CLIMATE-RESILIENT CITIES IN CHINA: POLICY AND CASES

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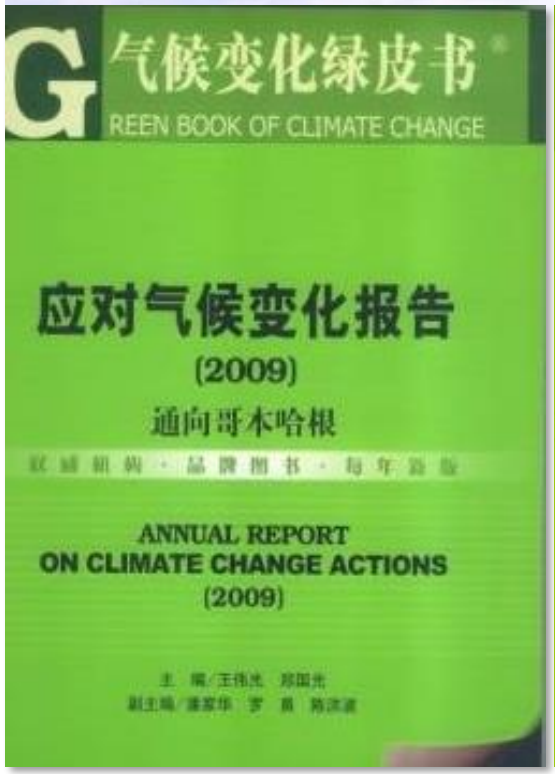
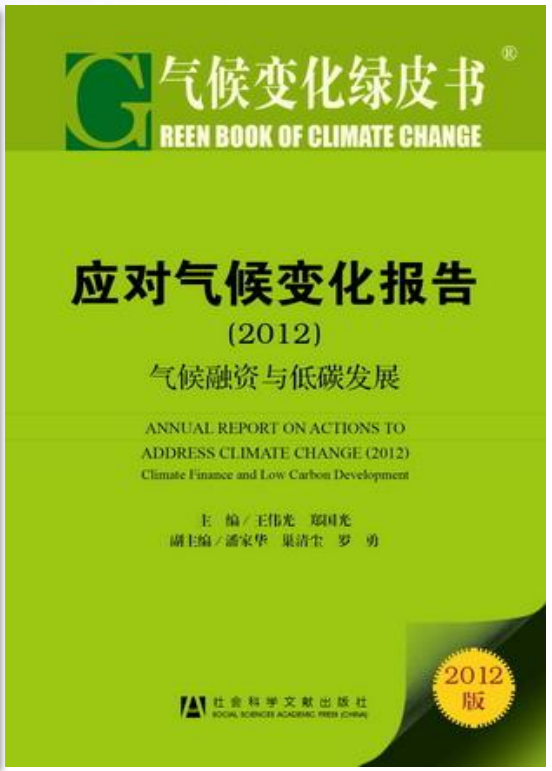
KEY POINTS

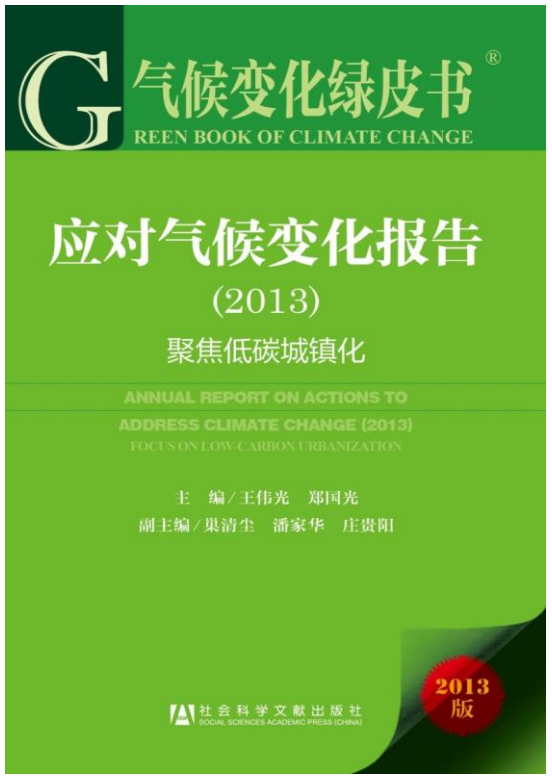
- Cities are hotspots in adapting to climatic risk.
- China launched pilot projects on Low carbon cities and climate-resilient cities.
- How to integrate mitigation and adaptation and to build a low carbon-resilient city?
- Some research work on Climate-resilient cities.
- Guangyuan case.

GREEN BOOK OF CLIMATE CHANGE

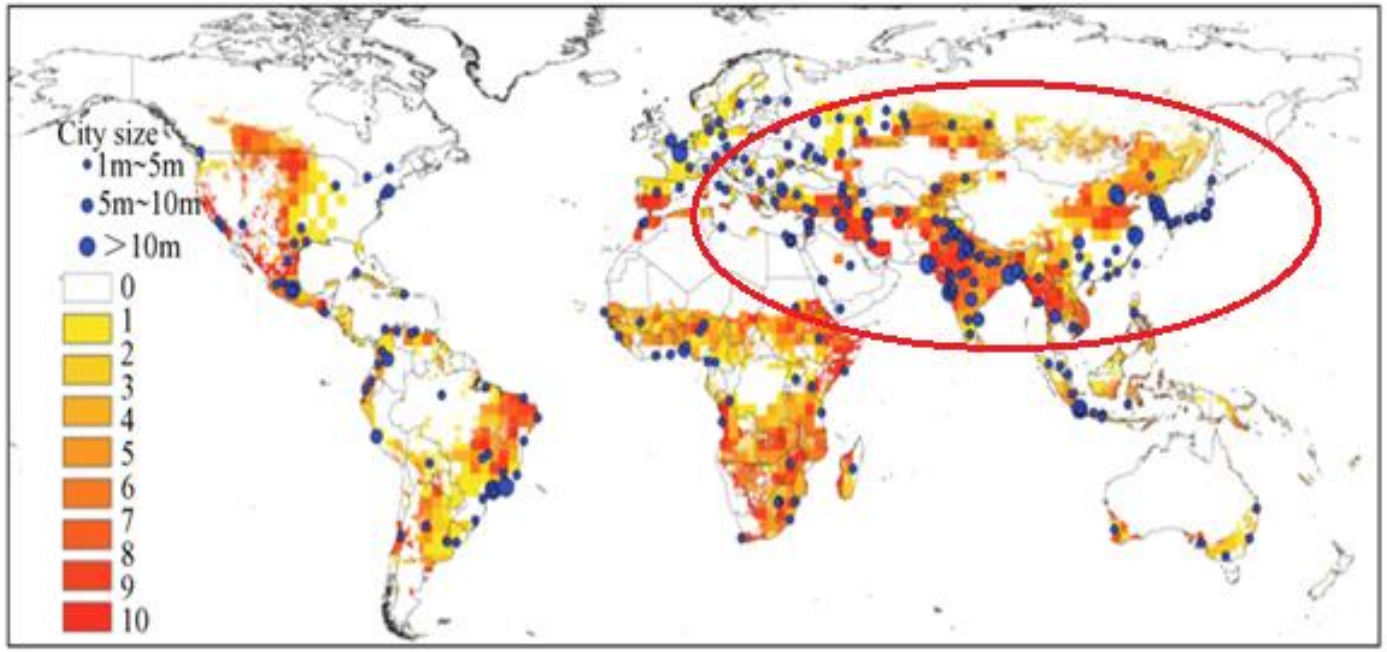
第11部气候变化绿皮书 The 11th CC Green Book
《应对气候变化报告（2019）：防范气候风险》







CITIES AS HOTSPOTS FOR ADAPTING TO CC
城市：适应气候变化的热点区域



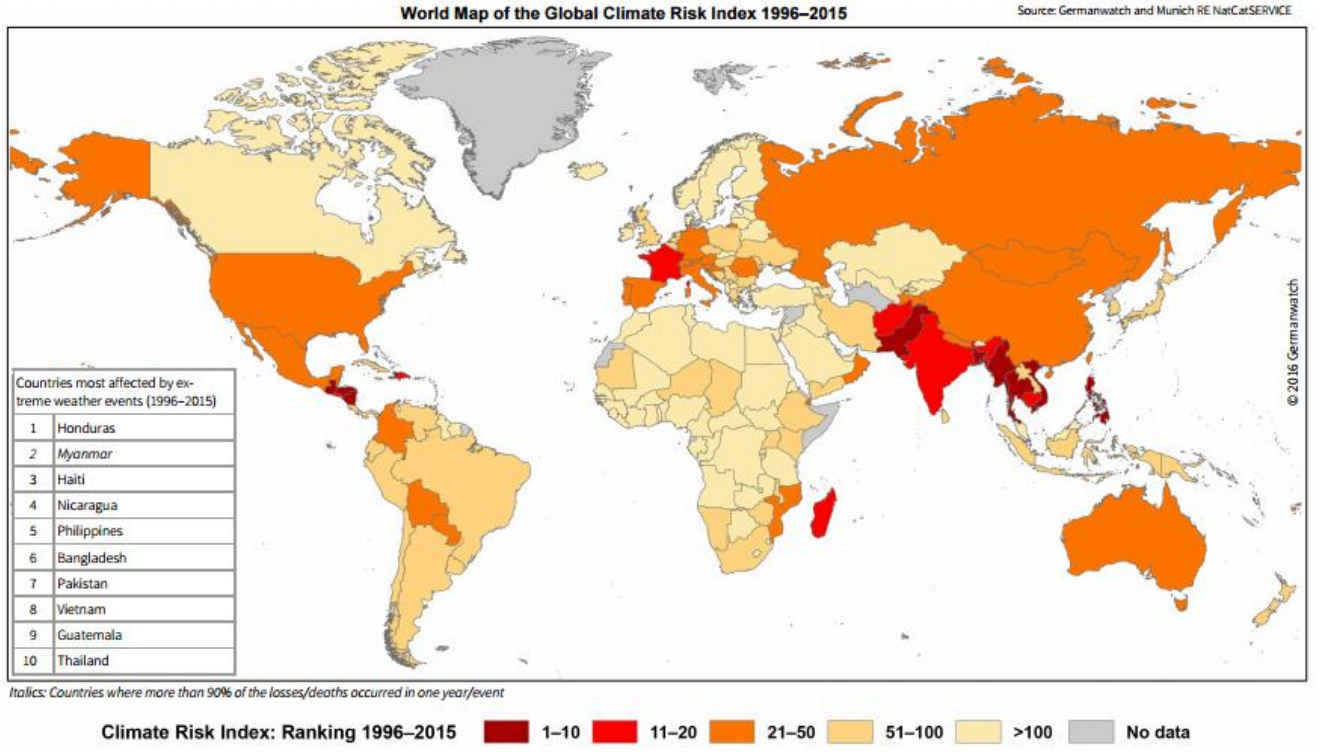
资料来源：de Sherbenin, A.、A. Schiller和 A. Pulsipher。即将出版。"全球城市对气候灾害的脆弱性"环境和城市化。说明：灾害风险是根据气旋、洪水、滑坡和干旱风险综合得出的累计结果。

Mega-cities with more than 1million people will be at higher risk to cyclone, flood, landslide , drought, etc.

- 70% people will live in cities by 2050, nearly 6.4 billion population.
- Urban disaster risk to climatic extremes is increasing, especially in the coastal low -lying areas.
- 2050年，全球将有70%的人口（64亿人）居住在城市。

(World population outlook 2011)

GLOBAL CLIMATE RISK INDEX
全球气候风险排名



During 1995-2014, China ranked at the top 30 of CRI among more than 200 countries,. (Zhai et al, 2016)

近20年来，6个南亚国家位居全球气候风险前10；中国多年位居全球前30位。
（翟建青等，2016）

Climate Risk Index = {Death toll; Losses per unit GDP in %; Deaths per 100 000 inhabitants ; Absolute losses (in US$ PPP) }

全球气候风险指数包括四个要素：死亡人口、10万人死亡率、经济损失及单位GDP损失比例。

http://germanwatch.org

BEAUTIFUL CITIES IN CHINA

BEIJING

**XIAN,
SHANNXI**

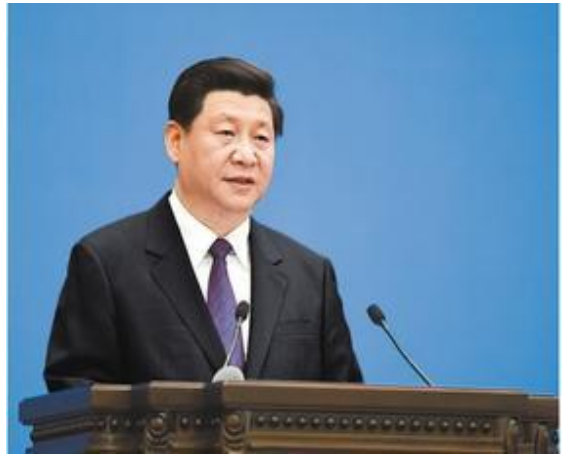
**NANJING,
JIANGSU**

VULNERABLE CITIES IN CHINA

➢近20年来，洪涝灾害在中国 气象灾害事件发生频次和损失占比重最大，分别是40%，63%。

➢Among the total natural disasters in China, floods accounted for 40% of frequency of total events and more than 60% of the total economic losses among that of.

POLITICAL WILLINGNESS FOR GREEN TRANSFORMATION



- *President Xi*: to promote low-carbon green transformation and build ***Ecological Civilization*** （促进低碳绿色转型、建立生态文明） Harmless nature means endless treasure.（绿水青山就是金山银山）

- *Premier Li:* Through energy saving and emission reduction efforts to achieve a "win-win" between economic development and climate change, namely reduce energy consumption and increase economic growth（通过节能减排、应对气候变化，实现经济发展与应对气候变化"双赢"）

CHINA'S GOVERNMENTAL BRANCHES REFORM

- MEE; MNR; MEM

URBAN ENVIRONMENTAL TARGETS IN CHINA

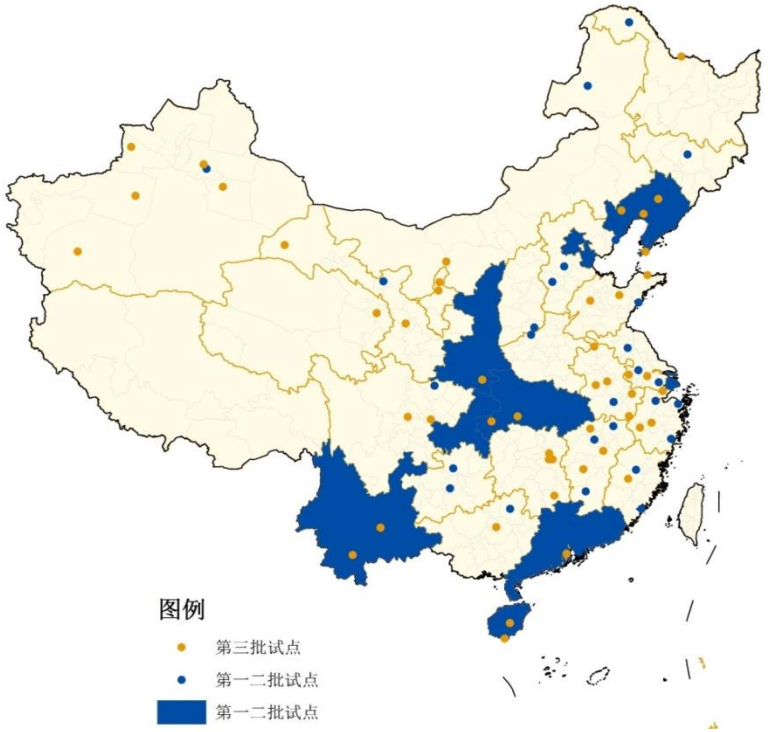
- 住建部、环保部《全国城市生态保护与建设规划（2015-2020年）》，提出生态园林建设、城市污染治理、海绵城市建设等2020年目标:
- 城市环境保护投资占GDP比例不低于3.5%
- 细颗粒物（PM2.5）未达标地级及以上城市浓度平均下降18%
- 老城区的雨污管网改造
- 省会城市（建成区）生活垃圾无害化处理率达到100%

- **MOHURD & MEE:** "*China's Urban Ecological Protection and Construction Planning (2015-2020)* " *targets:*
- *Urban environmental investment of GDP* ≥ 3.5%
- PM 2.5: reach to 18% reduce rate in major cities (≥*500,000 population*)
- renovate sewage pipelines in old communities
- 100% solid waste disposal in provincial capital cities

PRIORITY AREAS IN CHINA'S CLIMATE POLICIES

	National CC Programe (2007)		***National 12Five-Year Plan (2010)***		***National Adaptation Strategy 2013***
	Mitigation	Adaptation	Mitigation	Adaptation	Adaptation
Agriculture	√		√	√	√
Forestry	√	√	√	√	√
Energy/Basic industry	√		√		
Building & Construction	√		√		
urban wastes	√		√		
Infrastructure		√			√
Transport	√		√		
Land use/urban planning					√
Ecology/water/coastal areas		√		√	√
Disaster risk reduction		√		√	√
Health		√		√	√
Others (tourism, insurance, etc)					√

CLIMATE POLICIES & PRACTICE IN CHINA:
LOW CARBON CITIES



- NDRC ***Low Carbon Pilot project,***
  2010.07-2017.01:
  6 provinces and 81 cities/counties/districts

- MOHURD: 2013-2015
  18 ***Low Carbon Ecological Cities*** supported by China-EU cooperation

◆ ***Low Carbon pilot projects***:

priority areas: green building, renewable energy, solar PV, river restoration, sewage water disposal, urban green ways, new energy vehicles, urban rail transit, carbon trading, low carbon technology, innovation in policy and institutional set up, etc.

绿色建筑、可再生能源建筑应用、太阳能光伏城市、水系生态修复、污水处理、城市绿道、新能源汽车、轨道交通、低碳技术、碳交易、机制创新等等

CLIMATE POLICIES & PRACTICE IN CHINA: RESILIENT CITIES

- Adaptation Strategies

1. ***China's National Strategy on Adaptation to Climate Change*** *(NDRC, 2013)*
2. ***Adaptation Action Plan in Urban Areas*** *(NDRC, 2016)*

- ***City resilience*** reflects the overall 'capacity of a city (individuals, communities, institutions, businesses and systems) to survive, adapt and thrive no matter what kinds of chronic stresses or acute shocks they experience'. *(Rockefeller Foundation: 2013).*

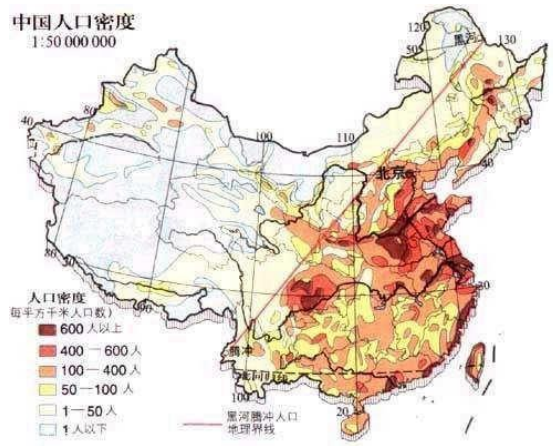
- Demonstration projects on Resilient Cities

1. ***Sponge Cities***: 28 pilot cities *(MOHURD,MWR,MOF)*
2. ***Climate-Resilient Cities***: 30 pilot cities *(NDRC,MOHURD)*

ADAPTATION ZONING BY VULNERABILITY MAPPING: A POLICY CONCERN

Adaptation Zoning	Provinces
Ⅰ:Developmental Adaptation Prioritized Areas发展型适应优先地区	Gansu, Ningxia, Guizhou, Qinghai, Anhui, Yunnan, Xizang, Guangxi, Chongqing
Ⅱ:Incremental Adaptation Prioritized Areas 增量型适应优先地区	Beijing, Tianjin, Zhejiang, Shanghai, Fujian, Guangdong, Liaoning, Jilin, Heilongjiang, Jiangsu
Ⅲ:Mixed Areas 发展型与增量型并重地区	Jiangxi, Hainan, Hubei, Henan, Hebei, Shandong, Shanxi, Inner Mongolia, Shannxi, Sichuan, Xinjiang

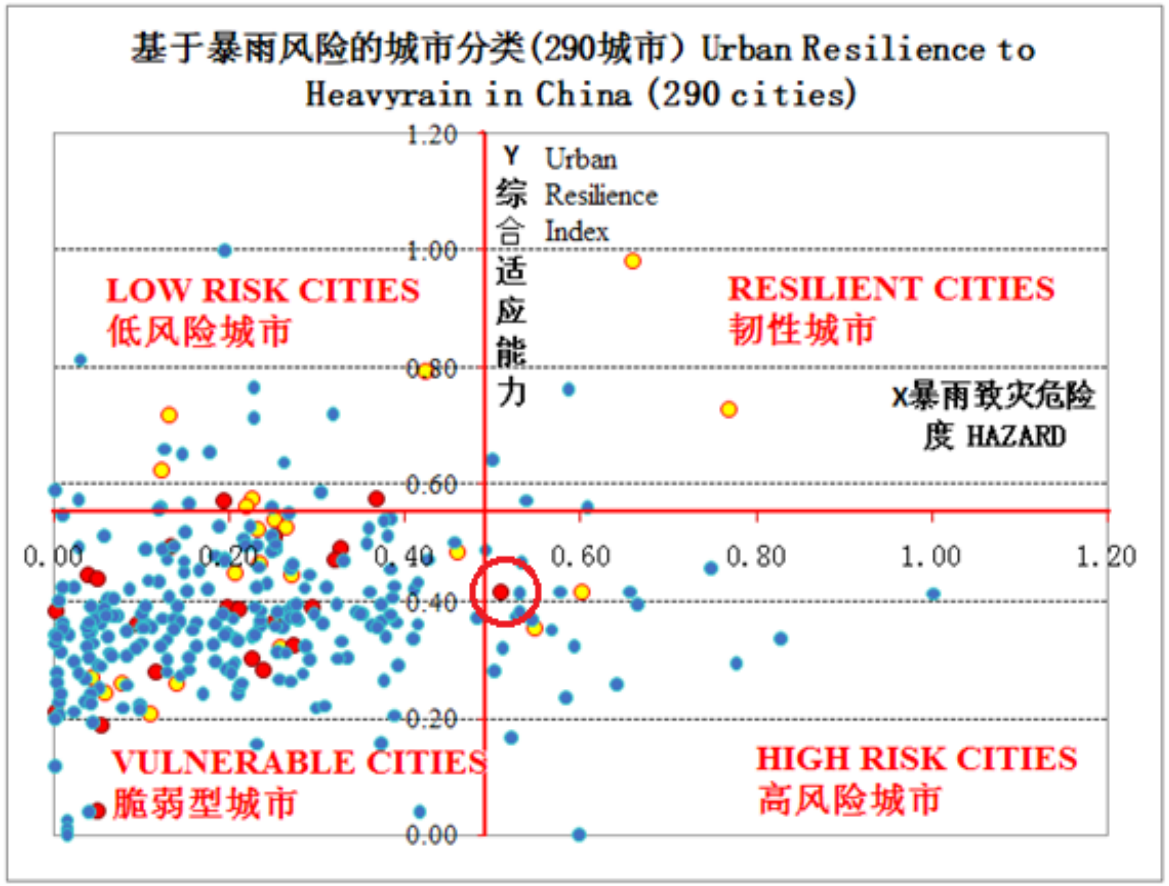
(Zheng et al., 2016)



✓China has a geographical and demographical unbalance in disaster risk mapping ;
✓ Western China is more vulnerable to climate and environmental change than the Eastern urbanized region.

中国城市暴雨韧性分类评估

A TYPOLOGY ANALYSIS ON CHINESE RESILIENT CITIES



《中国人口·资源与环境》）

- Take nearly 290 Chinese cities at prefecture-level and above as example, we constructed ***Heavy Rain Hazard Inedx*** (1971-2016)and ***Urban Resilience Index*** (urban development, green infrastructure, grey infrastructure);
- then categoried four stages and three resilience level: Resilient City (high resilience), Low Risk City (middle resilience), Vulnerable City and High Risk City (low resilience).
- Distribution imbalance: 33.3% of the total cases of pilot sponge cities range from resilient cities and low risk cities, while 92% of the pilot climate-resilient cities attributed into the low resilience stage of vulnerable cities and high risk cities,
- 选择全国280多个地级及以上城市，以1971-2016年作为基准气候态评估期，以暴雨强度和年际变化趋势指标设计致灾危险性因子，以城市发展水平、绿色基础设施和灰色基础设施指标设计城市适应能力指数。

✓ **海绵城市试点**：多为“锦上添花”（韧性城市和低风险城市占到1/3）

✓ **气候适应型城市试点**：亟需“雪中送炭”（脆弱型、高风险城市高达92%）

海绵城市与气候适应型试点城市暴雨韧性比较

类型	海绵城市 pilot sponge cities	分类占比（%）	气候适应型城市 pilot climate-resilient cities	分类占比（%）
韧性城市 Resilient City	珠海,宁波,厦门 Zhuhai, Ningbo, Xiamen	10%	--	0
低风险城市 Low Risk City	深圳,上海,北京,天津,镇江,青岛,武汉	23.3%	武汉,合肥	8%
脆弱型城市 Vulnerable City	迁安,白城,镇江,嘉兴,池州,萍乡,济南,鹤壁,常德,南宁,重庆,遂宁,贵安新区,西咸新区,福州,玉溪,大连,庆阳,西宁,固原	63.3%	内蒙古呼和浩特，辽宁大连、朝阳，浙江丽水，安徽淮北，江西九江，山东济南，河南安阳，湖北十堰，湖南常德、岳阳，广西百色，重庆壁山区、潼南区，四川广元，贵州六盘水、毕节市（赫章县）、陕西西咸新区、商洛，甘肃白银、庆阳（西峰区）、青海西宁（湟中县）	88%
高风险城市 High Risk City	海南三亚 Sanya, Hainan	3.3%	海南海口 Haikou, Hainan	4%

（郑艳，翟建青，李莹等，2018）

气候适应型城市试点情况
PROFILE ON CLIMATE-RESILIENT PILOT CITIES -1

Regional distribution

地区	省份	城市
东北地区	辽宁省	大连市、朝阳市
华北地区	内蒙古自治区	呼和浩特市、赤峰市
华中地区	湖南省	岳阳市、常德市
	湖北省	武汉市、十堰市
	贵州省	六盘水市、黔西南州市兴仁县、毕节市赫章县
	河南省	安阳市
西北地区	甘肃省	天水市、庆阳市西峰区、白银市
	青海省	西宁市
	新疆自治区/新疆建设兵团	乌鲁木齐市、库尔勒市、喀什市、和田市、阿克 石河子市
	陕西省	商洛市、西咸新区
华东地区	浙江省	丽水市
	安徽省	合肥市、淮北市
	山东省	济南市
	江西省	九江市
华南地区	海南省	海口市
	广东省	中山市
	广西自治区	百色市
西南地区	四川省	广元市
	重庆市	重庆市璧山区、潼南区

Major climatic risks

- 主要气候风险：高温、干旱、洪涝、大风、低温冰冻、沙尘暴和雾霾等。
- Heat wave, drought, flood, wind, low temperature and frozen, sandstorm, smog, etc.

气候适应型城市试点情况
PROFILE ON CLIMATE-RESILIENT PILOT CITIES -2

Weakness and Strengths:

- ***Strengths***: half the pilot cities are taking national pilot projects of low carbon cities, sponge cities, ecological garden cities, smart cities, and son on.
- ***Weakness:*** two third of the pilots situated in the middle and west areas, with increasing risk and challenges from fast urbanization and environmental problems
- **有利因素**：28个试点半数以上兼有低碳城市、海绵城市、生态园林城市、智慧城市等国家级试点，具有较好的试点经验和工作基础；
- **不利因素**：2/3试点位于中西部地区，城镇化和工业化提升将加剧环境压力和灾害风险的治理难度。

Priority areas:

- **Urban planning, urban lifelines, building and construction, ecology and landscapes, water safety, disaster management, etc.**
- **试点重点领域**：城市规划、城市基础设施、城市建筑、城市生态绿化系统、城市水安全、城市灾害管理体系等。
- **①disaster risk management 灾害风险管理**
- **②urban ecological system 城市生态系统**：绿色基础设施(green infrastructures)或基于自然的解决方案(nature-based solutions) 作为低成本、可持续、多效益的协同措施，以应对高温和洪水等气候风险。
- **③energy saving and pollutant reduction 节能减排**
- **④poverty alleviation 减少贫困**：城市低收入阶层、外来务工群体是深受气候变化影响潜在贫困人群，然而我国的减贫战略、城市社会保障政策中尚未考虑气候变化影响.

LOW-CARBON RESILIENT URBAN PLANNING

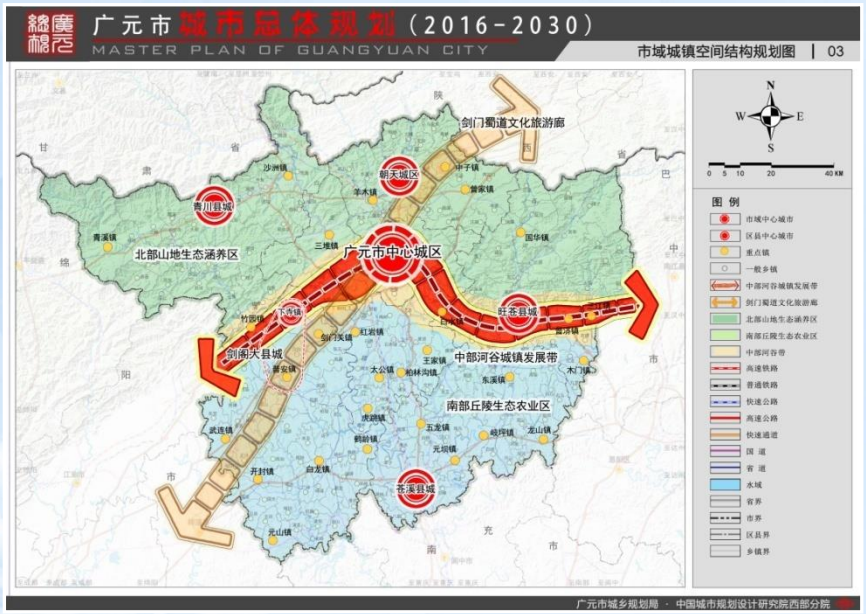
-- A PARTICIPATORY AP RESEARCH FOR GUANGYUAN, SICHUAN, DEC 2019

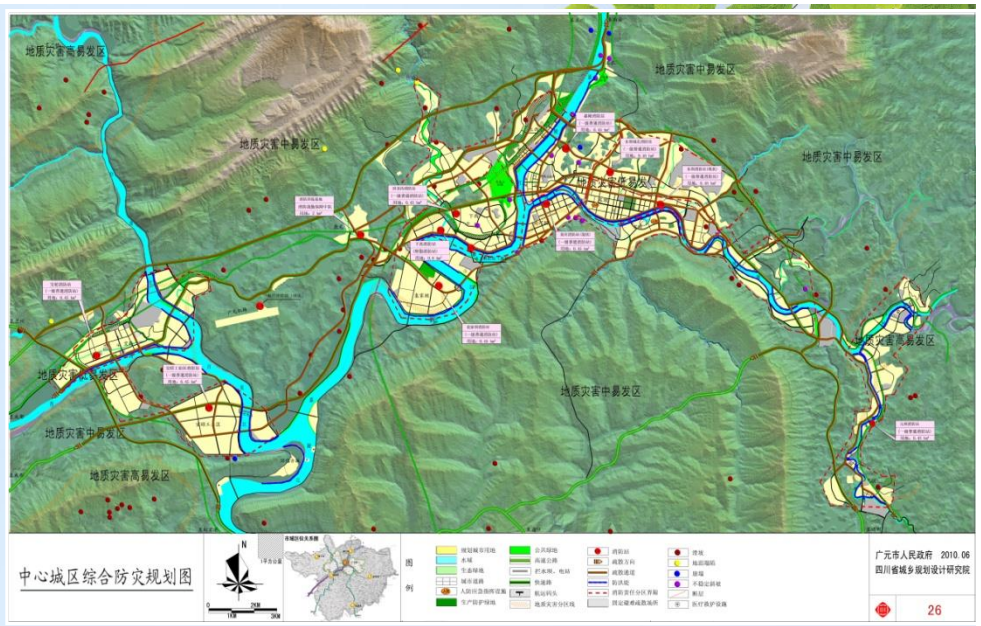
CONFERENCE

WORKSHOP

GUANGYUAN: BUILDING LIVABLE LOW-CARBON RESILIENT CITY

建设宜居宜养宜游的低碳韧性城市





附件

广元市气候适应型试点城市建设

实 施 方 案

广元市发展和改革委员会
广元市城乡规划建设和住房保障局
2016年9月

特市、辽宁省大连市、辽宁省朝阳市、浙江省丽水市、安徽省合肥市、安徽省淮北市、江西省九江市、山东省济南市、河南省安阳市、湖北省武汉市、湖北省十堰市、湖南省常德市、湖南省岳阳市、广西自治区百色市、海南省海口市、重庆市璧山区、重庆市潼南区、四川省广元市、贵州省六盘水市、贵州省毕节市（赫章县）、陕西省商洛市、陕西省西咸新区、甘肃省白银市、甘肃省庆阳市（西峰区）、青海省西宁市（湟中县）、新疆自治区库尔勒市、新疆自治区阿克苏市（拜城县）、新疆建设兵团石河子市等28个地区作为气候适应型城市建设试点。

三、工作目标

以全面提升城市适应气候变化能力为核心，坚持因地制宜、科学适应，吸收借鉴国内外先进经验，完善政策体系，创新管理体制，将适应气候变化理念纳入城市规划建设管理全过程，完善相关规划建设标准，到2020年，试点地区适应气候变化基础设施得到加强，适应能力显著提高，公众意识显著增强，打造一批具有国际先进水平的典型范例城市，形成一系列可复制、可推广的试点经验。

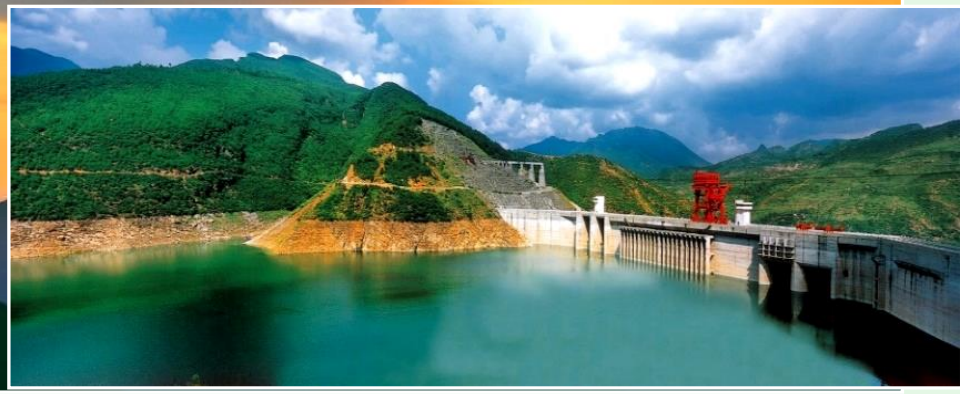
四、主要任务

（一）强化城市适应理念。统筹城市建设、产业发展和适应气候变化工作，创新城市规划建设管理理念，科学分析气候变化主要问题及影响，加强城乡建设气候变化风险评估，将适应气候变化纳入城市发展目标体系，在城市规划中充分考虑气候变化因素，修改完善城市基础设施建设运营标准，健全城市适应气候变化管理体

— 3 —

Building Low carbon city:
建设低碳城市的重点领域

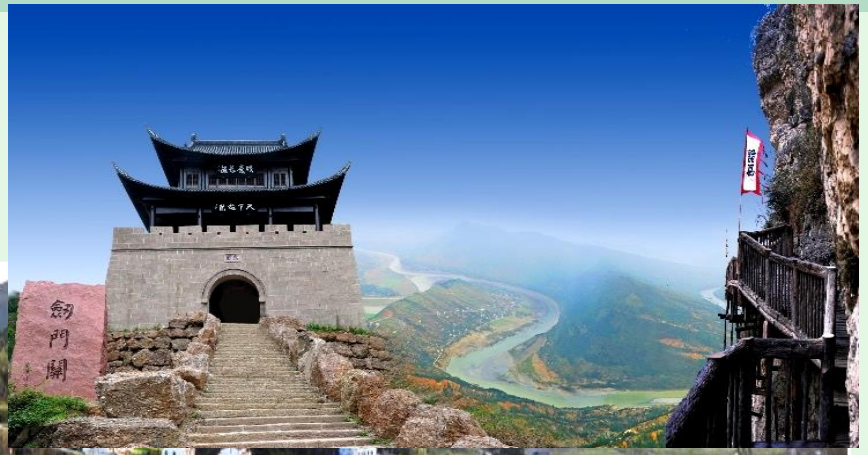
- **Low carbon energy and clean production**: 开发低碳能源、推广清洁生产
- **Low carbon transport:** 率先在全省开展“低碳出行”活动,便民自行车1000余辆，步行绿道和城市生态休闲廊道200余公里。
- **Low carbon community**: 在全省率先推行低碳示范社区



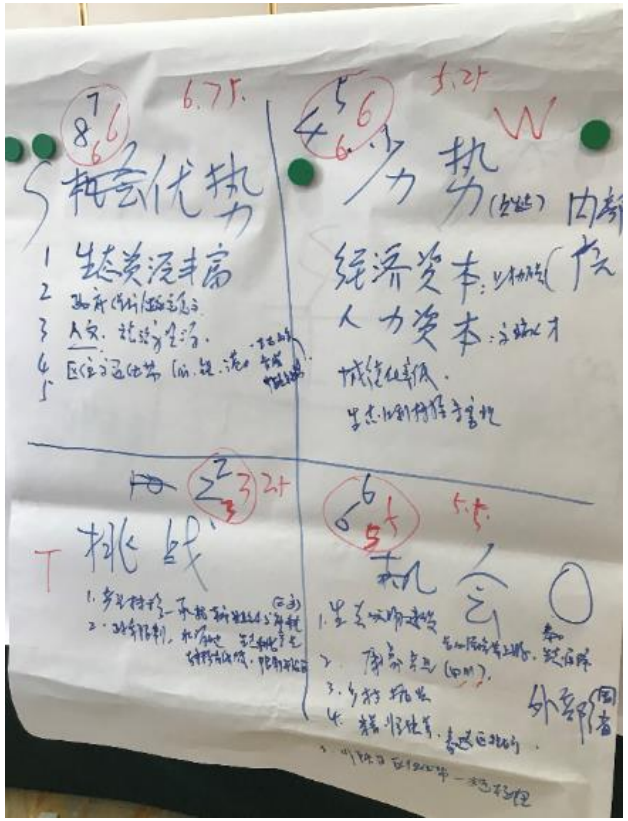
建设绿色宜居城市 Building green and livable cities

- **GREEN BUIILDING**: 推广绿色建筑，推广建设具有川北民居风貌的抗震能力强的轻钢结构、木结构住房。
- **GREEN FARMING**: 推进低碳农业园区建设，重点发展“6+3”特色林业和绿色农业， 全国唯一拥有2个国家有机产品认证示范县的地级市。
- **ECO-TOURISM**: 创建国家级生态旅游示范区1个、国家级森林公园3个、国家级自然保护区2个，国家级湿地公园2个。

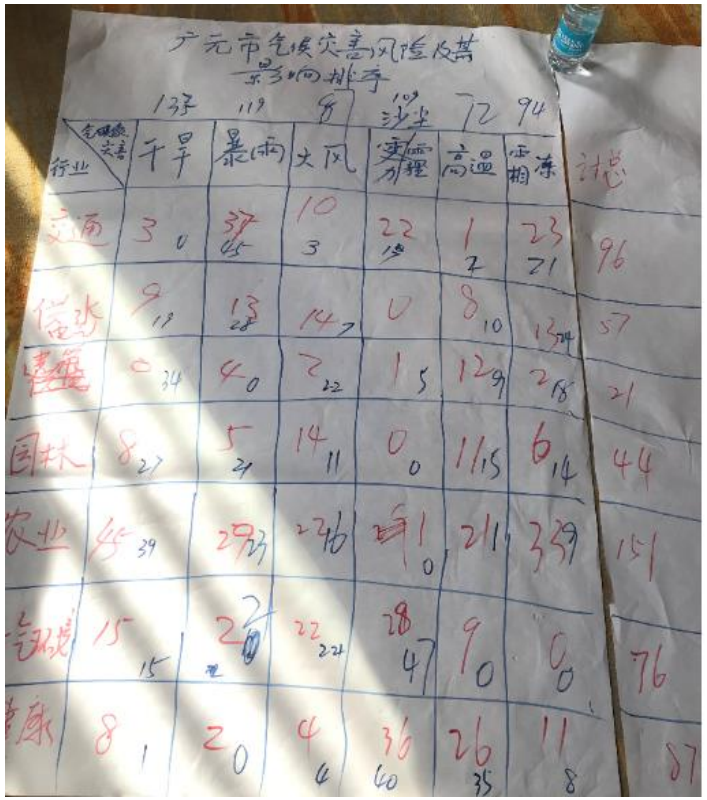

加气混凝土砌块



LOW-CARBON RESILIENT URBAN PLANNING: OUTCOME



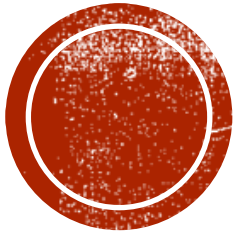
SWOT Analysis



Climate risk mapping for Guangyuan

OUTCOME

- The CASS experts facilitated more than 20 representatives of the agencies to identify:
- 1) the major climatic hazards, vulnerable sectors,
- 2) prioritized synergy policy and measures for priority AP sectors (transport, agriculture, health, etc.),
- 3) strengths and weakness in building low-carbon-resilient strategy for Guangyuan.



THANKS FOR YOUR COMMENTS!

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