46th IFLA WORLD CONGRESS

ORGANIZED BY
Associação Brasileira de Arquitetos Paisagistas

2009 STUDENT LANDSCAPE ARCHITECTURE DESIGN COMPETITION PRIZE WINNERS

FIRST PRIZE *IFLA Group Han Prize for Student Landscape Architecture*	TITLE AUTHOR(S) INSTITUTION	*The green shelter – street corridors as infrastructure for wind* Zhang Yunlu, Bao Qinxing, Su Yi, Liu Jialin, Zhang Xiaochen School of Landscape Architecture, Beijing Forestry University, Beijing, China
SECOND PRIZE *IFLA Zvi Miller Prize*	TITLE AUTHOR(S) INSTITUTION	*Desert Control* Wang Chuan, Cui Qingwei, Xu Xiaoqing, Zhuang Yongwen Department of Landscape Architecture, Tsinghua University, Beijing, China
THIRD PRIZE *Merit Award*	TITLE AUTHOR(S) INSTITUTION	*Eco-system Reconstruction of Qiangfeng Village* Jie Shen, Siyuan Wang, Yang Li, Rong Ren, Jing Hu School of Landscape Architecture, Beijing Forestry University, Beijing, China
JURY AWARD	TITLE AUTHOR(S) INSTITUTION	*Green infrastructure: landscape infrastructure, and people for tomorrow* Dong Li, Li Qiong, Sun Shuai, Zhang Hui, Shu Dongdong School of Landscape Architecture, Beijing Forestry University, Beijing, China
JURY AWARD	TITLE AUTHOR(S) INSTITUTION	*Towards a sustainable coastal (Suquia river)* Valentin Fernando Volpe Department of Architecture, Urbanism and Design, National University of Cordoba, Cordoba, Argentina
JURY AWARD	TITLE AUTHOR(S) INSTITUTION	*The Wetlands Archipelago* Jorrit Noordhuizen Department of Landscape Architecture, Wageningen University and Research Centre, Wageningen, Netherlands

FIRST PRIZE *IFLA Group Han Prize for Student Landscape Architecture*	TITLE AUTHOR(S) INSTITUTION	*The green shelter – street corridors as infrastructure for wind* Zhang Yunlu, Bao Qinxing, Su Yi, Liu Jialin, Zhang Xiaochen School of Landscape Architecture, Beijing Forestry University, Beijing, China

JURY NOTES

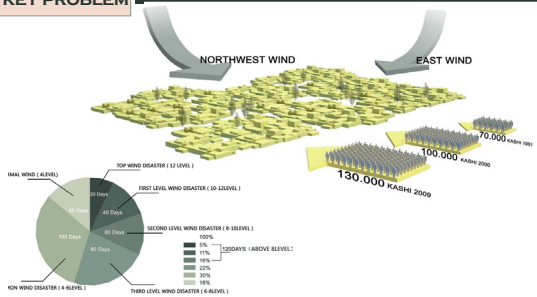
The project is a response to an elaborate reading of the landscape potential of the wind as a nature force. The wind forces and dynamics are approached concerning the existing city, as well as the possibility of the creation of alternatives open spaces through the architectural treatment of corridor network. It has a clear organization of the project information, a comprehensive and creative approach of the existing situation, and an outstanding graphic presentation.

The Green Shelter

----Street corridors as green infrastructures for wind preventing and sheltering

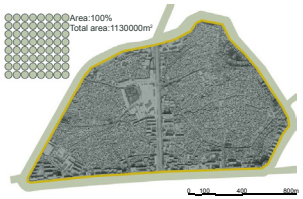
The present project aimed to resolve the wind and sand problem in the old town of Kashi, under the condition of a dry arid climate, by establishing a set of green infrastructures called street corridors which are composed of plants and specific constructions for wind preventing and sheltering. This set of infrastructures can effectively improve the wind environment, and in the mean time, resolve the lack of public space due to a high popular density in the Kashi old town. This project can also shed light into the exploration of positive adaptation for a historical town to extreme climate changes.

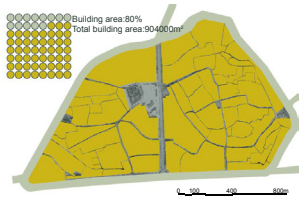
Background and key problem

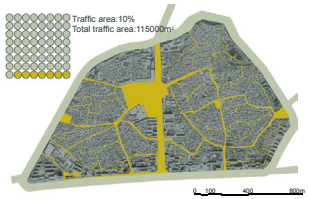


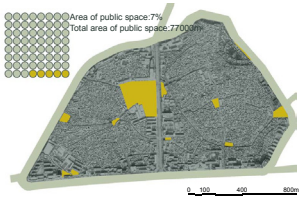
The city of Kashi is located in the southwestern Xinjiang, 73°20′ - 79°57′ E, 35°20′ - 40°18′, known as the "west end city" of China. Historically a trading town on the silk road, Kashi is an oasis city lying at the west side of the Taklamakan desert, surrounded by Kunlun mountains in the south, Tianshan mountains in the north and Pamir mountains in the west. The land of Kashi tilts from southwest to northeast, making the form of the city like a dustpan and the city is completely open to the winds and sands coming from the east desert. According to record, every year there are about 120 days of high winds above 8 degrees in Kashi, especially during the spring time. Even worse, the specific location of Kashi makes the sea winds from the Indian Ocean unable to come in, featuring a dry arid climate, with only 40 – 60 mm of precipitation annually. With an elevation of 1289 meters, the long and strong sunshine exposure makes this small precipitation amount very easy to evaporate, resulting in an average amount of 499 mm every year. This dry, windy and sandy weather has long been a key problem of Kashi environment, playing an important factor obstructing the residence, business and transportation. Especially, as the economy of Kashi centers on the open space business – Bazaars, weather like this is also the bottleneck of the development of this city.

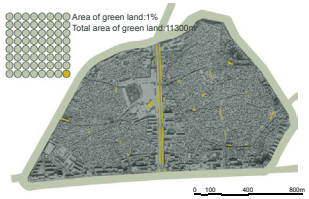
Analysis of the current situation

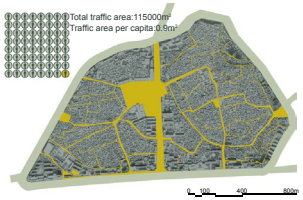


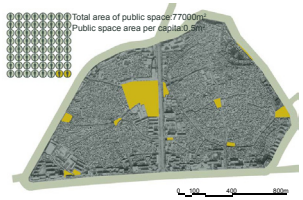


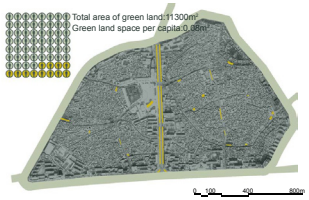








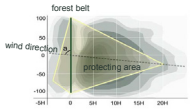




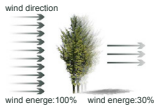
Very high popular density：The old town of Kashi is very crowded, with a total population of 125.8 thousands in a small area of 4.25 km², in some places the density could reach as high as 48.3 thousands per square kilometers. This has reached far beyond the limit of traditional street communities like Kashi.

Lacking public space and infrastructure：The old town of Kashi is currently over crowded with people, narrow streets, and old buildings. The quality of the civic infrastructures, such as the traffic, water and sewage systems, and the area of the public space and green land are all below requirements. This makes the living environment in Kashi old town quite far behind the time, and especially, the current condition of Kashi old town is not wind-proof. With the economical development and the trend of globalization, the calling of local residence for improving civic infrastructures and living conditions are getting louder and hence an effective plan for transformation and renewal of the old town has to be taken on agenda.

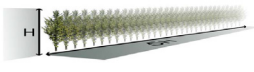
The wind-preventing effect analysis of plants



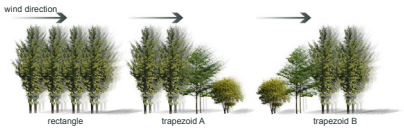
The total area covered: The primary shelter area on the leeward side of the belt is about between 2.5 – 19 H. The most efficient preventing occurs in this area. The wind speed gets mostly slowed in the area between 4 – 13 H, resulting in a degree of 29.7% - 57.8%, which is the triangular area where turbulent exchange gets weakest.



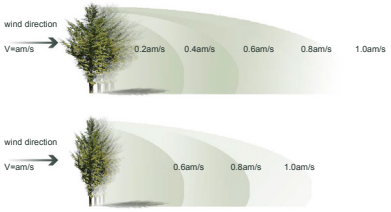
The porosity of the belt: A single line of belt produced the best preventing effect when the porosity is 30% and for multiple lines 48% is the best. Thus the tree species to be selected needs to have porosity close to 30%, and those trees needs to be pruned during growth to keep an optimal porosity.



The belt width: Narrow belt produced a better wind preventing effect than a wide belt, while keeping other conditions constant. When the ratio between width and the height is below 5, the influence of the width is large, and gets smaller when the ratio is above 5. Thus the ratio of the belt needs to be controlled below 5.

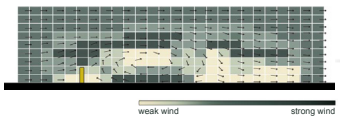


The shape of the cross section: Among the rectangle, trapezoid A (backslash shape) and B (slash shape) shapes of plantation, the latter produces the best preventing effect.

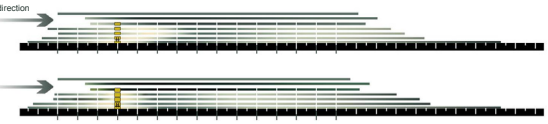


The forest canopy structure: The wind speed slows at the leeward side of a single tree. When the canopy diameter is large enough, the horizontal distance of this shelter area could be 4 times of the tree height. This distance decreases with the canopy diameter gets smaller while keeping the tree height constant. Thus pruning is needed in early breeding to stretch the canopy.

The wind-preventing effect analysis of single-unit constructions

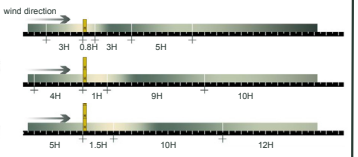


The wind-preventing effect analysis of single-unit constructions



The wind-preventing effect analysis of constructions of different porosities

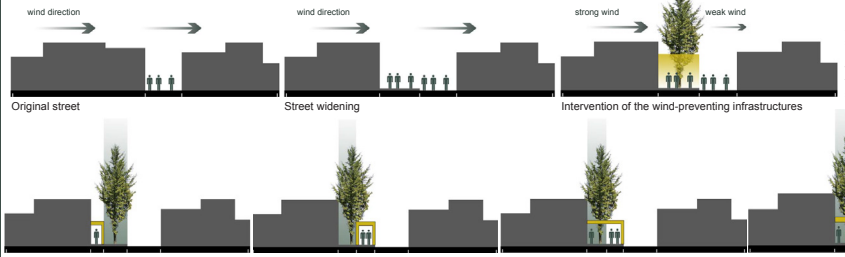
If the porosity of the corridor gets smaller, the wind speed at the top of the corridor increases quickly, producing a higher maximum wind speed. The size of the weak wind area before the corridor increases, with the whirlpool area and the weak wind area after the whirlpool getting smaller.



The wind-preventing effect analysis of constructions of different heights

When the height of the corridor gets larger, the size of the weak wind area before and after the corridor increases, with the size of the whirlpool area and the weak wind area after the whirlpool also increase.

Intervention of the infrastructures



A low-key intervention

Green infrastructures will be established on selected main streets, which need to be widened accordingly. Those infrastructures will serve both for wind preventing and wind sheltering. The main construction – corridors will be placed on the street side as a shelter to avoid the high bottleneck wind on the street. Plants with a high preventing ability will be placed in the corridors, against the east and northwest winds in the old town during spring time. The corridors can be divided into 5 types according to its accommodation ability: the rest space, the communication space, the sports space, the Bazaar space and the meeting space. The corridors, in combination of the plants and constructions will set up an effective wind-proof network to improve the wind environment in the Kashi old town.

Rest space: buildings – corridor – plants – street – buildings

Communication space: buildings – plants – corridor – street – buildings

Sports space: buildings – plants – inner sports space – corridor – street – buildings

Bazaar space: buildings – plants – inner business space – corridor – street – buildings.

Meeting space: buildings – plants – corridor - open Bazaar space – plants – street – buildings.

Selection of local tree species

	Juglans regia Linn	Fraxinus americana	Acer negundo Lin	Tamarix ramosissima	Populus euphratica	Ulmus laciniata	Morus alba Linn	Hippophae rhamnoides	Elaeagnus angustifolia	Populus bolleana
										
active growth period	spring+summer	spring+summer	spring+summer	spring+summer	spring+summer	spring+summer	spring+summer	spring+summer	spring+summer	spring+summer
growth rate	slow	rapid	rapid	rapid	rapid	rapid	rapid	rapid	rapid	rapid
height, mature	21-30m	8-15m	11-20m	6-10m	21-30m	21-30m	6-10m	6-10m	10-15m	21-30m
root depth	deep	deep	moderate	much deep	deep	deep	shallow	moderate	shallow	much deep
Pests and diseases	many	few	moderate	few	few	moderate	many	moderate	moderate	few
windy resistance	strong	strong	moderate	strong	strong	moderate	moderate	strong	strong	strong
tree shape	egg or sphere	egg or ellipse	sphere	weeping	sphere	sphere	egg	cloud	egg	column
select	X	√	√	X	√	√	X	X	X	√

MASTER PLAN

MAJOR GOAL

The present project will focus on the old town of Kashi, adopting scientific techniques to prevent the winds during spring time and the bottleneck wind effect inside the town, constructing wind-proof infrastructures covering the whole town to improve the wind environment. The major goal of this project is to create wind-proof infrastructures to prevent the sandy winds coming from the desert and the bottleneck wind effect along the streets. These infrastructures will combine wind-preventing plants with windbreak corridors to create a green public space.

Man is the eye of the nature. Our goal is not only a set of wind-proof infrastructures, but also a more comfortable living environment in the old town of Kashi. Thus we aimed our design to try to create a friendlier common out space for communication, activities, and Bazaar business, in order to restore the intangible cultural heritage of Kashi as traditional trading town and to combine this heritage with the economical development to transform the old town of Kashi virtuously. This project will shed light into designing positive adaptation to the climate and sustainable development in ecological fragile area as an oasis city as Kashi.

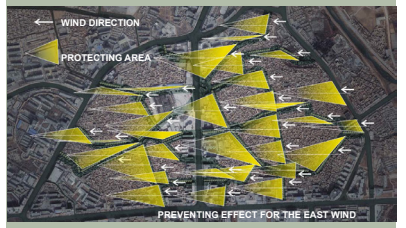
Inheriting

Ayiwang (meaning: house with light) is the traditional Uygur house, a production during adaptation to the dry, hot, windy and sandy climate in Kashi. we inherit the basic idea of Ayiwang to fit our infrastructures fit with the overall constructional and cultural image of Kashi.

Materials: All infrastructures will be constructed with local traditional materials, mainly the earth and aspen woods. The construction also makes use of the small heat conduction and good thermal inertia of the materials, and can resists heat effectively.

Size: The size of our wind-proof infrastructures is consistent with the community size of the Kashi old town. Muslims go to the mosques 5 times a day following the calling of the Uiemas. Thus the size of community in the old town is kind of small, around 30 – 40 families.

Space: Degree of intimacy of the contact on the street is limited by the width of the street space. Normally in the old town of Kashi, the street space is smaller than 6 meters, which promotes intimate contact between resident people. Constructions in this project will also try to follow up the space limit to keep our constructions not breaking the original city atmosphere.



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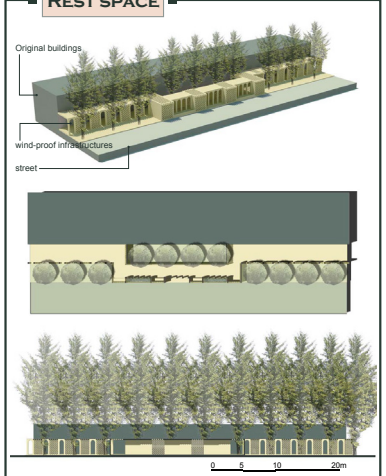
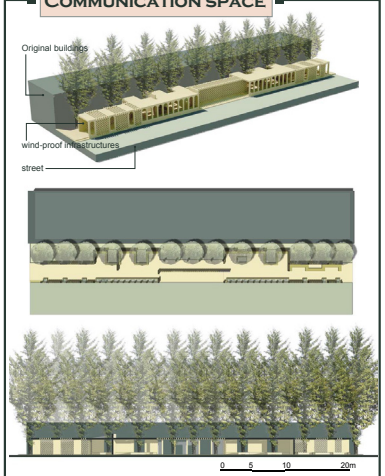
Rest space

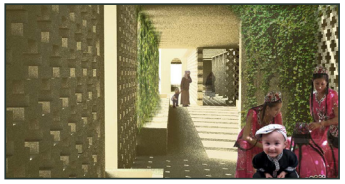


Rest space induces activities for 1 or 2 persons. Currently in the old town of Kashi, most streets are just narrow alley without any facility for rest. The surrounding buildings make the streets dull, mechanical and listless. Rest space injects a life to the street while lowering the effect of the sandy winds.

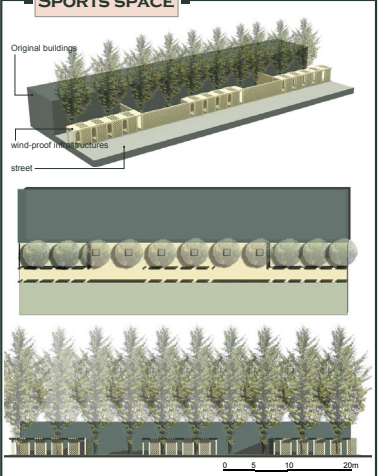
Communication space



Communication space induces activities for 3 – 5 persons. As the local buildings have a closed space outside, everyday communication between residents happens on the street. The communication space will make the street a safe and warm hallway for communication under the winds.

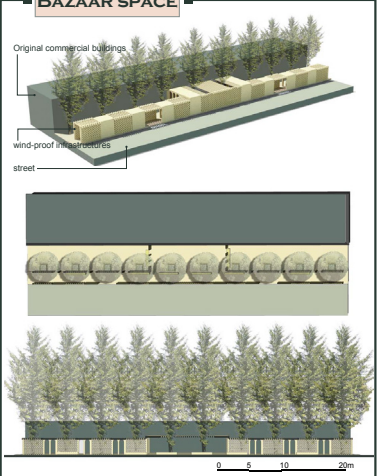


Sports space



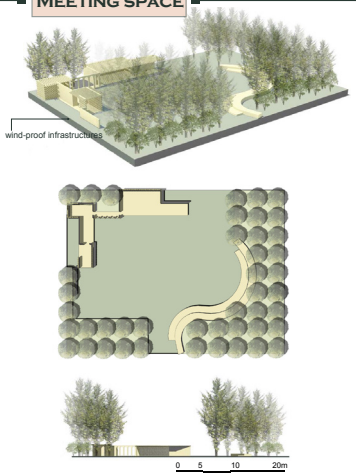
Sports space: induces activities for 5 -10 persons. The function of this type of space is to create an inner space for sports. Therefore, while keeping the plants at the street side, the corridor is covered with a roof and surrounded with a wall. This will create a green, sunny, still and moderate playground.

Bazaar space



Bazaar space induces activities for over 10 persons. This type of space is mainly for business activities. Kashi has been known as "kingdom of Bazaars". By introducing this type of space, several famous business areas will be restored. They are designed not only for business, but also for tourism, cuisine, crafts and cultural experiencing.

Meeting space



Meeting space induces activities for over 100 persons. This type of space will mainly be placed near the mosques to serve the religious activities. They could also be used for entertainment or social purpose.

SECOND PRIZE *IFLA Zvi Miller Prize*	TITLE AUTHOR(S) INSTITUTION	*Desert Control* Wang Chuan, Cui Qingwei, Xu Xiaoqing, Zhuang Yongwen Department of Landscape Architecture, Tsinghua University, Beijing, China

JURY NOTES

The wind is also an important motivation for landscape design, now with a focus on the desert sand movement and its relation to the nearby city. The solution is inventive and carefully based in natural and cultural processes. The poetics of the project is also revealed through its graphic representation.

THIRD PRIZE *Merit Award*	TITLE AUTHOR(S) INSTITUTION	*Eco-system Reconstruction of Qiangfeng Village* Jie Shen, Siyuan Wang, Yang Li, Rong Ren, Jing Hu School of Landscape Architecture, Beijing Forestry University, Beijing, China

JURY NOTES

The project brings a challenging and contemporary theme: the recovery of landscapes occupied by human settlements after an earthquake. The problems and their possible alternatives are carefully analysed relating people and landscape. The project has a refined sense of environment and a distinguished graphic representation.