

An aerial photograph of a city, likely Beijing, showing a large, traditional courtyard housing complex (hutongs) in the center. The complex features numerous small, traditional Chinese buildings with red roofs, arranged in a grid-like pattern around a central courtyard. The surrounding area includes modern buildings, roads, and green spaces. The title text is overlaid on the image in a large, bold, red font.

# Courtyard Housing and Cultural Sustainability in China

**Donia Zhang, PhD**

Director, Neoland School of Chinese Culture, Canada

Associate, City Institute, York University

University of Toronto, Munk School of Global Affairs and Public Policy

Asian Institute and Contemporary Asian Studies Student Union

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# Structure of the Presentation

- ☯ Four pillars of sustainable development
- ☯ Four key themes in Chinese philosophy
- ☯ Traditional courtyard houses and their decline
- ☯ New courtyard housing development in China
- ☯ Four cornerstones of culturally sustainable architecture
- ☯ Proposals for new courtyard-garden houses



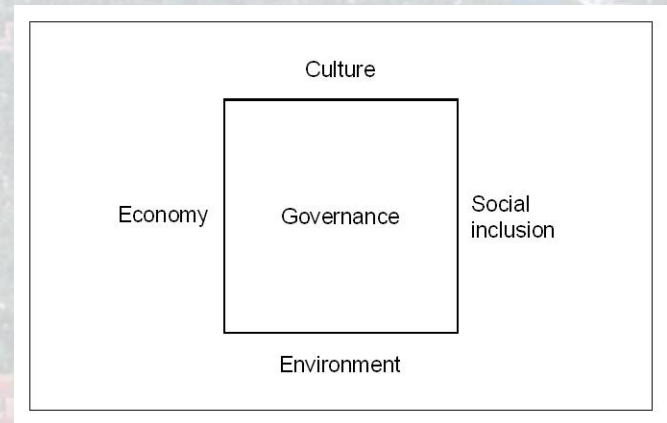
# Four Pillars of Sustainable Development

☯ Environmental responsibility

☯ Economic viability

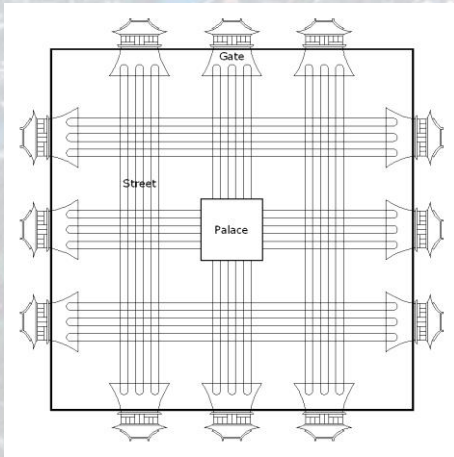
☯ Social equity

☯ Cultural vitality



The accepted 4-pillar sustainable development framework.  
Source: after UNESCO, 2006

# Four Key Themes in Chinese Philosophy



The ideal capital city in imperial China from the *Record of Trades in Rituals of Zhou* (c.1066-221 BCE). All the measurements within it are multiples of heavenly number 3. Drawing by Donia Zhang after Liu, 2002

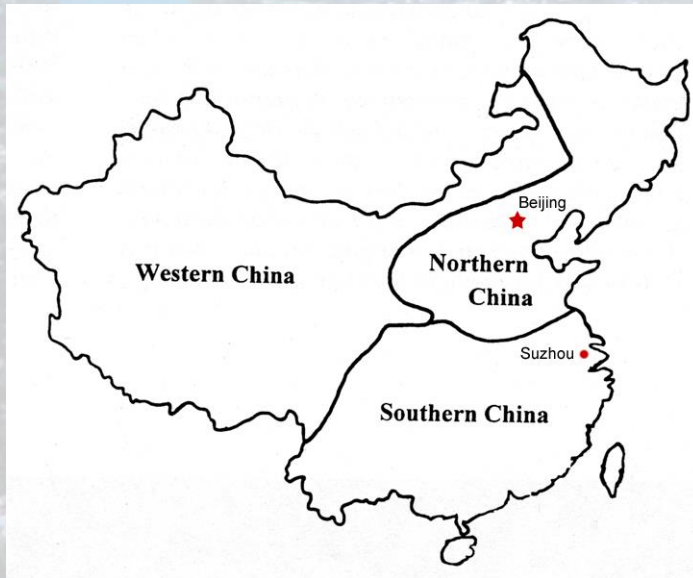
私 Private	私 Private	私 Private
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The Nine Squares System (井田制). Drawing by Donia Zhang based on the *Complete Chinese Dictionary*, 1915; *Chinese-English Dictionary*, 1980

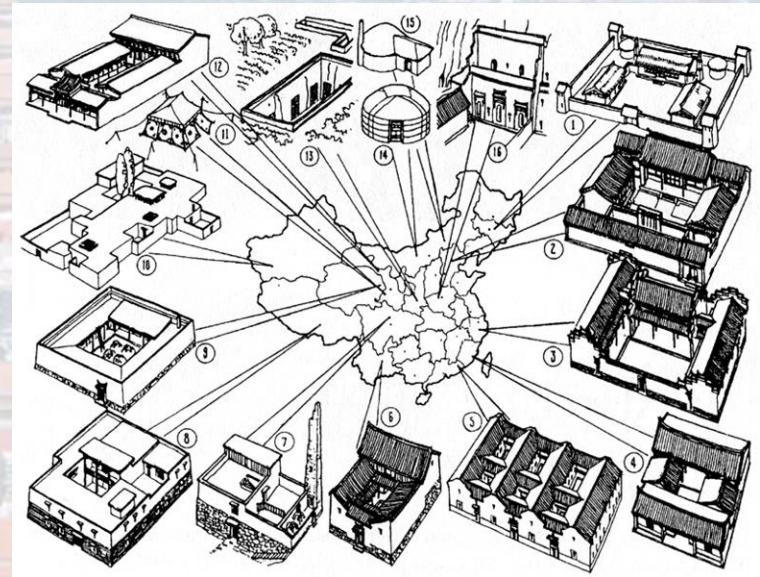
- ☯ Harmony with Heaven — form and environmental quality
- ☯ Harmony with Earth — space and construction quality
- ☯ Harmony with Humans — matters of social cohesion
- ☯ Harmony with Self — time and cultural activities



# Courtyard Houses across China



Map of China showing the northern, southern, and western divisions with locations of Beijing and Suzhou as my case study cities. Source: Knapp, 2000, p. 2

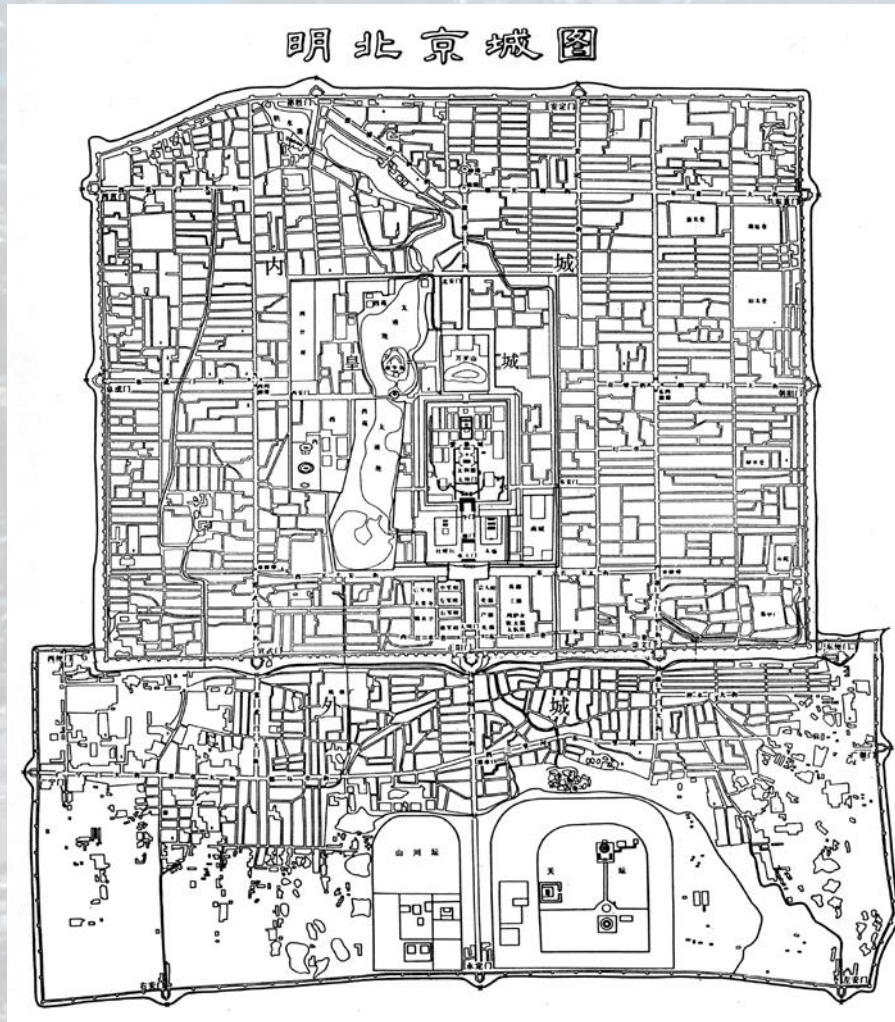


House types across China showing the courtyard as a common feature. Source: Drawing by Fu Xinian in Liu, 1990, p. 206

- ☯ The Chinese have lived in single-extended-family courtyard houses in many parts of China for thousands of years
- ☯ The courtyard can offer many advantages
- ☯ Traditional Chinese courtyard houses were grouped as northern, southern, and western types



# City of Beijing



Beijing during the Ming dynasty (1368-1644). Source: Dong, 1987

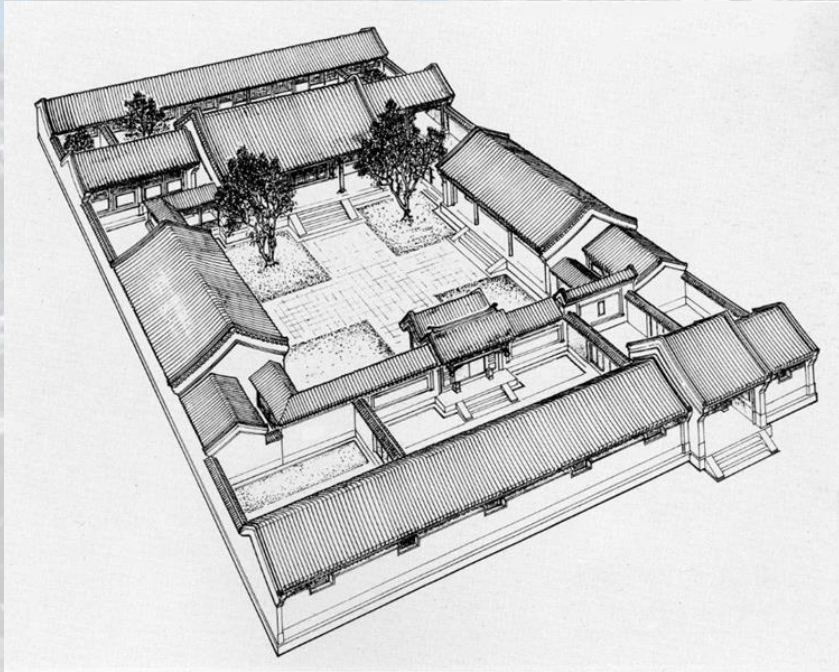


Traditional courtyard houses and *hutong* (lanes) in an old residential district of Beijing. Source: Ma, 1993, p. 2

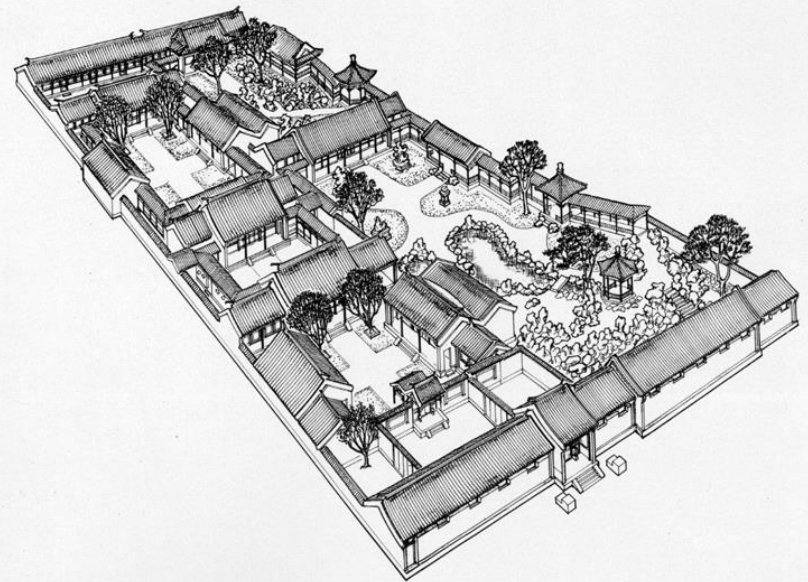
Beijing is a northern Chinese city with a rich history of over 3,000 years and as China's capital for over 800 years; its famous *siheyuan* (courtyard houses) with strict axial, symmetrical, and hierarchical planning embody the Confucian ideal of "harmony in social relationships."



# Courtyard Houses of Beijing



A typical or standard three-courtyard house of Beijing.  
Source: Ma, 1999, p. 7



A large, five-courtyard house with gardens in Beijing.  
Source: Ma, 1999, p. 227

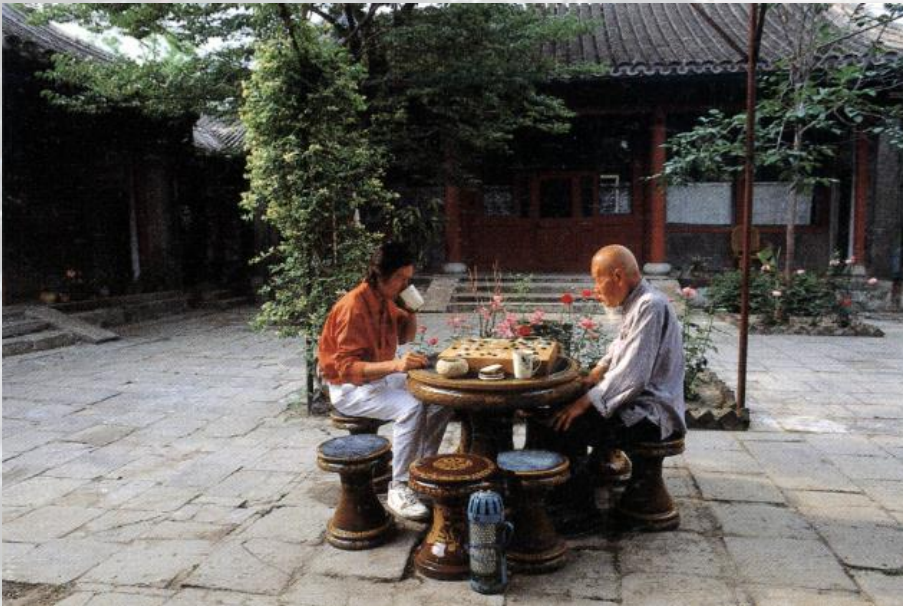




Children playing in a traditional courtyard of Beijing. Source: Ma, 1993, p. i



Fireworks lit in Beijing courtyards on Chinese New Year's Eve. Photo: Junmin Zhang 1988



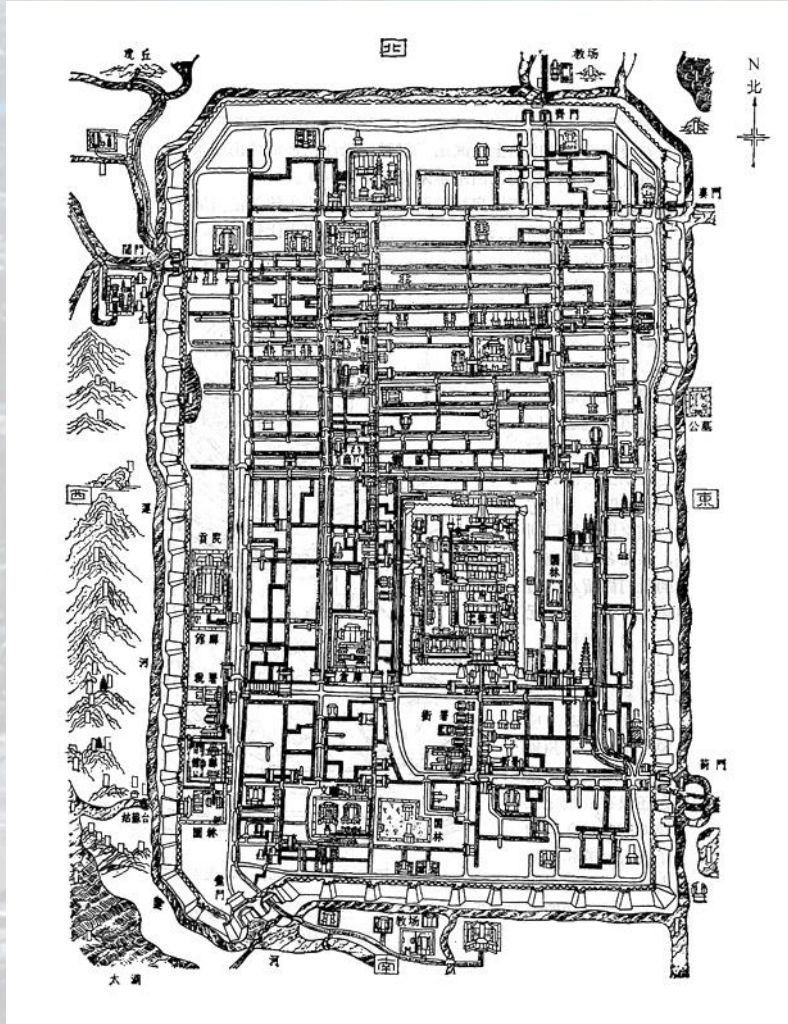
Playing games in a traditional courtyard of Beijing. Source: Ma, 1993, p. 39



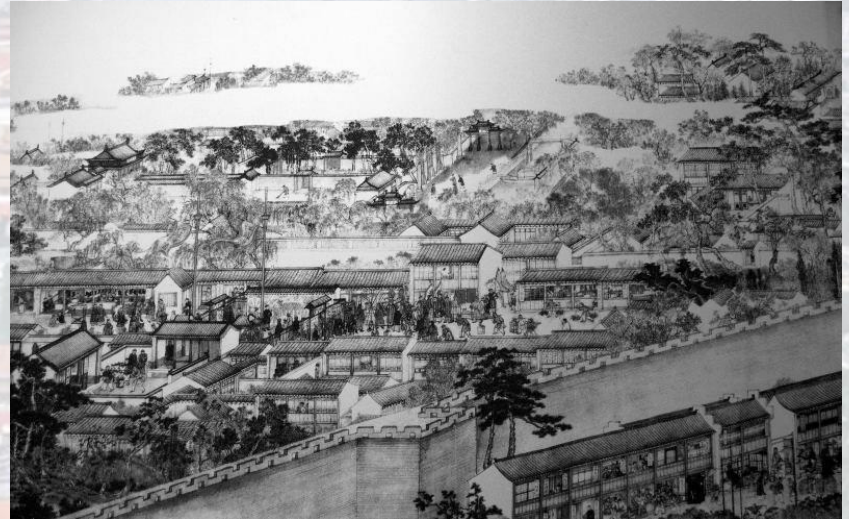
Making dumplings in a traditional courtyard of Beijing. Source: Ma, 1993, p. 44



# City of Suzhou



Pingjiang/Suzhou map from a stone stela in 1229.  
Source: *History of Chinese Architecture*, 1986, p. 56

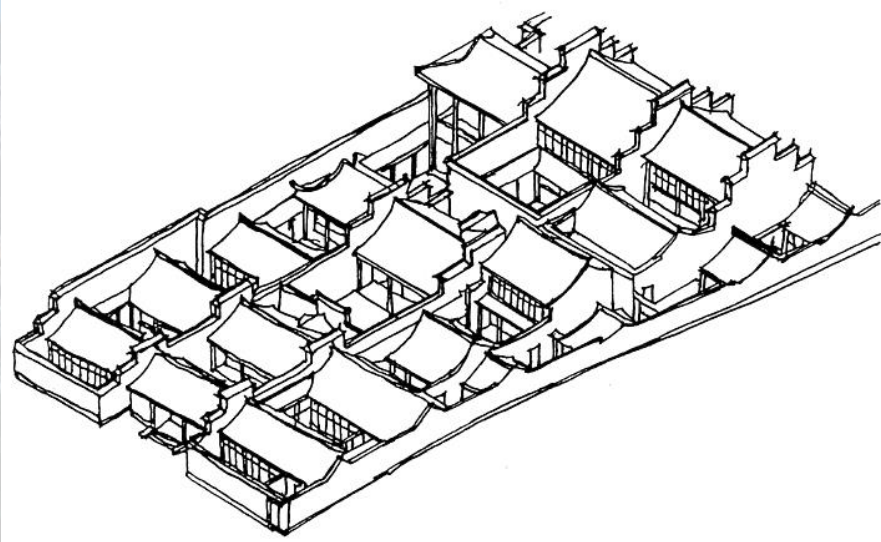


Scroll painting *Suzhou Flourishing* (*Gusu Fanhua Tu*, 姑苏繁华图) by Xu Yang in 1759. Courtesy of Liaoning Museum

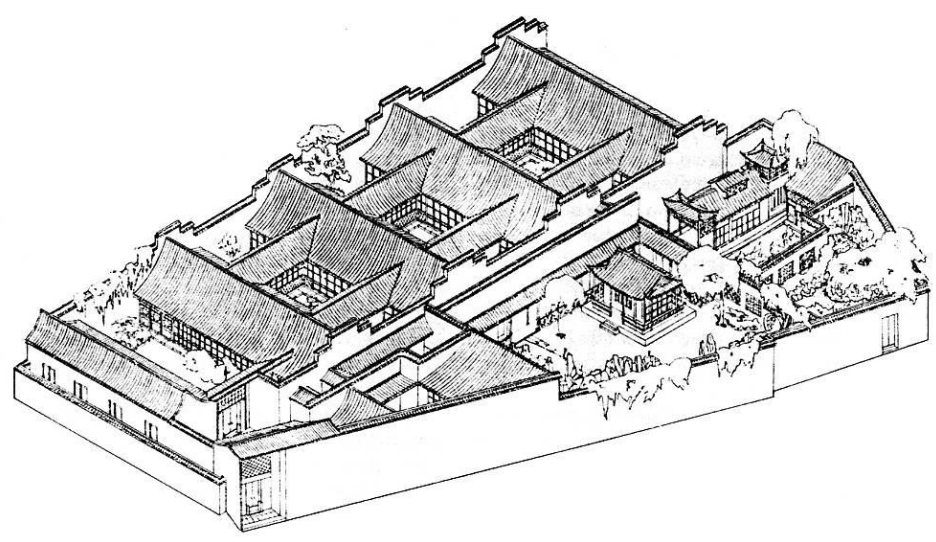
Suzhou is a southern Chinese city with a prosperous history of over 2,500 years, and was a regional capital renowned also for its private gardens enclosed within courtyard house compounds, whose spontaneous layouts reflect the Daoist principle of “harmony with nature.”



# Courtyard Houses in Southern China

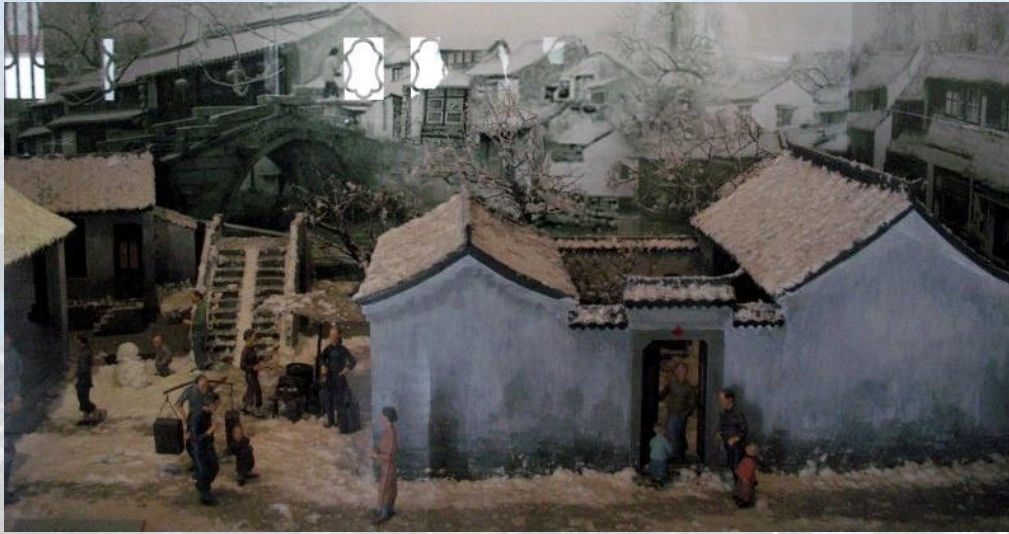


A large classical courtyard house in Suzhou.  
Source: Wu, 1991, p. 58



A large classical courtyard house in Yangzhou.  
Source: Schinz, 1989, p. 58





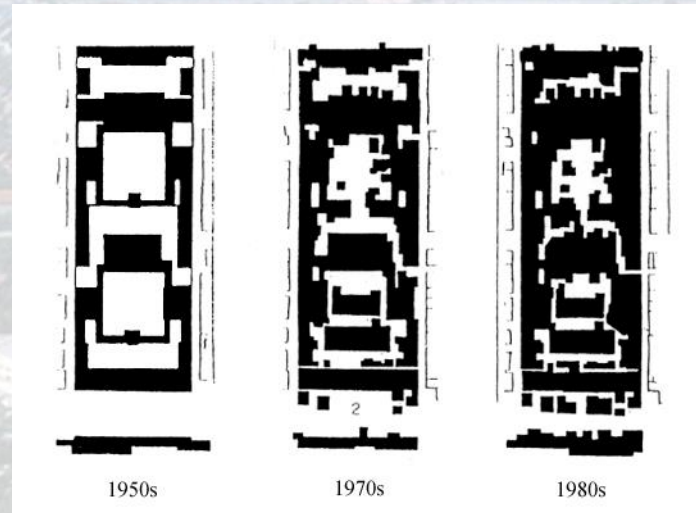
Model of a small riverside courtyard house in Suzhou Folk Custom Exhibition Centre. Photos by Donia Zhang 2007



Model of a classical courtyard house in Suzhou Folk Custom Exhibition Centre depicting *zhuazhou* in the courtyard. Photos by Donia Zhang 2007



# Decline of Traditional Courtyard Houses



The decline of a courtyard house compound in Beijing from early 1950s – 1970s – 1980s. Source: Zhu and Fu, 1988

- ☯ China's population more than doubled between 1953 and 2010
- ☯ However, the average household size in China has decreased from single-extended to nuclear families
- ☯ The change in Chinese family structure demands a subsequent change in housing form



# Demolition of Traditional Courtyard Houses

**Table 1. Destruction and conservation of *siheyuan* and *hutong* in inner Beijing**

Year	<i>Siheyuan</i> (courtyard house)	<i>Hutong</i> (lane)
1949	100 percent (of 62 sqkm of inner-city land area)	7000
1990	1.9 percent (805 courtyard houses in relatively good condition in the conservation areas)	3900
2003	1.5 percent (658 courtyard houses in relatively good condition in the conservation areas)	1570
2004	1.3 percent (539 courtyard houses in relatively good condition in the conservation areas)	1200

Sources: Abramson, 2001; *Beijing City Planning Chart*, 2007; Collins, 2005; Kong, 2004; Ornelas, 2006



# Renewal of Traditional Courtyard Houses

- ☯ Since 2005, Beijing Municipal Government has been restoring traditional courtyard houses
- ☯ However, the renewal did not solve problems of small living space, and many communal courtyards have become even smaller and caused disputes among neighbors
- ☯ Thus, decreased spaces in communal courtyards have had a negative impact on social relations among neighbors



# Redevelopment of New Courtyard Housing

**Table 2. New courtyard housing estates constructed in China since the 1990s**

City	Name of Estates	Year of Completion	Number of Units	Number of Floors	Size of Units	Size of Courtyards
Beijing	Juer Hutong (菊儿胡同 “Chrysanthemum Lane”)	1990-1994	210	2-3-storey walk-up apartments	40-120 sqm	13 m x 15 m; 6.5 m x 7.5 m
	Nanchizi (南池子 “South Pond”)	2003	301	2-storey row/town houses	45-75 sqm	7-9 m (distance between buildings)
Suzhou	Tongfangyuan (桐芳苑 “Aleurites Cordata Fragrant Garden Housing Estate”)	1996	220	2-storey row/town houses, 2-storey courtyard garden villas, and 3-storey walk-up apartments	70-200 sqm	10-12 m (distance between buildings)
	Jiaanbieyuan (佳安别院 “Excellent Peace Garden Housing Estate”)	1998	600	2-storey row/town houses, and 4-6-storey walk-up apartments	90-180 sqm	Ratio of building height to distance is 1:1.3
	Shilinyuan (狮林苑 “Lion Grove Garden Housing Estate”)	2000	232	3-storey row/town houses, and 3-4-storey walk-up apartments	90-180 sqm	8-13.5 m (distance between buildings)

Source: My summary





New Courtyard Housing  
built in Beijing and  
Suzhou since the 1990s  
All Photos by  
Donia Zhang 2007

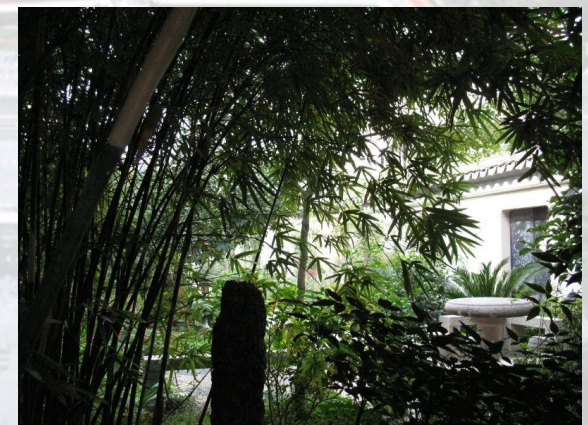






## New Communal Central Gardens in the Suzhou Cases

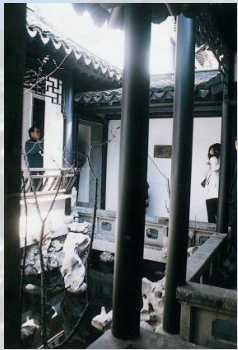
All Photos by Donia Zhang 2007





# New Courtyard Gardens in the Suzhou Cases

All Photos by Donia Zhang 2007





# Form and Space of the New Courtyard Housing

- ☯ The results reveal that the new courtyards are generally too small to admit enough sunlight
- ☯ The ratio of building height to distance should be at least 1:3 for Beijing (Zhang, 2006, 2011) and 1:1.3 for Suzhou
- ☯ The interior spaces of new courtyard housing are generally small in Beijing Nanchizi and Juer Hutong, they are larger and more satisfactory in Suzhou Shilinyuan and Jiaanbieyuan
- ☯ Interior space of 120-180 sqm per unit for a 3-4-person household is generally satisfactory
- ☯ Most residents prefer to live in low-rise housing of 1-3 storeys for practical reasons, and living close to the earth (*Feng Shui*) is still preferred
- ☯ Residents have expressed a preference for pitched roofs than flat ones because they have experienced better thermal performance of pitched roofs



# Social Cohesion and Cultural Activities in the New Courtyard Housing

- ☯ The findings also suggest that communal courtyards foster social interaction and private courtyards facilitate self-cultivation
- ☯ Neighborly relations are partly influenced by the form and space of the courtyard housing
- ☯ Neighborly relations are partly influenced by a changing and polarizing society, socio-economic differences, housing tenure, modern lifestyles, community involvement, common language, cultural awareness, and the cultural background of the residents
- ☯ The communal courtyards help sustain some traditional Chinese cultural activities. The primary function of a communal courtyard is to maintain health/natural healing
- ☯ Many cultural activities are much less or no longer partaken in the communal courtyards, likely due to such factors as time, climate, courtyard ownership, yard size, facilities, and so on



# Four Cornerstones of Culturally Sustainable Architecture

**Table 3. Four cornerstones of culturally sustainable architecture in China**

Material/dwelling culture (archi-culture, tangible)		Immaterial/spiritual culture (socio-culture, intangible)	
Harmony with Heaven: form and environmental quality	Harmony with Earth: space and construction quality	Harmony with Humans: matters of social cohesion	Harmony with Self: time and cultural activities
<ul style="list-style-type: none"> <li>• Exterior form</li> <li>• Exterior walls</li> <li>• Gate and access</li> <li>• Windows</li> <li>• Courtyards and gardens</li> <li>• Roofs</li> </ul>	<ul style="list-style-type: none"> <li>• Interior space</li> <li>• Floor levels</li> <li>• Furniture styles and materials</li> <li>• Facility provision</li> <li>• Building materials and construction quality</li> <li>• Maintenance and management</li> <li>• Car park spaces</li> </ul>	<ul style="list-style-type: none"> <li>• Education, occupation, and house-purchasing power</li> <li>• Social relations among neighbors</li> <li>• Relations with foreign neighbors</li> <li>• Indoor-outdoor visual interactions</li> </ul>	<ul style="list-style-type: none"> <li>• Philosophy and religion</li> <li>• Cultural activities at home</li> <li>• Cultural activities in courtyards</li> <li>• Cultural activities in community/city parks/gardens</li> <li>• Cultural festivities indoors and outdoors</li> <li>• Birthday celebrations</li> <li>• Wedding ceremony or anniversary celebrations</li> </ul>



# Proposed Beijing New Courtyard-Garden Houses



Models of the proposed Beijing new courtyard-garden house compound based on a system of 60 m × 60 m standard block size, the common courtyard is 26 m × 26 m shared by 8 nuclear families, and each household also enjoys a private garden at the back. Each housing unit measures 6 m × 10 m (total 180 sqm) with a semi-basement and 2 ½ storeys. Design and models by Donia Zhang



# Proposed Suzhou New Courtyard-Garden Houses



Models of the proposed Suzhou new courtyard-garden house compound based on a system of 40 m × 40 m standard block size, the common courtyard is 12 m × 20 m shared by 4 nuclear families, and each household also enjoys a private garden on the side. Each housing unit measures 6 m × 10 m (total 180 sqm) with 3 storeys. Design and models by Donia Zhang



# Thank you

Presentation based on my PhD thesis completed at Oxford Brookes University (2006-2012), which has been published as a book, *Courtyard Housing and Cultural Sustainability: Theory, Practice, and Product* by Ashgate/Routledge (2013/2016)

