From Interiors to Urban Enclaves: Scaling Sustainable Water Conservation Strategies

Statement of Interest

At least one billion people in Asia rely on water from sources originating from rapidly receding glaciers on the Tibetan Plateau, and the two main consumers of this water, China and India, are using ever-increasing amounts.[i] It was while writing a policy paper about the delicate Sino-Indian relationship that I became intrigued by India's growing reliance on a resource controlled by China. The product of my analysis and Ambassador Teresita Schaffer's experience, "India and China: The Road Ahead,"[ii] marked the beginning of my focus on India's efforts to entice international business while managing a variety of economic, social, political, and environmental needs across the country. Subsequently, while working at the Center for Strategic and International Studies and a consulting firm in Washington, D.C., I considered the formation and implementation of national and state laws, as well as environmental issues. My research did not consider the human scale in order to understand how laws, initiatives, and projects impacted individual citizens.

My desire to focus on individual human experiences led me to the MFA in Interior Design at Parsons. I hope that this grant will allow me to research the human-scale implications of various projects and laws intended to encourage water conservation. Water has myriad impacts on Indians in different parts of the country; my project seeks to consider four. If awarded this grant, I hope to speak with individuals in Jaipur required to harvest rainwater to minimize the impact of state-wide droughts, with residents of Laxman Pura slum in Madhya Pradesh, who have use more water but are healthier after establishing public toilet facilities, with Varanasi residents and pilgrims about the relationship between conservation of the Ganges and religion, and with residents of Big Andaman Island in the Andaman and Nicobar Archipelago, who are surrounded by water but do not always have enough to meet their basic needs.

Through discussions and site visits, I hope to better understand how policies chosen by national, state, and municipal governments impact residents in India on an individual level, and how attitudes about a culturally significant resource – water – can combine with current sustainable techniques to mitigate the risk of water shortages throughout the country. I recognize that one of the biggest problems associated with development projects and new designs alike is their acceptance by users; by understanding why various technologies have been accepted or rejected by the communities in which they have been implemented, I hope to gain insight into the ways in which I, and perhaps the broader design community, can better consider design projects for their users. I recently completed a studio project that considered the possibility of filtering greywater from a laundromat for use by toilets in nearby New York City apartments. This technique would save approximately 64 three-person apartments 30-40% of their daily water bill.[iii] It is my hope that, if I am awarded this grant and can thus learn from Indians experiencing different impacts of water management, I will be better equipped to approach problems of water conservation in my own designs. On a grand scale, I hope that this could eventually inform building users and other designers, while potentially conserving a valuable resource.

Project Proposal

Jaipur, Rajasthan: Required water harvesting conserves water for statewide use

While Rajasthan covers 10.5 percent of India, it shares 1.15 percent of the country's water resources. The state's population is growing and, while per capital water availability in 2001 was 840 cubic meters, it is expected to decrease to 439 cubic meters by 2050, nearly half the anticipated national average. However, an integrated approach to water harvesting and conservation holds promise. Rajasthan's terrain could potentially be utilized to conserve 90-145 million cubic meters of runoff, and studies indicate that rainwater catchment techniques could provide water for nearly 69 percent of villages in Jodhpur district.[iv]

In July 2010, the monsoon's late arrival left 75 percent of the state's dams dry, causing electricity cuts and water shortages. The government supplied water to villages by tanker and train[v] and bolstered an April law requiring urban structures on plots of land 300 or more square meters to house rainwater catchment systems and underground water storage systems.[vi]

Figure 1, a household-level rainwater harvesting cistern funded by Safe Water Network in Jaipur

I would like to visit Jaipur to speak with residents housing the rainwater catchment systems, specifically in Lava Ka Baas, known because of contention between villagers and the Rajasthan government over the locally-built water harvesting structure, and Neemi Village, notable because of the villagers' return to the village following the installation of a rain catchment system.[vii] Additional interviews with residents of Jaipur and its surrounds can be confirmed if I am awarded the grant. I have planned to stay in Rajasthan for ten days in the hope of seeing the area transition from semi-arid to flooded as the monsoons arrive.

Gwalior, Madhya Pradesh: Increasing water consumption in slums while improving water and sanitation issues

Figure 2, Public sanitation facility in Laxman Pura slum

Madhya Pradesh is home to the Slum Environment Santiation Initiative (SESI), which was jointly sponsored in 2005 by WaterAid India, UN Habitat, and the municipal corporations of Bhopal, Indore, Jabalpur, and Gwalior; Madhya Pradesh's four biggest cities.[viii] The project sought to encourage community-led approaches to water and sanitation issues in each city's slums. Since the project's implementation, toilets, sewer lines, and drainage systems have been introduced to slums in order to promote the safe disposal of waste.

Laxman Pura slum in Gwalior is 150 years old. Located in the heart of the city, the slum was known for its lack of sanitation facilities. Laxmam Pura, with its large percentage of families without private sanitation facilities, was chosen as a model for the construction of community toilets, and

was declared an 'Open-Defecation Free Slum' in 2007.[ix] In recognition, Gwalior Municipal Corporation was granted the India's National Urban Water Award in 2008.

Two years after the award, I would like to visit the site to speak with residents and Dr. Pavan Sharma, Commissioner of the Gwalior Municipal Corporation, as well as representatives from the partner organizations.[x]

Varanasi, Uttar Pradesh: Increased community participation in efforts to clean Ganges despite the campaign's conflict with traditional Hindu beliefs

Falling water levels and an increased amount of untreated sewage have changed attitudes towards the Ganges in recent years. A decade ago, the Clean Ganga movement struggled for acceptance as many Hindus believed that acknowledging the Ganges' pollution was tantamount to doubting the power of the sacred river. The movement has gained recognition, however, as water levels have fallen and the amount of untreated waste flowing into the river has grown.[xi] More plants built to clean the waste failed to resolve the problem, as unreliable electricity supply kept the plants operating sporadically. More recently, the government committed $4 billion dollars towards cleaning the river, backup power for the sewage plants, and pilot projects to develop treatment ponds that would clean waste using minimal electricity. Locals

Figure 3, pollution of the Ganges in Varanasi

and tourists alike have taken up the cause. The acknowledgement of the Ganges as a natural space that can be polluted without losing its sacred character is marks a shift in public opinion that Veer Bhadra Mishra, founder of the Clean Ganga movement, sought to achieve for 28 years.

During my travel, I will seek to speak with Mr. Mishra, who is also a professor of hydraulic engineering, as well as pilgrims, and locals visiting the rivers' banks. I plan to visit the non-functioning sewage-treatment plants, and hope to speak with Varanasi residents nearby about their experience of the water towers.

Big Andaman Island, Andaman and Nicobar Islands: Water shortages persist and cultural challenges abound

In the isolated Andaman and Nicobar Islands in the Indian Ocean, recovery from 2004's tsunami continues. A year after the event, half of the island of Car Nicobar remained submerged under water, and residents of the islands were relying on 8,500 latrines to maintain safe waste disposal.[xii] According to official figures, 3,513 people on the 572 islands in the archipelago were killed during the tsunami.[xiii] Islander's relationship to water is complex, however, and recovery from the 2004 tsunami is one challenge with which residents struggle. Despite heavy average rainfall, several years of low rainfall have led to water shortages in the archipelago. The economy relies on tourism, but increased numbers of tourists and a growing population mean increased water usage, a problem that led officials to clean wells dug by Japanese forces during

World War II.[xiv] In 2007, the India Planning Commission recommended desalination plants and water tapping from freshwater lakes into bigger island towns,[xv] but water scarcity remains one of the archipelago's greatest challenges. While locals remember an average of nine months of rain a year in the 1960s, they now experience just two rainy months per annum.[xvi] Frustration at the slow implementation of water harvesting structures abounds as residents are surrounded by water, but without enough for their basic needs. This tension is exacerbated by controversy regarding the impact of new water treatment facilities on native tribal populations.

Figure 4, Little Andaman Island after the 2004 tsunami

If awarded this grant, I intend to travel to Rutledge Island, the main source of untapped non-saline water, and to observe current catchment techniques in the area, as well as the Japanese wells being tapped for clean water. I plan to visit Little Andaman Island to speak with tsunami survivors and UNICEF representatives regarding recovery following the tsunami, and hope to speak with locals to better understand local attitudes towards the tourist economy and its impact on the archipelago's water shortages.

Budget Outline

N.B. Some of these prices are approximate, but are based on seasonal rates.

International travel from New York City to Mumbai:
- 6 Month Multiple Entry Visa for US Citizen: 73USD
- Flight to India from New York City: 1200USD

Arrival in Mumbai, stay in Mumbai to reacclimate (3 days):
- Hotel in Mumbai: West End Hotel, 80USD per night
- Food per diem: 20USD

Travel to Jaipur (1 day), stay in Jaipur (10 days):
- Mumbai to Jaipur: 55USD
- Hotel in Jaipur: Umaid Mahal Hotel, 40USD per night
- Food per diem: 10USD

Travel to Gwalior (1 day), stay in Gwalior (4 days):
- Jaipur to Gwalior: 30USD
- Hotel in Gwalior: 30USD per night
- Food per diem: 10USD

Travel to Varanasi (2 days), stay in Varanasi (7 days):
- Gwalior to Varanasi: 36USD
- Hotel in Varanasi: 40USD per night
- Food per diem: 15USD

Travel to Big Andaman Island (3 days), stay on Big Andaman Island (8 days):
- Train from Varanasi to Kolkata: 40USD
- Flight from Kolkata to Andaman Island: 150USD
- Hotel in Andaman: 130USD per night
- Food per diem: 30USD

Travel to Mumbai for departure (1 day), overnight in Mumbai before flight:
- Andaman Island to Mumbai: 200USD
- Hotel in Mumbai: 80USD per night
- Food per diem: 15USD

Totals:
International Travel: 1273USD
Travel within India Total: 511USD
Hotels for 36 days: 2160USD
Food for 36 days: 560USD
Anticipated miscellaneous expenses (taxis, etc): 500USD

Grand Total: 5004USD

Sources:

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[iii] http://www.theinstallteam.com/products/brac/brac.htm

[iv]http://www.google.com/url?sa=t&source=web&cd=1&ved=0CBcQFjAA&url=http%3A%2F%2Fwww.iwmi.cgiar.org%2Fpublications%2FWorking_Papers%2Fworking%2FWOR104.pdf&rct=j&q=Potential%20for%20Water%20Conservation%20and%20Harvesting%20against%20Drought%20in%20Rajasthan%2C%20India&ei=2rUeTZbXKZOisAOWjpTSCg&usg=AFQjCNE4br_vFVSWej45E1CMCI-O6JCxMQ&sig2=h1W2TOUmPsr0ul_vbMvt5A&cad=rja

[v] http://www.hindustantimes.com/Rajasthan-on-brink-of-water-emergency/Article1-574005.aspx

[vi] http://timesofindia.indiatimes.com/city/jaipur/State-cabinet-makes-major-decisions/articleshow/6198164.cms

[vii] http://www.rainwaterharvesting.org/index_files/Paani_Yatra6.htm

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[ix] http://www.waterawards.in/2008-finalists-profile-gmc.php

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[xi] http://www.time.com/time/magazine/article/0,9171,2002524-3,00.html#ixzz19enYDDXg

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[xiii] http://www.survivalinternational.org/news/1278

[xiv] http://uk.reuters.com/article/idUKB52065920070323

[xv] India Planning Commission. Andaman and Nicobar Islands Development Report, pp. 74. http://books.google.com/books?id=ujf2N5O4iKgC&pg=PA73&lpg=PA73&dq=andaman+water+shortage&source=bl&ots=t_zGBvllk8&sig=QUBr3pUU6gKIe1L_Yj_hUAulCCA&hl=en&ei=lZ8eTcarOJDUtQOk8pXdCg&sa=X&oi=book_result&ct=result&resnum=8&ved=0CEsQ6AEwBw#v=onepage&q&f=false

[xvi] http://www.hindu.com/2010/07/06/stories/2010070661180700.htm

Images:
Figure 1: http://www.csrwire.com/press_releases/13567-Safe-Water-Network-Announces-New-Partnerships-to-Create-a-Sustainable-Affordable-and-Scalable-Rainwater-Harvesting-Program-in-Rajasthan-India
Figure 2: http://4.bp.blogspot.com/_NrMDpRCSd-M/SCmkrUAPpHI/AAAAAAAAAAM/EYsSxWM8Oew/s320/Picture1.jpg
Figure 3: http://img.xcitefun.net/users/2010/02/147589,xcitefun-ganges-river-india.jpg
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