Water Resource in Xi'an

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Water resources in Xi’an

- Overview of water resource in Xi’an
- Water resources: surface water
- Water resources: ground water
- Case study: The project of water transferring from Heihe River etc. to Xi’an
- Water demand of Xi’an in 2010

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Overview of the water resource in Xi'an

- The annual total volume of water resource: $26.66 \times 10^8\ m^3$;
- Annual surface water volume: $21.78 \times 10^8 m^3$
- Annual ground water volume: $17.27 \times 10^8 m^3$
- Overlap between above two parts: $12.39 \times 10^8 m^3$.

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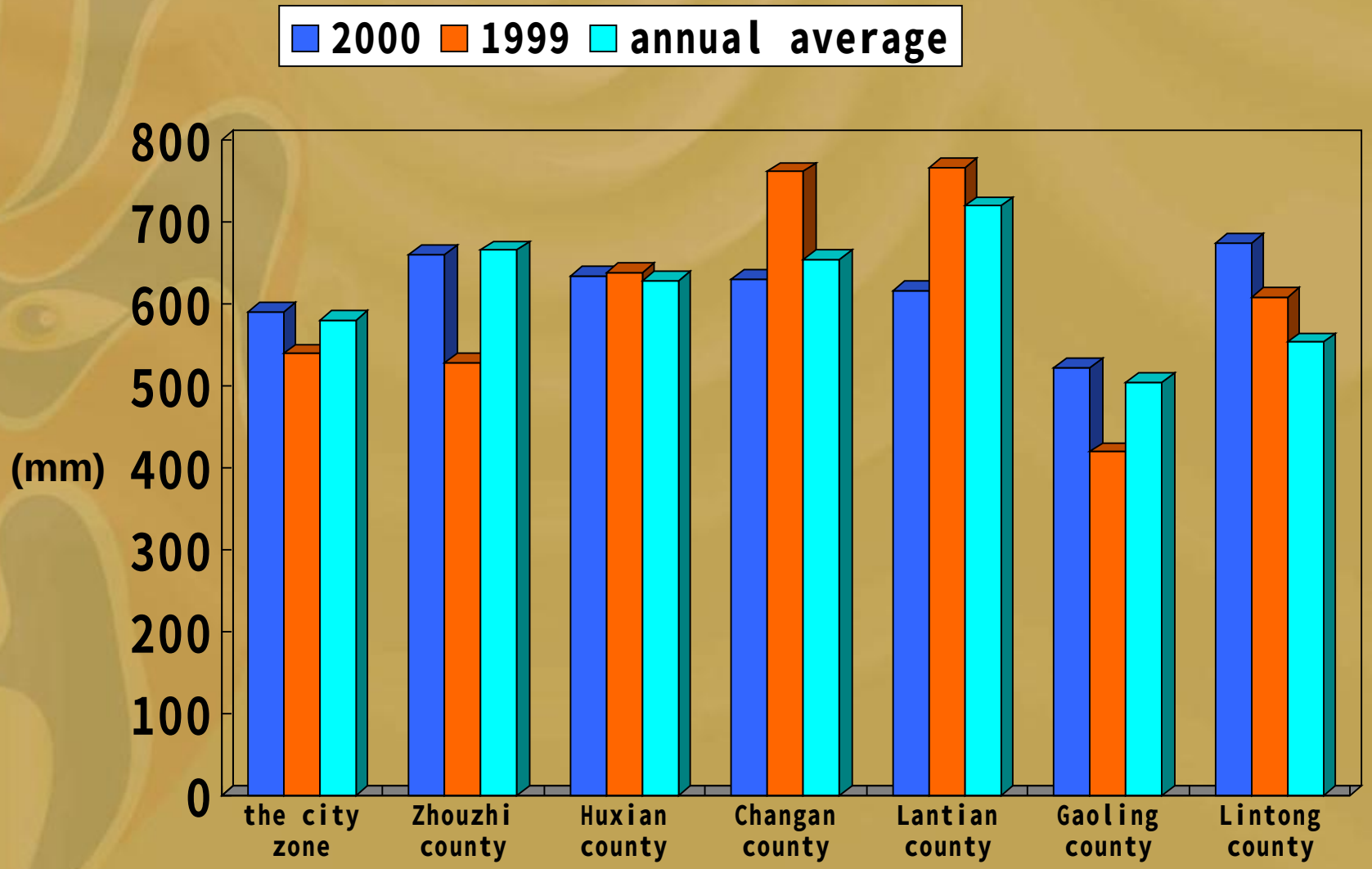
Precipitation of Xi'an from 1999~2000

The annual average precipitation of Xi'an is 745mm.



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Surface water resources

- There are 54 rivers in Xi'an area.
- The river system consist of Weihe River, Heihe River, Bahe River, Chanhe River and so on.
- The annual average surface water volume is $21.78\times10^8\ m^3$.

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Exploitation of surface water resource

River	Annual runoff amount ($10^8 m^3/a$)	Annual Average available water ($10^8 m^3/a$)	Water used by the City ($10^8 m^3/a$)	Water used by agriculture ($10^8 m^3/a$)
Heihe River	6.67	4.818	0.3258	0.5085
Shitouhe River	4.48	0.948	1.0300	0.2833
Fengyu River	4.57	2.924	0.0807	0.1394
Tianyu River	0.909	0.521	0.1306	0.0110
Shibianyu River	0.841	0.250	0.2516	0.2300
Chanhe River	1.57	0.270	0.2692	------
Total	19.0434	9.731	2.0879	1.1722

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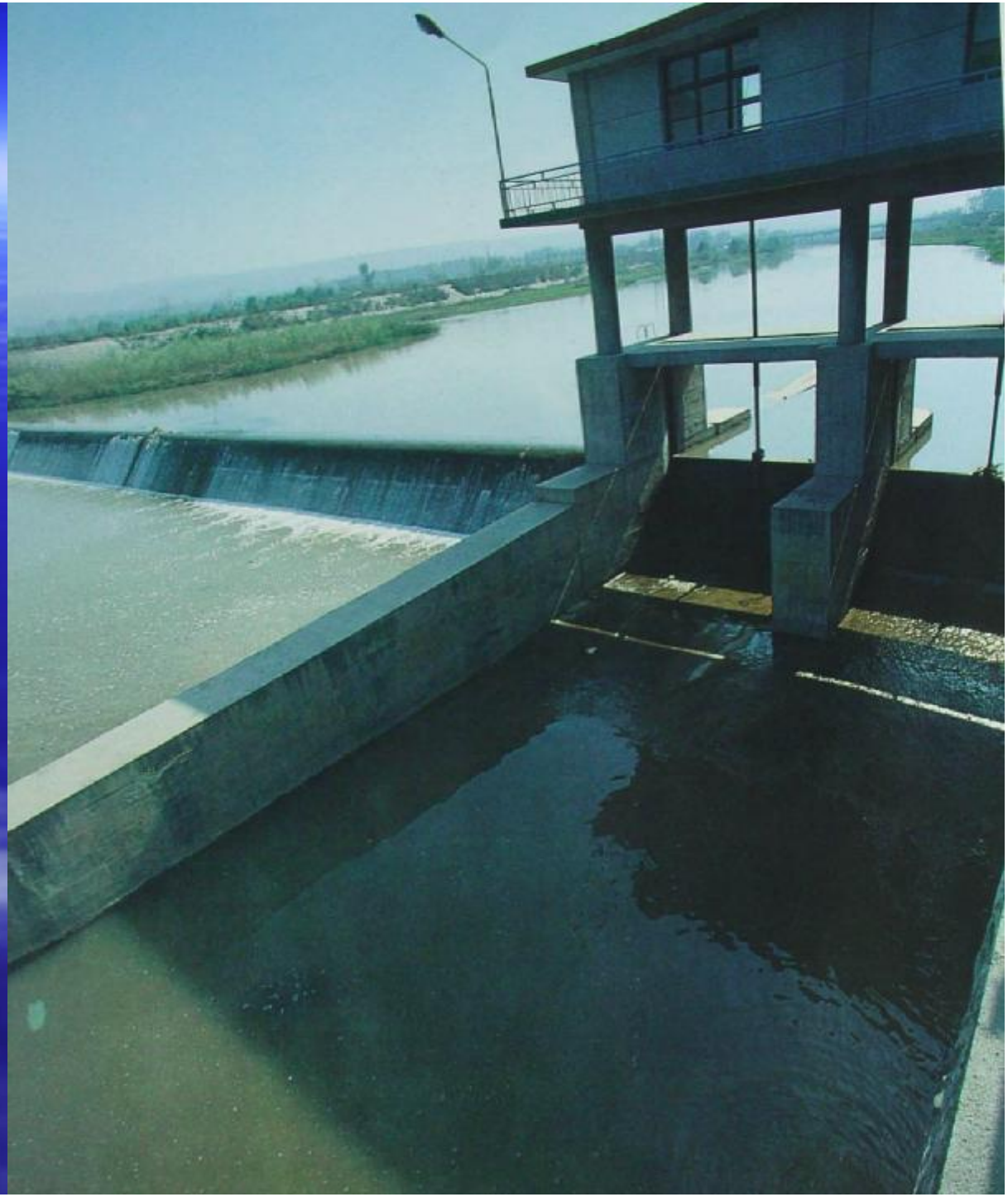
Low cut-off dam and water intake of Chanhe River(1)

The low cut-off dam and the intake located at Tianjiawan, east suburb of Xi'an.

Water capability caught by the dam is $12 \times 10^4\ m^3/d$.



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Water intake of Chanhe River(2)

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Ground water resource

- **Five ground water resources in Xi'an: Bahe- Chanhe Source, Fenghe- Zaohe Source, Weihe Source, Northwest suburb Source and Duancun Village Source.**
- **All the ground water resources are all located near rivers and recharged by both surface runoff and underground runoff.**
- **Annual ground water volume: $17.27\times10^{8}m^{3}/a$**

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Exploitation of ground water resource

Ground water source	Annual available water volume ($10^8 m^3/a$)	Exploited water volume ($10^8 m^3/a$)	Overload of exploited ground water volume ($10^8 m^3/a$)
Chanhe River	0.0219	0.0256	0.0037
Bahe River	0.3781	0.4004	0.0223
Fenghe River	0.4534	0.3653	0.1028
Zaohe River		0.1909	
Northwest suburb	0.8587	0.5778	0.1875
Along the Weihe River		0.4684	
Duancun Village	0.1000	0.0580	-0.0420
Total	1.8121	2.0864	0.2743

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Project of transferring water from Shitouhe, Heihe and Shibianyu Rivers to Xi'an

- **Rivers related to the project : Heihe River, Shitouhe River, Fengyu River, Tianyu River, Shibianyu River.**
- **Reservoirs related to the project : Jinpan Reservoir, Shitouhe Reservoir, Shibianyu Reservoir.**

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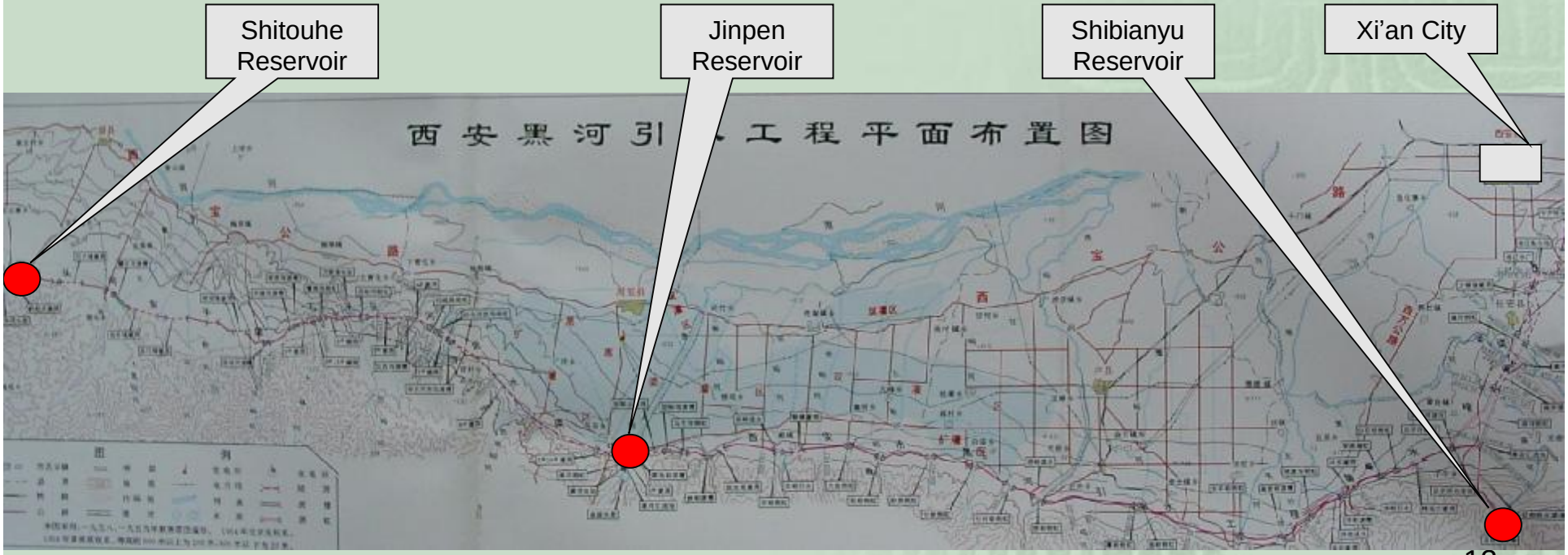
Sketch map of Project of transferring water from Shitouhe, Heihe and Shibianyu Rivers to Xi'an

The maximal transferred water volume: 110×10^4 m^3/d

The annual transferred water volume: 4.0×10^8 m^3/a.



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Chief features of major rivers of the project

River	Area of the river basin (km^2)	The area of river Upstream of intake (km^2)	The length of the river (km)	Slope of the river (‰)	Annual average runoff amount (10^8m^3)	The distance to the water plants (km)
Heihe River	2258	1481	125.8	8.8	7.840	84.3
Tianyu River	298	234	52.6	20.5	0.909	75.0
Fengyu River	1398	154	78.0	8.2	4.570	26.3
Shibianyu River	278	140	46.1	21.3	0.841	32.3
Shitouhe River	779	673	68.4	20.0	4.480	141.3

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Chief features of major reservoirs of the project

Reservoir	River	Drainage area (km^2)	Reservoir Water capacity (10^8m^3)	Effective reservoir water capacity (10^8m^3)	Daily water supply capacity (10^4m^3)	Annual water supply capacity (10^8m^3)
Jinpen Reservior	Heihe River	1481	2	1.774	80	3.05
Shitouhe Reservior	Shitouhe River	673	1.47	1.2		0.95
Shibianyu Reservior	Shibianyu River	132	0.281	0.256	40	
Total		2268	3.751	3.23	120	4.0

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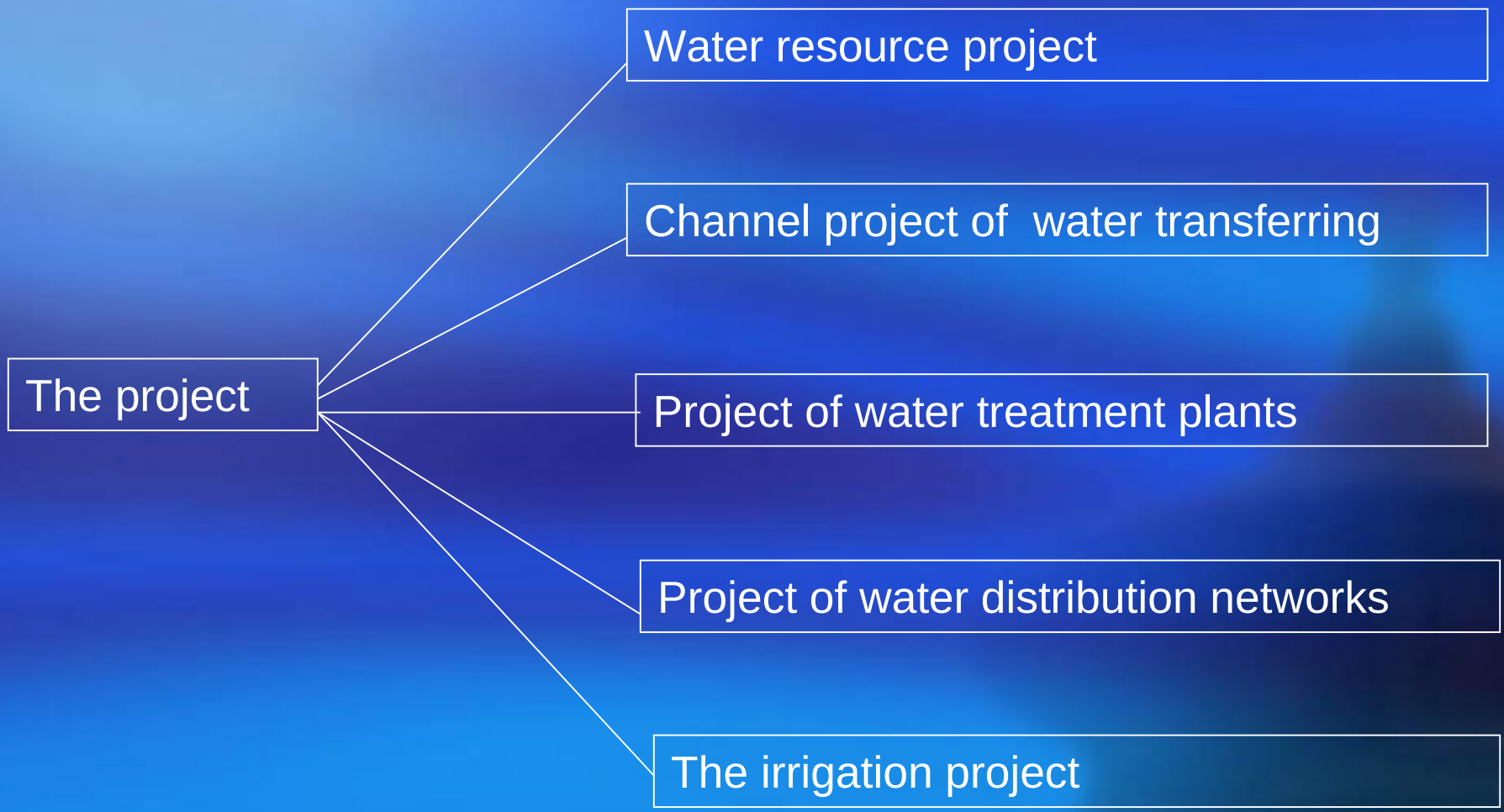
The branches of the project



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Content of the project

Water resource project : the dam of the Heihe Reservoir locate at the 1.5 km upriver of Heiyukou, far from Xi'an 86km.The reservoir started to supply water for Xi'an at 1995.

Channel project of water transferring: The total length of the channel is 109 km.

Project of water treatment plants: Including Qujiang Water Treatment Plant and Nanjiao Water Treatment Plant.

Project of water distribution networks : The increased total length of distribution pipes reachs to 56.38 km covering, area of 73km^2 ,and the distributing water volume to 110×10^4 m^3/d.

The irrigation project : the area which can be irrigated rise from 0.93×10^4 hectare to 2.46 $\times10^4$ hectare.

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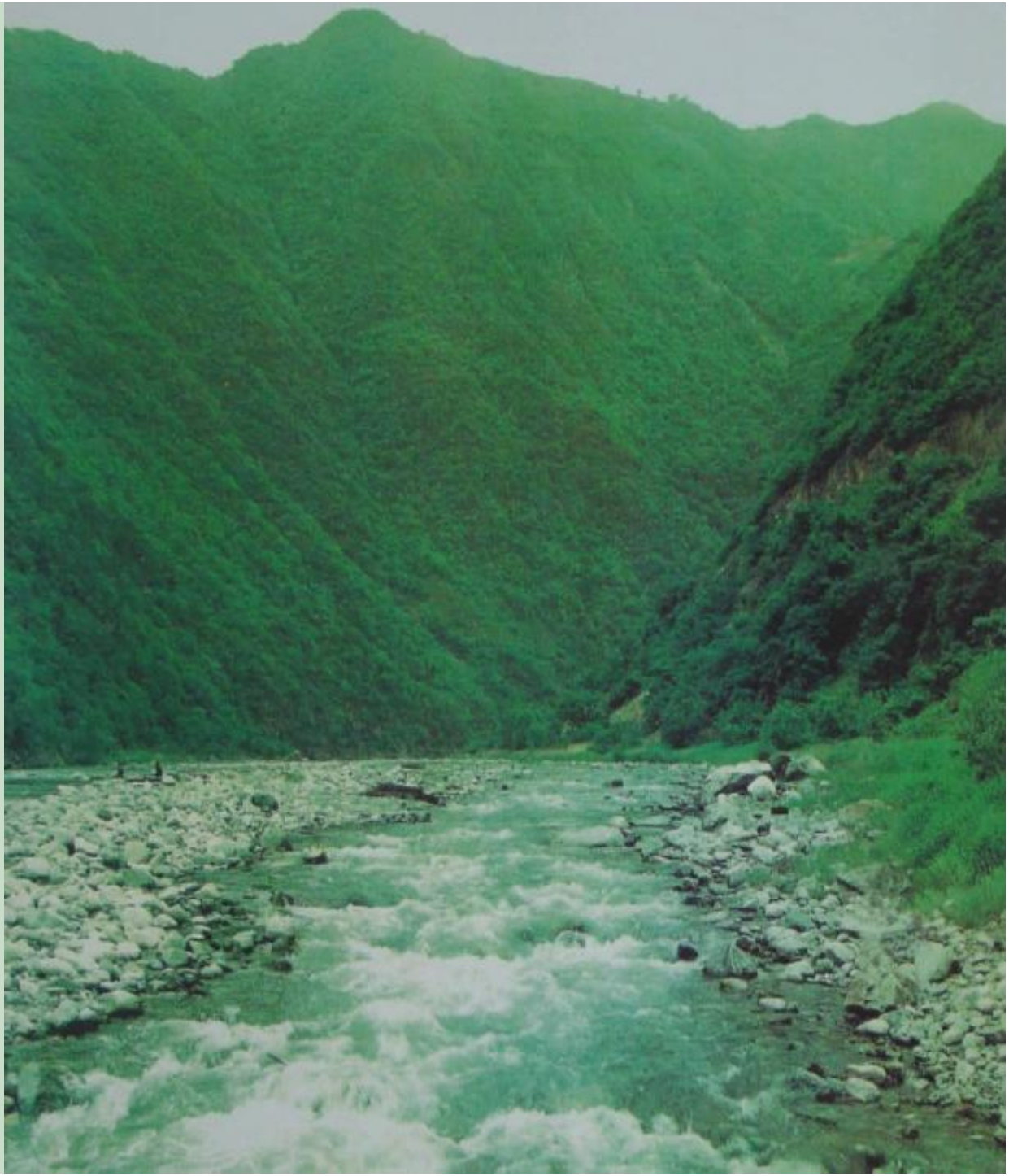
Riverhead of Heihe River

- The river basin area: 2258 km^2.
- The percentage of forest covering area: 46.5%
- The Max. flow volume: 3040 m^3/s
- The Min. flow volume: 1 m^3/s
- The silt concentration is zero during 8 months in a year.



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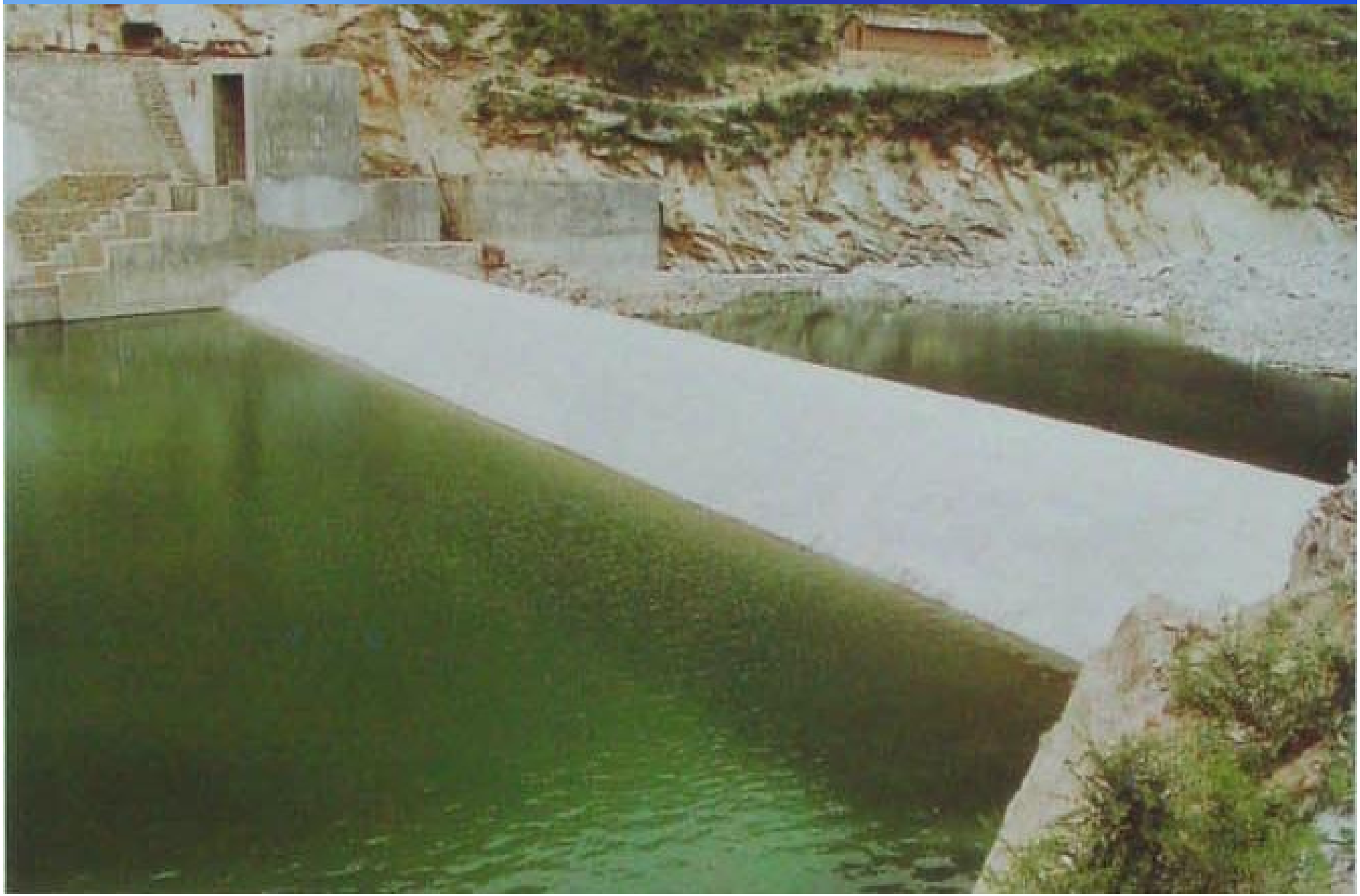
Low dam of the water intake of Heihe River



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Water junction tank of Shitouhe Reservoir and Jinpen Reservoir in Heiyukou, Linjiawan Village

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The water demand of Xi'an in 2010

- The population of Xi'an city will reach 3.1 million in 2010.
- The water use quota of urban citizens will be 250 L/cap·d.
- The total industry production value is 78.0 billion Yuan. Water use volume per 10000 GDP of industrial production will go down to 62 m^3.
- The industry water demand will total 132.5×10^4 m^3/d.

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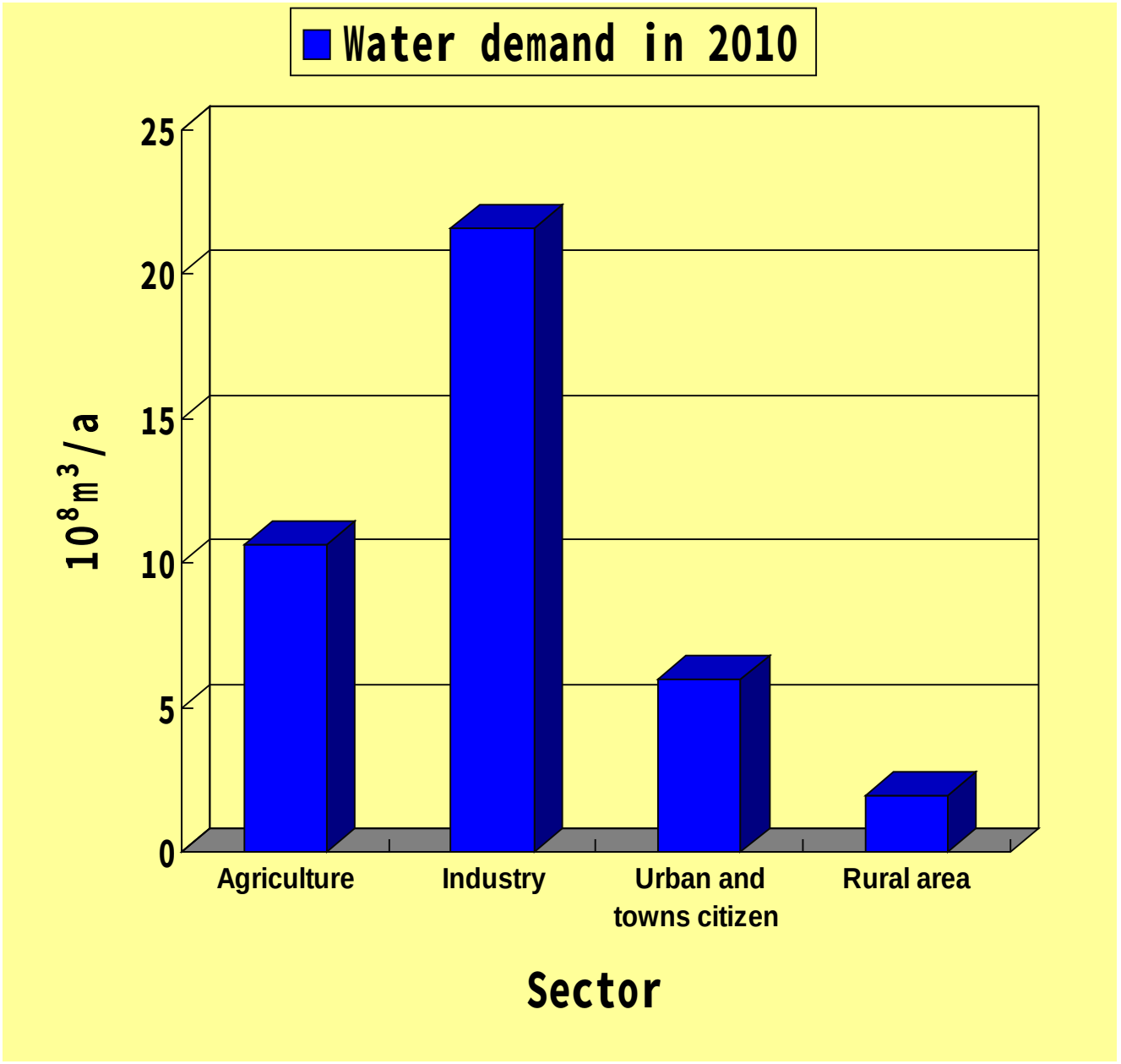
The water demand of Xi'an in 2010



- **Agriculture: $10.67\times10^8m^3/a$**
- **Industry: $21.63\times10^8m^3/a$**
- **Urban and towns citizen: $5.96\times10^8m^3/a$**
- **Rural area: $1.94\times10^8m^3/a$**

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THE END

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