

Center for Community-Based Resource Management (CBRM)

Natural Resources Institute, University of Manitoba

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Case Study Name:	Water resources constraint force on urbanization in water deficient regions: A case study of the Hexi Corridor, arid area of NW China		
Author:	Bao, Chao and Fang, Chuang-lin		
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Region:	Central and Eastern Asia		
Country:	China		
Ecosystem Type:	Semi-arid		
Social Characteristics:	Other (urban and rural communities)		
Scale of Study:	District/municipalities		
Resource Type:	Surface Water		
Type of Initiative:	Research-driven project		
Community-Based Work:	Resource management		
Keywords:	Case study, Water resources constraint force (WRCF), Water resources constraint intensity (WRCI), Rapid		

	urbanization, Water crisis, Hexi Corridor in NW China
Summary:	<p>Based on analysis of water crisis during rapid urbanization especially in arid and semi-arid areas around the world, the concept of Water Resources Constraint Force (WRCF) is presented. The method utilized to identify the existence of WRCF is also introduced. After a logarithmic relationship model between urbanization level and total water utilization is established, the method to measure the WRCF on urbanization is also obtained. A case study of the Hexi Corridor, a typical arid area in NW China is presented. The results indicate that when the population, economic and urban scales approach or exceed the water resources carrying capacity, or the utilization of water resources approaches or exceeds the threshold of natural water resources, the water resources system significantly slows down the development of socio-economic systems, including the urbanization process. Furthermore, where the scarcer water resources are, the larger water resources constraint intensity (WRCI) is. In the Hexi Corridor, the WRCI is the largest in the Shiyang River Basin, in the eastern part, and where water resources are the scarcest. The WRCI in the middle and western part of the Hexi Corridor is relatively smaller because of relatively more water resources. Subsequently, areas within the Hexi Corridor should take a range of different measures to lessen the WRCF on urbanization according to their specific water resources constraint types: (1) Areas of the very strong constraint type should take emergency measures to resolve their water problems, including transferring water from other river basins, limiting the population, economic and urban scales, innovating in institution, policy and technology of water utilization, and strengthening water resources planning and management in the whole river basin; (2) areas of the less strong constraint type should avoid traditional methods of water utilization during the process of urbanization and industrialization in areas of the very strong constraint type. They should adjust the urbanization pattern and construct an intensive water resources utilization system, so that total water utilization can realize zero or negative growth and water-ecology–economy system can realize harmonic and sustainable development.</p>