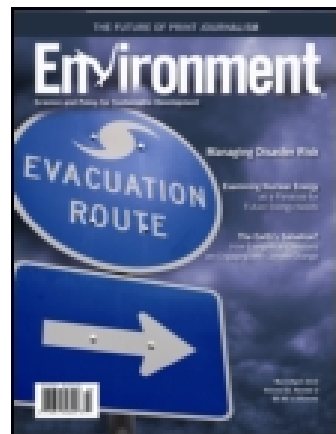


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Sustainable Urbanization in Western China

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Sustainable Urbanization in Western China

by Xiangzheng Deng and Xuemei Bai

The skyline of Chongqing, photographed from Nanshan.



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China has achieved a remarkable social and economic development since its open-up policy in 1978, but most of the economic activities are concentrated in eastern coastal regions. Western China has played a critical supporting role for economic booms in China during the past decades, including the provision of cheap labor, abundant resources, and hinterland, but the region is largely left behind in terms of its own development. In 2010, the per-capita gross domestic product (GDP) of Western China was less than half of that in Eastern China. Up to 60% of the country's poverty-stricken counties and up to half of the ecologically vulnerable counties are in the western region. In addition, the western region has vulnerable ecological and environmental conditions. Up to 70% of ecologically

vulnerable counties in the western region are also poverty-stricken counties, compared to 23% and 41% in Eastern and central China, respectively.¹ It is considered time to enhance the feedback to benefit the western region.²

Rectifying such regional imbalance has become one of the top priorities of the Chinese government, which launched the National Western Development Strategies in 1999. The initiative aims to combine governmental policies with market-based instruments to accelerate the development of the western region while protecting its fragile ecological systems and environment. Promoting sustainable urbanization is considered as a potential vehicle for western development, and one of the key strategies of the initiative. Qiu Baoxing, Vice Minister of the Ministry of Housing and Urban-Rural Development of the

People's Republic of China, insisted on promoting a new kind of urbanization to develop Western China.³

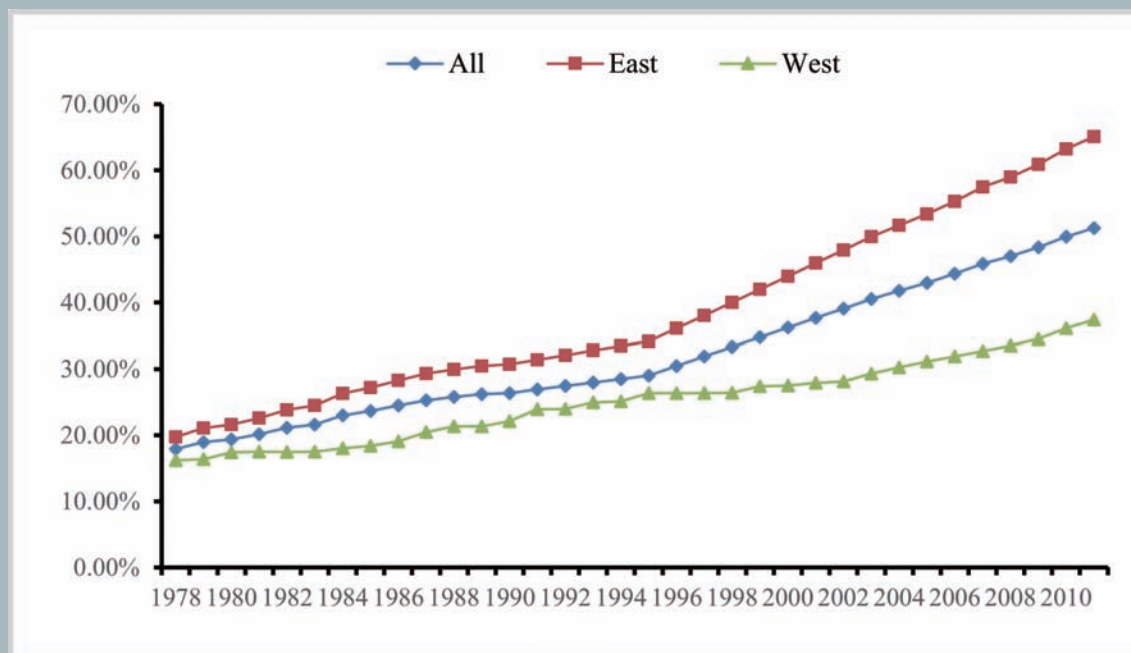
It is a daunting task, and not without risks, trying to promote urbanization in an inland region that has a relatively low level of economic development and high level of poverty, with fragile ecological conditions and resource and environmental constraints, and that harbors a population with diverse cultural and ethnical backgrounds. This article examines the rationale, challenges, and opportunities of promoting urbanization in Western China, and identifies key issues in the way forward. The article draws on a recently concluded Task Force on Western China Development Strategies, under the China Council for International Cooperation on Environment and Development, in which the authors participated as expert members.

Rationale

Urbanization has increased rapidly in China since 1978, but the western region has lagged behind the national average and eastern region (Figure 1). The level of urbanization can be an indicator of social economic development of the region or state, with higher urbanization level often linked to higher levels of income, education, and job opportunities. Research shows a strong relation between urbanization and economic growth. Bloom et al.⁴ revealed a strong correlation between urbanization level (defined as population living in urban area) and per-capita real income across 200 countries (Figure 2). In Western China, a historical trend shows a very strong correlation between urbanization level and per-capita GDP (Figure 3). While such correlations do not sufficiently suggest a causal linkage across nations, such that promoting urbanization will bring about income growth,⁵ recent research shows there are positive linkages between urban growth and

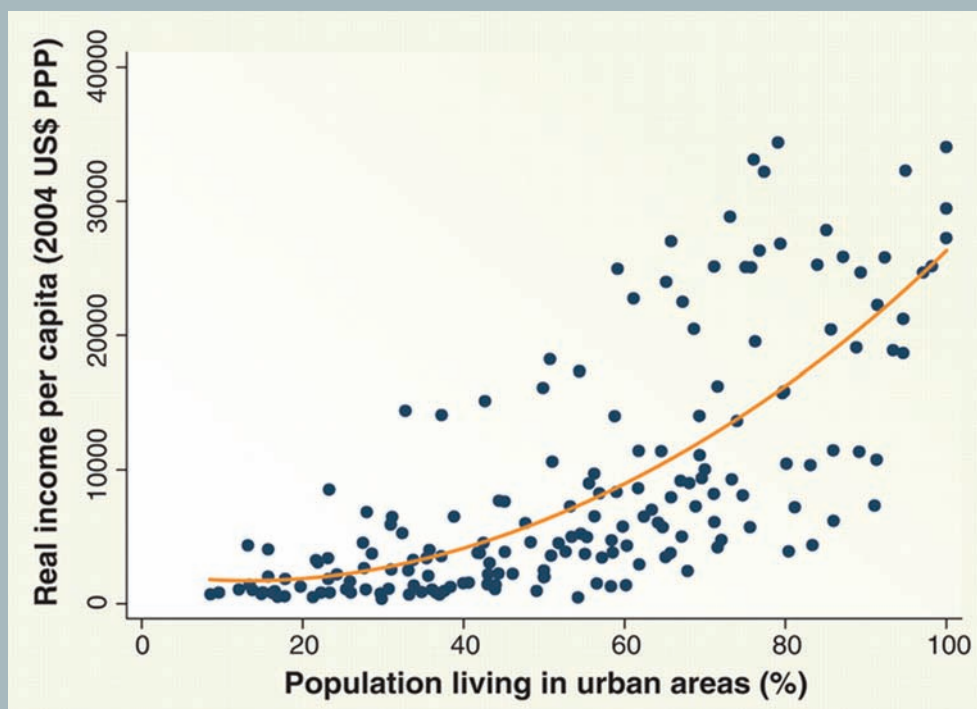


Figure 1. Trends of Chinese urbanization from 1951 to 2010.



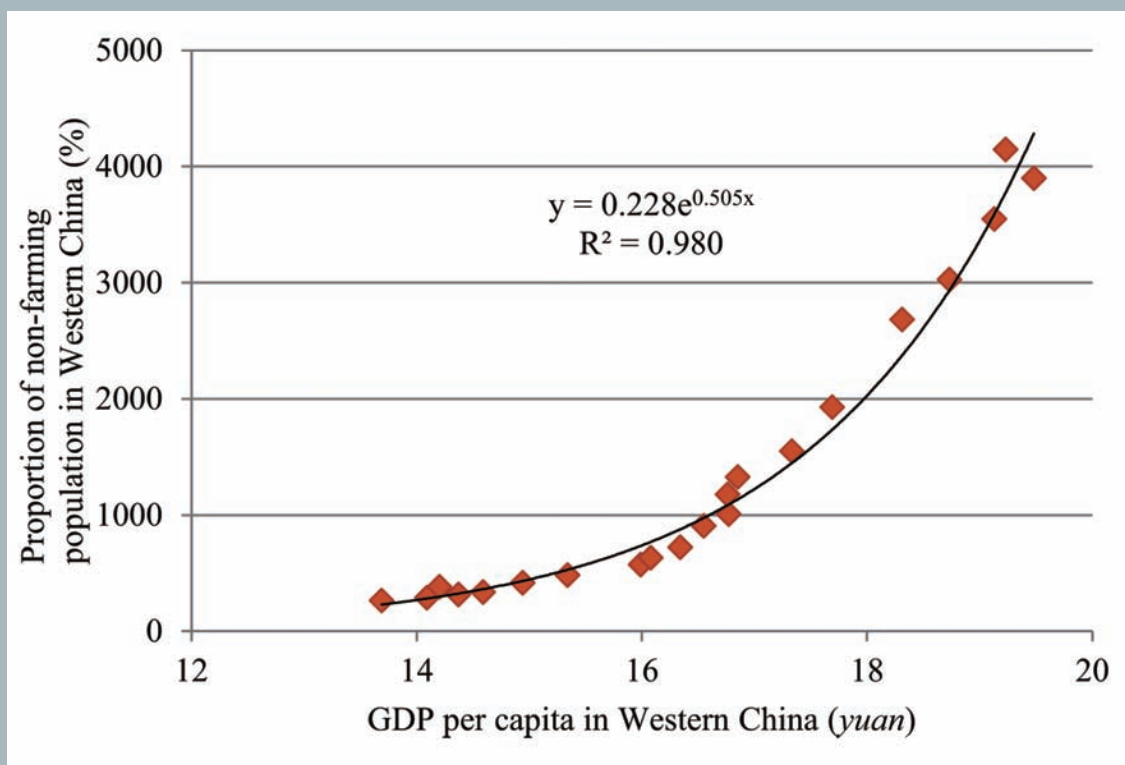
Data from National Bureau of Statistics of China³⁹

Figure 2. Urbanization level and real income per capita across nations.



D. E. Bloom, D. Canning, and G. Fink⁴⁰ © American Association for the Advancement of Science

Figure 3. Urban population share and GDP per capita in Western China.

Data from China Statistical Yearbook¹

economic development in the city and with a spillover effect in the inland region in China.⁶ Thus, urbanization and associated changes can become a powerful driving force for socioeconomic development, and provide an opportunity for poverty alleviation and human development.

In addition, urbanization has the potential to relieve eco-environmental pressures of population in Western China, both directly and indirectly. Population pressure on sensitive ecosystems through inappropriate and excessive use has been cited as the most powerful agent of ecosystem degradation in Western China,⁷ and reducing such pressure often becomes the most important task of the many ecological protection programs.⁸ Cities can provide alternative settlement form, education, and job opportunities that

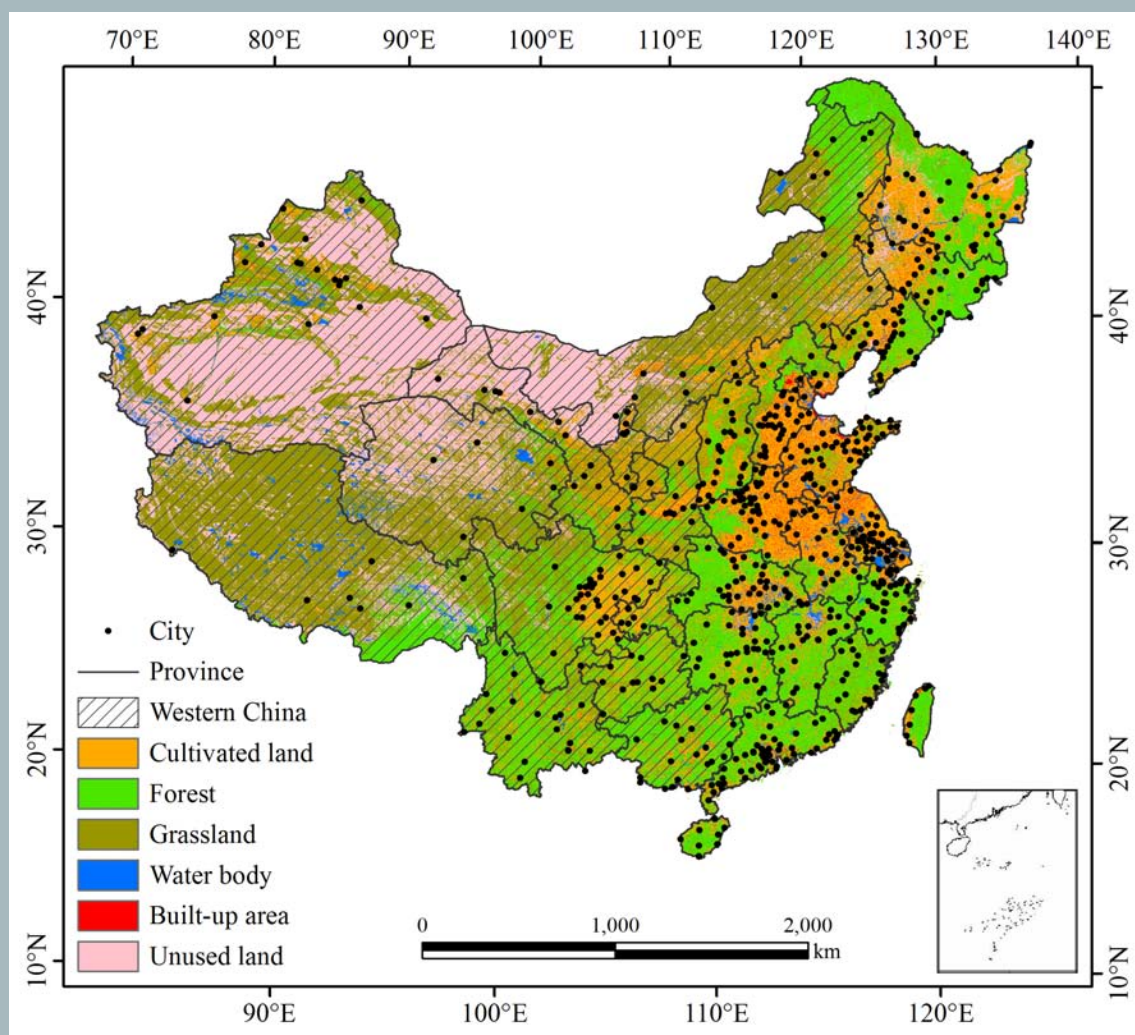
can reduce direct pressure on sensitive ecosystems. Indirectly, cities can be more environmentally friendly than rural living. As a developing region, urbanization will inevitably increase the living standard of people and the resource and environmental impacts associated with income growth in Western China; in the long run, it has the potential to become a more sustainable habitat form. Given the same income level, cities show higher per-capita environmental efficiency than their rural counterpart,⁹ often due to their much higher density and efficiency of scale.

Therefore, if urbanization can be promoted well, it can potentially improve at least four key types of capital in Western China, namely, social, economic, environmental, and natural capital. It can serve as a powerful agent of change, as the urbanization process

requires infrastructure development such as transportation systems and urban environmental infrastructure, accompanies industrial development, and brings about changing lifestyle and consumption behavior of local people.

While there is strong positive evidence for urban development, it is not without risk, and careful attention needs to be paid to the special features in Western China, illustrated as constraints and challenges detailed in the following. Such risks require a full and careful examination before large-scale policy instruments are introduced. It is important to note that promoting urbanization in Western China should not be aiming at attracting large-scale migration from outside of the region, which was the case in eastern coastal regions. It should not be about simply enhancing the urbanization level in the

Figure 4. City distribution in China in 2005.



Data from Data Center for Resources and Environmental Sciences Chinese Academy of Sciences (RESDC)

region either. Rather, it should be promoted as an agent to provide an environmentally and socially sustainable habitat form that (a) provides support for Western China development via attracting and retaining a high-level labor force; (b) reduces population pressures on the ecosystem and environment; and (c) provide a platform for economic development and poverty alleviation. In other words, urbanization in Western China needs to be viewed and utilized as an agent for real, positive change to support the overall green development goal in Western China.

Current State

The current state of urbanization in Western China can be characterized as a relatively low level of urbanization, with smaller city size, strong intraregional disparity (Figure 4),¹⁰ unbalanced economic structure and lower level urban infrastructure, and resultant low urban attraction.

Relatively Low Urbanization Level

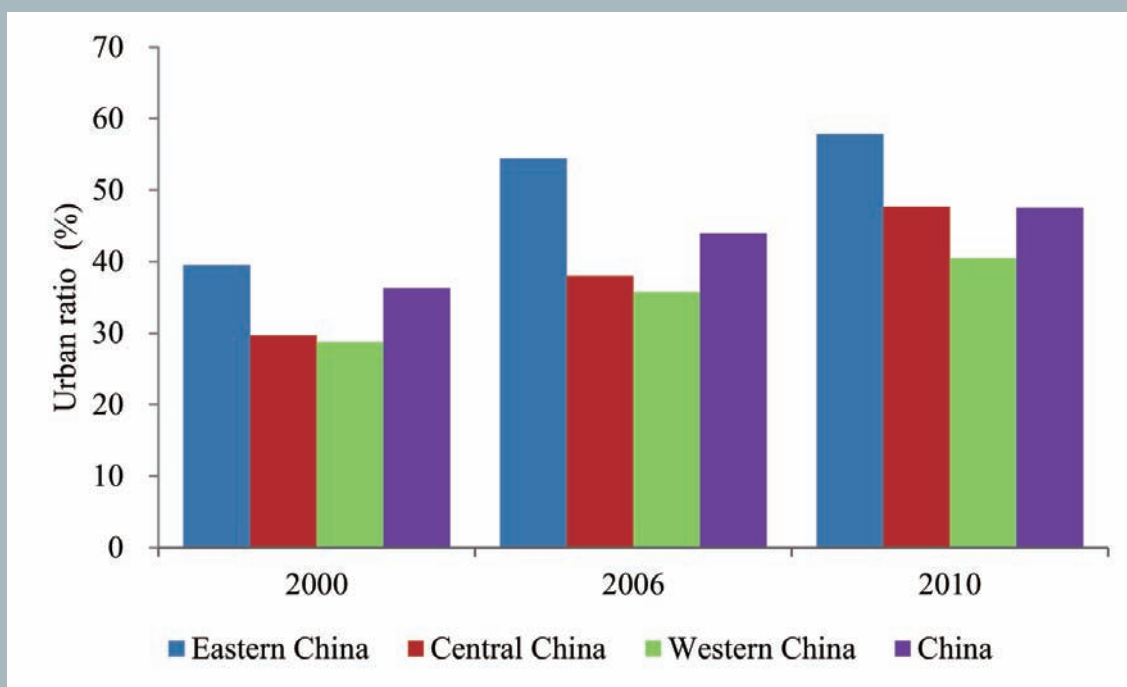
Though the pace of urbanization has accelerated during the year of

2000–2010, largely due to the Western China Development Strategies, the gap between the eastern and Western urbanization levels has been enlarged (Figure 5), and is estimated to be widened in the future.

Smaller Number and Size of Cities

Figure 4 shows the spatial distribution of cities in China. It can be seen that cities are predominantly located in the eastern and central parts of China, and Western China has fewer cities and with much lower

Figure 5. The urbanization ratio from 2000–2010.

Data from National Bureau of Statistics of China⁹⁸

density. Among all cities in Western China, there are only three pairs of cities within 500 km distance of each other, and 11 pairs of cities within 500 to 1000 km. The rest of the cities are more than 1000 km apart, and six of them are even more than 4000 km apart. Of the 287 cities that are above prefecture level, 121 cities are in Eastern China, 81 cities in central China, and 85 cities in Western China (Table 1). The share of relatively small cities in the Chinese context, defined as having a population below 0.5 million, is the highest in Western China.

Strong Intra-regional Disparity

There is a large disparity in urbanization level within the western region. For example, the urbanization level of Inner Mongolia, which is the highest among the western provinces, had reached to 53.4% at the end of 2010; in Tibet it was 23.8%, which is the lowest among the western provinces.¹¹

Unbalanced Economic Structure

Many cities in Western China have a similar industrial structure, with dominating industries being mining, energy, and raw material processing. Such similarities suggest a lack of diversification, which often lead to excessive competition among cities. There is also room for enhancing scale in these industries. The contribution of primary industry to the region's GDP is the highest in China, but GDP per capita in the sector is significantly lower than that of secondary and tertiary industry, which can be a pressure for rural–urban migration.¹²

Lower Level Urban Infrastructure and Low Urban Attraction

Table 2 compares the levels of basic infrastructure and public facilities among different regions in China. It can be seen that in all indicators, cities in the western region lag behind the eastern region and behind the national average

for China. Similar tendencies can be found in “soft infrastructure,” such as public education, public health and insurance, living standard, and entertainment. Among the 2,358 higher education institutions around China in 2010, 1,181 were in Eastern China, and only 564 institutions were in Western China. In terms of radio and TV coverage, nearly 99% of people in Eastern China could listen to radio and watch TV programs, while the radio and TV coverage in the western region was 94.62% and 96.10%, respectively. As a result, cities in Western China are much less attractive than their eastern counterparts; in 2010, western cities attracted less than one-tenth of the foreign investment compared to that of Eastern China.¹³

Key Constraints/Challenges

Four key constraints and/or contextual issues need to be kept in mind when promoting urbanization in the western

Table 1. The Number of Cities at Prefecture Level and Above				
Population	Eastern China	Central China	Western China	China
4 million and more	9	2	3	14
2–4 million	19	6	5	30
1–2 million	33	24	24	81
0.5–1 million	46	36	27	109
0.2–0.5 million	12	13	24	49
Fewer than 0.2 million	2	0	2	4
Total	121	81	85	287

Data source: National Bureau of Statistics of China.⁴³

region. First and foremost, the region has a fragile ecological system that provides vital ecosystem services to the rest of the country, which should be considered as an overarching framing constraint. Second, while overall Western China has abundant resources in general, the shortage in some key resources, such as water, already is a strong constraint. Third, the region has a relatively low starting point, as local industries are relatively weak and underdeveloped, and both hard and soft urban infrastructure is insufficient. Fourth, the region has a rich and diverse social and cultural background, with many ethnic minority groups, each with different lifestyle and traditions. Urbanization needs to be promoted with respect to

this unique natural, economic, and social situation of the region.

Fragile Ecosystem

Soil erosion and desertification are severe in Western China; up to 95% of all desertification occurred in western provinces such as Xinjiang, Inner Mongolia, Tibet, Gansu, and Qinghai in 2009. While natural geographical conditions in Western China are not favorable, overgrazing and other unreasonable development activities contributed highly to the ecological fragility in the region.¹⁵ Strict regulation of land use, including newly built-up areas associated with urbanization, is required.

Water Resource Constraints

While the total amount of water resources is abundant in Western China, with up to 56% of the national total, available water resources are very limited, as the water resources located in the upper reach of the Yangtze and Lancang rivers and the alpine zone of the Qinghai–Tibet Plateau could not be used. The shortage and inequality of distribution of available water resources is another constraint on urbanization in Western China. Half of the twelve provinces of Western China are water-shortage areas, and seasonal water shortage happens frequently in most regions of Western China. For example, Ningxia province has severe water shortage with less than 500 m³ per capita water sources, Shanxi and Gansu provinces have moderate shortage with per-capita average between 1000 and 1700 m³, and Guizhou, Inner Mongolia, and Chongqing City have between 1700 and 3000 m³, categorized as mild water-shortage areas.¹⁶ In the remaining six provinces, even though they are not categorized as water-shortage areas, the conflict in the demand and supply is still sharp due to the distribution of available water resources.¹⁷ In recent years, glaciers, which are the main source of water in Western China, have shrunk notably due to climate change, which has led to the reduction of water storage in regional lakes.¹⁸ Water resource



A village as seen from Bada, Yuanyang County, Yunnan.

Wikimedia Commons/chenyuan

Table 2. Level of Public Facilities in Cities by Region in 2010

	Coverage Rate of Urban Population with Access to Tap Water (%)	Coverage Rate of Urban Population with Access to Gas (%)	Number of Public Transportation Vehicles per 10,000 Population (number of cars)	Per Capita Area of Paved Roads (m ²)	Per Capita Public Green Areas (m ²)	Number of Public Lavatories per 10,000 Population (seats)
China	96.68	92.04	9.71	13.21	11.18	3.02
Eastern China	98.03	98.03	10.25	15.39	12.55	3.25
Central China	95.11	85.65	8.28	12.80	9.85	2.80
Western China	94.18	83.95	9.53	11.92	10.00	2.68
0.2–0.5 million	12	13	24			49

Data source: National Bureau of Statistics of China.¹⁴

availability and distribution need to be taken into account seriously in planning the location and scale of urban development in the region.

Weak Social–Economic Foundation

Viable economic activities, in particular the secondary and the tertiary industries, are foundations for urban development. Western China has a much lower level of economic activities compared to other regions, and a much lower share of it comes from non-agricultural activities. In 2010, the total GDP of Western China was less than one-third of the total GDP of Eastern China and the per capita GDP of Western China was less than half of that in Eastern China and lower than the national average.¹⁹ The contribution of primary industry to the total regional GDP in Western China is the highest of the three regions of China, with a much higher percentage of population working in the sector of primary industry in Western China, and with much lower income. According to statistics in the *China Statistical Yearbook 2011*,²⁰ the per-capita GDP in the secondary industry was 9.2 times as much as the

per-capita GDP in primary industry, and the per-capita GDP in the tertiary industry was 4.1 times as much as the per-capita GDP in primary industry. In addition, western industries are mainly focused on resource-intensive heavy industries, such as mining, energy, and raw material processing, which tend to be less beneficial to local residents compared to manufacturing and service industries.

Human capital, for example, human knowledge, talents, and health, is considered to contribute more to the economic growth compared with physical capital and the amount of labor force.²¹ The labor-force quality in Western China is generally lower than in other regions due to low educational level. As of the end of 2010, in terms of China's illiteracy level, eight out of twelve western provinces had higher illiteracy rate than the national average of 4.08%, with the highest reaching 24.42% in Tibet. The relatively low education level of the labor force in the region was considered one of the key barriers hindering the western development. Labor quality is considered to be one of the key barriers hindering the western development in this knowledge age.²²

Cultural Sensitivity

Western China has a rich and diverse cultural background and is home to members of 55 of China's 56 ethnic minority groups, who all have different lifestyles and traditions. For example, in Qinghai province, Han Chinese account for about 55% of the population, while Tibetans make up about 21% and Hui 16%, according to estimates.²³ The main minority groups in Western China are Tibetan, Yi, Qiang, Bai, Miao, Naxi, Nu, Hani, Lahu, Lisu, Luoba, Dulong, Dai, Pumi, Jingpo, and Achang, which have their own values, preferences, and culture.²⁴ Some of these ethnic groups are nomadic and are not used to or necessarily preferring urban life. Contradictions and conflicts may be aggravated by the closer contact and interaction brought about by urbanization.

There are already alarming signs of cultural and historical sites being destroyed, due to the construction of infrastructure and tourism industry in Western China. For example, the "Stone Buddha" in the Gengma county of Lincang region, which is an old caste cave from the new stone period and the site of local religious activities,



The Beipanjiang River Railway Bridge on the Liupanshui–Baiguo Railway in western Guizhou is the highest railway bridge in the world.

has been damaged due to the regional tourism resources development. This has caused strong objections and resistance from local people. Many development projects are rejected by some minority peoples, indicating that



The Long-horn tribe, a small branch of ethnic Miao in the western part of Guizhou Province, China.

cultural sensitivity is an important issue to be considered when promoting urbanization in Western China.²⁵ This suggests the importance of reexamining current practices, and adopting a culturally sensitive way forward.

Unique Opportunities

The western region enjoys unique opportunities in terms of promoting urbanization.

First, the central government's determination to develop the region can be the "wind under the wings" for the region, as high-level political attention and well-designed and coordinated government policies can provide a favorable environment and window of opportunity for sustainable urban development. Various favorable policy measures covering taxation, investment, industry and infrastructure development, education, research and development (R&D), and so on, have been or will be introduced by the central

government.²⁶ According to the report of the 16th National Congress of Communist Party of China, preferential policies and institutional arrangements for Western China span 18 aspects: (a) increasing capital investment in the construction; (b) arranging western construction projects in priority; (c) increasing the transfer payments; (d) increasing the financial credit support; (e) improving the soft investment environment; (f) providing tax breaks; (g) providing land preferential policies; (h) supplying preferential policies for investment in mineral resources exploration; (i) adjusting the regional economy by pricing and charging mechanism; (j) enlarging the range of investment open to foreign investors; (k) opening more channels for foreign capital utilization; (l) relaxing the restrict of use of foreign capital; (m) promoting the development of foreign trade; (n) promoting regional cooperation and counterpart aid; (o) increasing the attraction for talents and make good use of them; (p) emphasizing the leading role of science and technology; (q) increasing educational input; and (r) strengthening cultural, health facilities, and other infrastructure construction.²⁷

Second, the region's abundant natural resources are still underdeveloped. According to statistics,²⁸ 23% of arable land, 51% of forestland, and 94% of grassland around China were located in the western region, which provide opportunities for the development of agriculture and agricultural and livestock products processing. Mineral resources are also abundant in Western China. The concentrated distribution of mineral resources in Western China produces a strong relative advantage for the region, and provides a strong foundation for pillar industries.²⁹ According to a report from the China Mining Association,³⁰ among the total 157 mineral resources with proven reserves throughout the country, 138 mineral resources can be found in the western region of China. Among these, more than 30 mineral resources such as coal, petroleum and natural gas, rare earth minerals, copper, and others are abundant compared to other regions. The prospective reserve of coal in

Xinjiang ranks at the first place in China. The prospective potentials of petroleum and natural gas resources in the Ordos Basin, Talimu Basin, Zhunge'er Basin, Tulfan and Hami Basin, Chaidamu Basin, and Sichuan Basin are also promising. The abundant mineral resources may promise effective industrial development, which had been proved by the development process in many regions like the industrialized Ruhr area of Germany.

Third, there are some unique opportunities in terms of industrial development. The low labor cost in the western region can be attractive for labor-intensive industries in the eastern region to relocate. This, however, needs to be examined with caution, to avoid the relocation of pollution together with such industries.³¹ There is already evidence of resource-intensive and polluting industries relocating to the inland region.³² There are many world heritage sites, national key scenic spots, historical and cultural cities, and meeting spots of various minority cultures with relatively well preserved traditional minority culture in Western China, which provide advantages for the development of tourism industry. Stronger policy focus on the protections and improvements of the ecological environment in western development can generate unique opportunities for new industries such as environmental protection and new energy technologies in the region.

Fourth, the relatively low current level of urbanization means there is little minus legacy and associated need to retrofit, which can be costly. It also means an opportunity to embrace state-of-the-art sustainable development technologies and practices, including building code, infrastructure, planning approaches, and others. Late-developing advantage is something urbanization could rely on in Western China. Unlike in the eastern coastal region, where urbanization occurred when the country had a much lower economic strength to fund infrastructure development, financial constraints for urban development in Western China can be eased with the inflow of capitals associated with the Western China development initiative.



Wikimedia Commons/Collegota

The Pamir Mountains of the Xinjiang Uighur Autonomous Region of Western China, Central Asia.

Lessons and experiences from Eastern China can be used to avoid many potential problems and difficulties by more rational planning, which can in turn reduce the cost of urban construction.³³

Fifth, as urban air and water pollution in eastern cities generate increasing health concerns, relatively clean air and water in some secondary cities in the west can be attractive to some well-educated human capitals. The soaring real estate price in coastal cities started to divert more and more college graduates to settle in western cities. Changing lifestyle and the appreciation of the proximity to nature³⁴ provide an opportunity for Western China to change the natural resource and landscape advantages into economic advantages.

The Way Forward—Guiding Principles and Priorities

Promoting urbanization in Western China could be a long winding road that requires careful navigation. To meet the challenges and seize the opportunities, several guiding principles

and priorities are essential in terms of developing urbanization policies in the region.

Adopt a Differentiated and Tailored Urbanization Policy, and Align With the National Functional Zoning System

This is to ensure that the type of cities developed and their functional role are compatible with the overarching purpose and constraints set out by the national Main Function Oriented Zoning System (MFOZ). The MFOZ defines zones that are suitable for different level of development, zones that should be developed under restriction, and zones where any development activities should be prohibited. According to this, only a small part of Western China belongs to the key zones for development; the remaining parts are either in the restricted development or no development zones.³⁵ Urban development should strive to be a vehicle to achieve MFOZ within its larger regional context, rather than undermine it. Other local context, such as the geographical



The Dazhu Rock Carvings, a World Heritage Site in Chongqing Municipality.

location, local resource availability, and environmental capacity, needs to be carefully taken into consideration in developing cities, to avoid one-size-fits-all kinds of solutions, or the rushing into similar but mutually competing and thus unrealistic goals among cities. How to operationalize such principles is yet to be explored, as the implementation of MFOZ itself is not clear yet, and also it might be against some local government interests.

Enhance Urban Infrastructure Investment as Preventative Measures of Negative Environmental Impacts of Urbanization

Urban development in Western China should learn from the lessons of the coastal region, and be promoted with minimum possible impact to the environment. For example, water pollution is one of the most serious environmental issues in the coastal area, and untreated urban wastewater has been one of the most significant sources. This was particularly severe when cities didn't have sufficient wastewater treatment facilities, or the capacity to properly operate them. Urban environmental infrastructure is

important in protecting water quality in the upstream of main rivers, particularly in the western region, but it can be costly and often requires substantial initial investment. Given the strategic importance of the western region in terms of water resources in China, and given the relatively low development level and financial capacity for the region to put in place costly urban infrastructure from the beginning, it is essential to develop an effective and efficient financial mechanism to install urban environmental infrastructure up front, rather waiting for the cities to obtain financial power to do so. Together with diverse financial mechanisms, including public-private partnership, part of the central government investment in economic infrastructure could be diverted into supporting urban infrastructure in the region. Current infrastructure development in the region is more focused on economic infrastructure, such as highways and airports. While recognizing the importance of such regional economic infrastructure, equal emphasis should be given to urban infrastructure to minimize environmental impact of new and growing cities in the west.

Develop Long-Term, Green, Eco-City Development Strategy

Specifically, attention needs to be paid to the following four aspects: Building standards and regulations need to be established and implemented; a compact urban development model needs to be adopted to avoid urban sprawl, and public transportation system should be given higher priority; establish a long-term, green industrial development strategy as an integral part of the urban development strategy to support urban functions; and state-of-the-art and suitable technologies, planning, and management approaches need to be sought out and adopted.

Invest in Soft Infrastructure

Invest in building a number of medium-sized, attractive and highly livable cities that provide a state-of-the-art physical and cultural living environment, with higher education institutes and R&D centers. One of the key constraints of Western China development is the lack of, or brain draining of, a high-quality labor force. In Guizhou province, for example, while the province attracted 111 personnel with master's or

higher degrees from 1995 to 2000, it lost 147 during the same period.³⁶ In terms of skilled workers, the numbers were 604 versus 1,738. While the ability to provide economic opportunities will be of vital importance, strengthened soft infrastructure such as providing better physical and cultural environment and attracting higher education institutes and research and development facilities can also be important factors in a workforce destination. These cities can be anchors of the region in attracting and retaining high-level human capitals and high value-adding industries into the region, and eventually can become regional innovation and incubation hubs.

Systems Approach Toward Integrated Urban–Rural Development to Enhance Urban–Rural Mutual Support and Co-Development

Cities and their hinterlands are increasingly connected, in particular through land use changes driven by urbanization,³⁷ but policies are lagging behind in recognizing such linkages. Peri-urban communities can benefit from urbanization through being exposed to new job and market opportunities, but they can also become vulnerable to associated changes, such as land use change.³⁸ It is important to adopt a coordinated systematic approach toward urban and rural development, to reduce urban–rural dichotomy and competition for resource and capacity, and to enhance/harness positive spill over effect from urban development.

Summary

Western China has played a critical supporting role for economic development in China over previous decades, by providing cheap labor and abundant natural resources, but it is time to reap some returns. Research shows a strong correlation between urbanization and economic growth and between urbanization level and per-capita income. Therefore, urbanization and associated



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Jiuzhaigou Valley National Park, Sichuan, China.

changes can become a powerful driving force for socioeconomic development, and can provide an opportunity for poverty alleviation and human development. Also, it has the potential to relieve eco-environment pressures of population in Western China.

For sustainable urbanization in Western China, there is still a long way to go, and there are both challenges and opportunities. Related to but rapidly increasing urbanization, Western China has the following characteristics: an overall low but rapidly increasing urbanization level, with a strong spatial variety; few urbanized areas, with small size and low density; a relatively weak growth engine function of cities; and few cities have fully fledged urban function and enough attraction to retain high-end human capital. However, Western China also has unique opportunities in terms of promoting urbanization. First, the central government's determination to have the region develop can be the "wind under the wings" for the region. Second, the relatively low current level of urbanization means there is little "minus" or historical legacy and the associated necessity to retrofit, which can be costly. Third, as urban air and water

pollution in eastern cities is drawing increasing concern, relatively clean air and water in some secondary cities in the western region can be attractive to the well-educated "human capital."

Sustainable urbanization in Western China is a highly complex issue that requires sophisticated management approaches. Despite significant investments and changes already undertaken, severe impacts on the natural environment are already being experienced and some environmental services are at or near a point of severe ecological and health-related disruption. Nonetheless, there are also significant opportunities in this region of enormous natural resource wealth and cultural diversity. What is required is a well-articulated, integrated, consistent and strategic framework and approach involving all levels of government.

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