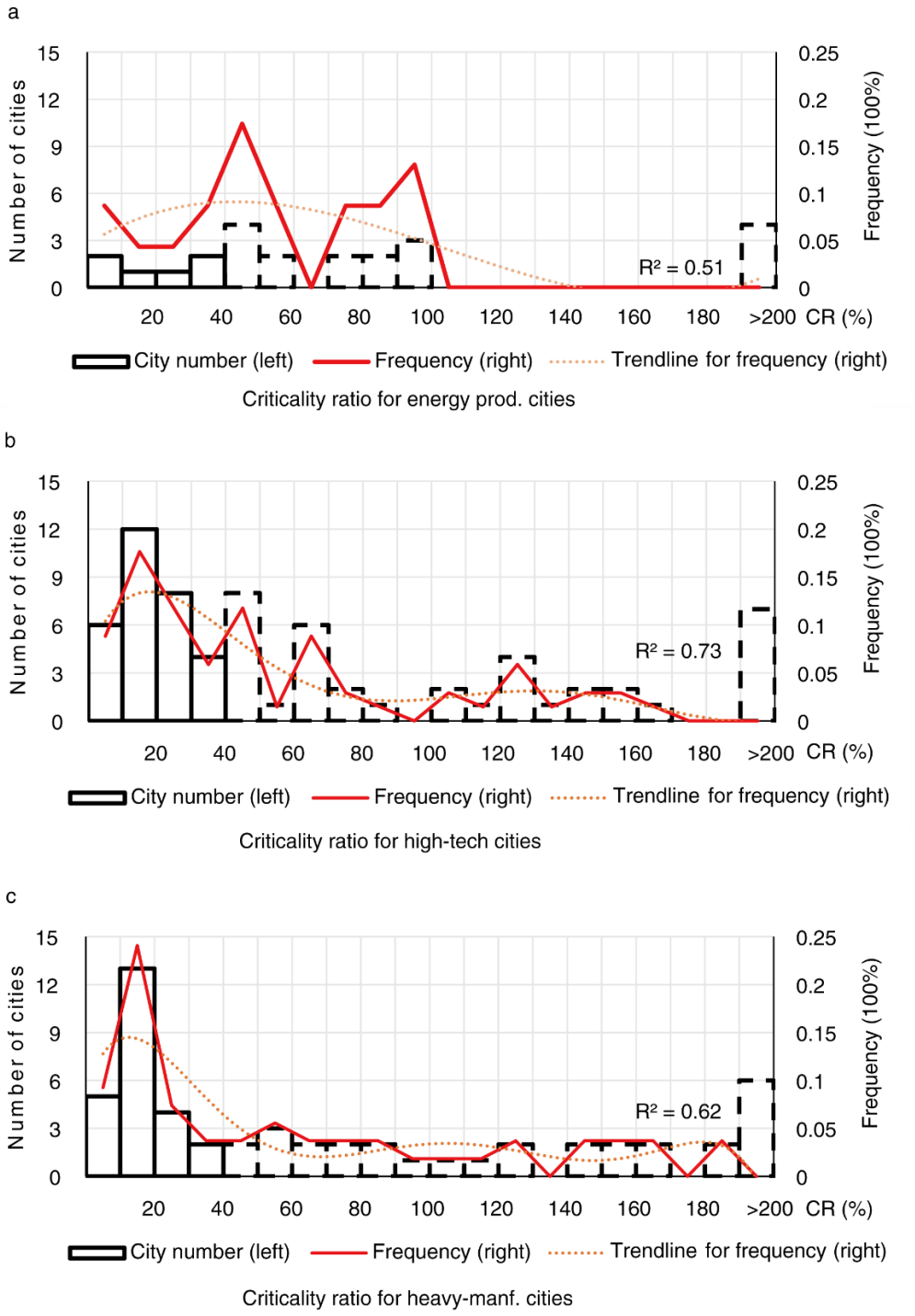

Fig. 2. Histograms showing frequency distribution of the criticality-ratio for three representative city clusters i.e. energy production, high-tech and heavy manufacturing types. (Criticality ratios above the 40% threshold are indicated by dashed squares; we merged >200% samples due to slightly lower frequencies.)

III. Table 1 List of 43 sector classifications used in this study

Code	Full name and description	Classification
1	Farming, forestry, animal husbandry & fisheries	Primary industry (Agriculture)
2	Coal mining & processing	Energy production industry
3	Extraction, mining & processing of petroleum & natural gas	Energy production industry
4	Ferrous metal ore mining & processing	Heavy industry
5	Nonferrous metal ore mining & processing	Heavy industry
6	Nonmetal ore mining & processing	Heavy industry
7	Mining supporting activity	Heavy industry
8	Other mineral mining & processing	Heavy industry
9	Processing of food from agricultural product	Light industry
10	Food manufacturing	Light industry
11	Liquor, beverage, & refined tea manufacturing	Light industry
12	Tobacco manufacturing	Light industry
13	Cloth manufacturing (textile)	Light industry
14	Clothing manufacturing (apparel, footwear & hats)	Light industry
15	Leather, fur, feather, & related product & footwear manufacturing	Light industry
16	Processing of timber, wood, bamboo, rattan, palm, & straw product	Light industry
17	Furniture manufacturing	Light industry
18	Papermaking & paper product manufacturing	Light industry
19	Printing, reproduction of recording media	Light industry
20	Culture, education, handicraft, fine art, sport & entertainment article manufacturing	Light industry
21	Processing of petroleum, coking, & nuclear fuel	Energy production industry
22	Chemical material & product manufacturing	Heavy industry
23	Medicine manufacturing	Light industry
24	Chemical fiber manufacturing	Heavy industry
25	Rubber & plastics manufacturing	Heavy industry
26	Nonmetallic mineral product manufacturing	Heavy industry
27	Smelting & pressing of ferrous metal	Heavy industry
28	Smelting & pressing of nonferrous metal	Heavy industry
29	Metal product manufacturing	Heavy industry
30	General purpose machinery manufacturing	Heavy industry
31	Special purpose machinery manufacturing	Heavy industry
32	Automobile manufacturing	Heavy industry
33	Railway, ship, aerospace & other transportation equipment manufacturing	Heavy industry
34	Electrical machinery & equipment manufacturing	High-tech industry
35	Communication equipment, computer, & other electronic equipment manufacturing	High-tech industry

36	Measuring instrument & machinery for cultural activity & office work manufacturing	High-tech industry
37	Other manufacturing	High-tech industry
38	Comprehensive utilization of waste resource	High-tech industry
39	Repair of metal product, machinery & equipment	High-tech industry
40	Production & supply of electricity & hot water	Energy production industry
41	Production & supply of gas	Energy production industry
42	Production & supply of tap water	Energy production industry
43	Service	Tertiary industry

Notes: 2-8 are associated with mining and processing, 9-39 are manufacturing, and 40-42 are production and supply of electricity, gas and hot water. These were selected according to the widely used classification of national accounting system i. e. industrial classification for national economic activities, released by the National Administration for Quality Supervision, Inspection and Quarantine (AQSIQ-PRC 2016)[1].

IV. Table 2 List of cities with above-average water saving potential, as summarized in figure 4, which should be targeted in future water saving policy interventions.

Sector	City	Province	Cluster	Criticality ratio (%)	Industrial output (Billion Yuan)	Water saving potential (10^4 m^3)
Cloth manufacturing	Bengbu	Anhui	light	60	9	2,755
	Ma'anshan	Anhui	heavy	149	1	3,018
	Foshan	Guangdong	high-tech	107	69	4,014
	Guangzhou	Guangdong	service	74	28	17,698
	Shantou	Guangdong	light	58	28	9,007
	Zhongshan	Guangdong	high-tech	69	17	6,134
	Shijiazhuang	Hebei	high-tech	400	78	14,207
	Nanyang	Henan	light	60	49	5,871
	Pingdingshan	Henan	high-tech	115	8	5,685
	Zhoukou	Henan	light	93	45	3,127
	Anyang	Henan	heavy	162	4	3,474
	Huai'an	Jiangsu	high-tech	62	30	10,944
	Suzhou	Jiangsu	high-tech	127	136	71,972
	Anshan	Liaoning	heavy	57	11	7,859
	Weifang	Shandong	high-tech	122	113	2,938
	Jiaxing	Zhejiang	high-tech	49	97	3,830
Chemical material & product manufacturing	Xiangyang	Hubei	light	77	38	8,882
	Xiangtan	Hunan	heavy	51	13	22,417
	Liaoyuan	Jilin	light	80	8	3,096
	Taizhou	Jiangsu	high-tech	77	133	4,980
	Tongliao	Inner Mongolia	light	81	19	5,895
Electricity & hot water supply	Hefei	Anhui	high-tech	59	40	5,077
	Liupanshui	Guizhou	energy	42	16	4,913
	Nanjing	Jiangsu	service	87	19	29,417

References

1. Li, X. *et al*. City-level water-energy nexus in Beijing-Tianjin-Hebei region. *Appl. Energy* **235**, 827–834 (2019).