RETHINKING SHANGRI-LA
Revival of the sustainable courtyard dwellings
Kathmandu, Nepal

Pooja Vaidya
Advisor: Prof. David Crutchfield
Secondary Advisor: Dr. Doug Schulz
Everywhere throughout the world, one finds the same bad movie, the same slot machines, the same plastic or aluminum atrocities, the same twisting language of propaganda etc. It seems as if mankind, by approaching an en masse at a sub-cultural level. Thus we come to a crucial problem confronting nations just rising from underdevelopment. In order to get toward the road to modernization is it necessary to jettison the old cultural past which has been the raison d’etre of a nation. There is a paradox: how to become modern and to return to sources; how to revive an old, dormant civilization and take part in universal civilization.’

-Paul Ricoeur quoted by Kenneth Frampton

History and Truth
As a growing metropolis in a developing nation, how can the built form of Kathmandu valley take part in a universal civilization while preserving its local culture?
Claim

The built form of Kathmandu should embrace advanced sustainable technology to meet its current and future needs while respecting the socio-cultural patterns of the city.

PREMISES:

Modern sustainable technologies are capable of creating an impact in the Kathmandu valley where resources are scarce.

Influence of Colonization in India in the past and globalization at present has enabled technology transfer in the valley.

The built environment of Kathmandu face the challenge to adapt to the modern world and is losing its ‘sense of place’. It should be able to preserve its identity since the response to shelter is closely affiliated with cultural, social and economic factors.
Conclusion:
Globalization has many pros and cons. It has made technology transfer possible which the valley can use in its built environment to meet its current and future needs. Furthermore, the response to shelter should reflect the social, cultural and economic norms of the society.

Project Justification:
With two global powers India and China as its neighbors, the effects of globalization in Nepal is inevitable, but the question is how to make globalization improve the society than to let it fall into ruins?

It is important to take part in a universal civilization, but people should be able to preserve their identity at the same time. There are great problems in the developing world that cannot be solved by simple cultural imitation. Globalization can be used for the betterment of the society rather than just fulfilling the gross materialistic wants.
Sustainable courtyard housing
The spaces will be determined according to current day social structure and culture of the valley

30 people total
Male 11
Female 19
Eduard Sekler

UNESCO consultant, and co-founder of the Kathmandu Valley Preservation Trust which he chaired 1990-1996

When Eduard Sekler first visited the Kathmandu Valley in 1962, he realized he was seeing something very special and very vulnerable.

Nepal had opened to the outside world only 10 years before, and the culture was still relatively untouched by industrial influence. In the urban areas, Sekler found an exquisite vernacular architecture fully integrated into the daily lives of the inhabitants, while the surrounding hillsides, covered by terraced rice paddies, suggested an ancient, sustainable economy in harmony with the environment. Forming a background to the human realm stood the magnificent, snow-covered peaks of the Himalayas.

"It was the way it had been for centuries - a beautiful valley filled with happy, peaceful people. It seemed like Shangri-La," Sekler said.
Carl Pruscha on Vernacular Architecture

Austrian architect, UNESCO consultant for regional planning in Nepal from 1964 to 1974

For ‘thousands of years, human dwellings have developed in an incredibly rich diversity, reflecting man’s ability to respond to the environment-topography and climate and to create social norms and physical standards for his habitat. Until fairly recently, this habitat has always been in harmony with nature.

Our western world has become accustomed to a standard of living that is not only unsustainable in the long run, but lags behind previous achievements which are in danger of becoming forgotten. We have limited our choices to two equally unsatisfying and extreme dwelling alternatives: the highrise apartment blocks and the free standing single family house that have become the epitomes of contemporary American and European city. Both are extremely uneconomical in terms of infrastructure and maintenance. Nevertheless and almost incomprehensibly, each alternative is being copied universally.

The Eastern world, a world that developed its own predominantly inward orientation as opposed to the purely outward orientation of its Western counterpart has been especially affected. Unfortunately, the societies for whom the typically introverted oriental urban houses were commonplace for several millennia are now abandoning this house type to adopt occidental schemes.’
Kenneth Frampton on Critical Regionalism

Born 1930, Woking UK

Theory emerged in 1980 as a reaction to Modern and Post-Modern architecture

Critical regionalism - An approach to architecture that strives to counter placelessness and lack of identity in Modern Architecture by utilizing the building’s geographical context

Frampton’s emphasis on topography, climate, light and tectonic form rather than on scenography and should be based on the sense of touch rather than the visual sense.

Critical arriere-garde: critical practice which removes itself from both the optimization of new technology and the ever present tendency to regress into nostalgic historicism or the glibly decorative
Valley’s Present Issues/Concerns

The rate of urbanization in Nepal was 6.6% per annum, which was the highest among the Asia Pacific region followed by Cambodia (6.2%), Bangladesh (5.3%), Pakistan (4.4%), India (2.9%) and Sri Lanka (2.2%).

Population growth rate: 4.71% per year, one of the highest in the world today.

Theoretical Premise/Unifying Idea Research
Consequences of Rapid urbanization:

• consistent power, proper sanitation and clean drinking water supply hasn’t been proportional to rate of urbanization
• Loss of cultural Heritage
• River pollution
• Air pollution
• Traffic congestion
• Solid Waste Disposal
• Land Speculation
• Substandard and Slum Housing condition
Proposal
Vernacular architecture
Re-FOCUS
Designed by University of Florida

Solar Housing: Participant of 2010 European Solar Decathlon

800 sq.ft space - modern interpretation of traditional Florida ‘cracker house’ that has a well covered porch for sun protection

high tech photovoltaic panels, solar passive design and prefabricated modular construction

solar panel and produces 14.6 KW of energy which is more than enough for the 1 bedroom house

Reclaimed, reused and recycled material, energy efficient appliances
ICON Solar House

Solar Decathlon: University of Minnesota, 2009

Vernacular gabled roof

30 polycrystalline panels
11 monocrystalline/amorphous silicon hybrid panels

Six flat plate thermal array for domestic water heating and floor heating

Heavy insulated walls (R-50)
Roof (R-70)

Triple glazed window with Ar

Greywater recycled for irrigation of plants
Nepal
Population: 29 million
Area: 56827 sq mi

Bagmati
KATHMANDU
population of 1.5 million
altitude of 4297ft.
Area 58.2 sq.miles

Patan
Population 337,785
Area 14.67sq, miles

Site Area: 251762ft2
Expected population
SITE VIEWS and VISTAS

1. Southern view toward Modern Indian School
2. Built features on the East
3. Chobar on the West
4. Panoramic View on the North
5. Sunrise Homes in the North Eastern view
Site Analysis

- Bridge
- Busy traffic
- Light traffic
- Moderate Traffic
- Dirt road
City Climate data

**Avg Min Temp(°F)**

![Graph showing average minimum temperatures](image)

**Avg Max Temp(°F)**

![Graph showing average maximum temperatures](image)

**Humidity (%)**

![Graph showing humidity levels](image)

**Rainfall (in)**

![Graph showing rainfall](image)
Wind and Sun Diagram
History of Patan

• Licchavi Period (5th to 9th Century): King Bir Deva founded the city/ Hinduism and Buddhism flourished
• Thakuris or transitional period (879-1200) and early Malla period (1200-1382): Buddhism remains the dominant religion: stupa and monastery construction
• Later Malla Period (1382-1768): Hindu Malla Kings ruled over majority of Buddhist population
• Early Shah (1769-1846) and the Ranas (1846-1951): unification of Nepal under Shah rule. 1934 earthquake caused great destruction to the built forms of the valley/Ranas brought Renaissance architecture and Neo-classical architecture to Nepal
• After the 1950s: Modern state of Nepal born and open to outside world. Democracy came into existence and modern buildings built around the historic fabric/ architects like Carl Pruscha, David Dobereiner, Louis Khan introduced modernism in the valley
• Patan Durbar Square listed in World Heritage site by UNESCO in 1979
• 2000- present: Urbanization of valley at an alarming rate
History of modern developments/urbanization after the 1950s

1967

1978

1991

2000

Historical Context
Program

The Program will comprise of two kinds of spaces: private spaces and semi-private spaces. The dwelling units will comprise the private spaces whereas the neighborhood courtyards will create the semi-private spaces.

Semi Private Areas:
- Courtyards

House Program:
- Kitchen/Dining
- Worship Room
- Living Room
- Bedrooms
- Bathrooms 2
- Parking/Garage

Community Building:
- Maintenance
- Gathering space
- Leasing Office
- Farmers Market

Carbon Footprint of each Unit: 360sq.ft
Advantages/Disadvantages
Kathmandu Durbar Square Courtyard study
Courtyard Configuration study

Bus Route  Pedestrian + Bike Path  Vehicular Access
Birds eye Perspective of typical courtyard

DESIGN SOLUTION
Section Perspective

DESIGN SOLUTION
Technology when used appropriately doesn’t overpower nature.
Steps for sizing PV:

1. Energy used per day = 3590 WH
2. Adjusted load to account for system losses = \((\text{WH/day}) \times 1.5\) = 5385 WH
3. Number of sun hours = 6
4. Required peak watts (\(W_p\)) = \(\frac{\text{Adjusted load}}{\text{sun hours}}\) = 897.5 \(W_p\)
5. a. Divide \(W_p\) by 12 for single crystal silicon cells = 74.79 sq.ft
   b. Divide \(W_p\) by 8 for amorphous silicon cells = 112 sq. ft

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<td><strong>Total Watt</strong></td>
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First Floor and Ground floor radiant floor heating system:
  a. Concrete in ground floor (Terracotta Tiles in first floor)
  b. Heavy duty polyethylene pipes for warm water to circulate within the wood floor decking
  c. Concrete slab
  d. Insulation above concrete foundation

Wall Detail:
  a. Reclaimed Zn Painted
  b. Corrugated steel anchor
  c. Vapor Retarder
  d. Insulation
  e. Brick back up wall

Roof Detail:
  a. Aluminum struts
  b. Rubber seal strips
  c. Roof battens
  d. 2”X6” deckings
  e. Tiles
  f. Monocrystalline silicon module

Design Solution
Row Housing
Ground Floor

1a-Storage; 1b-Storage, 1c, 1d-Retail, 1e-Parking
360sf.ft footprint
Row Housing
First Floor

2a, 2b, 2c, 2d, 2e - Living Room; 2b.1 - (Grandparents’) bedroom
Row Housing
Second Floor
3a, 3b, 3c, 3d, 3e- Master Bedroom; 3a.1, 3b.1, 3d.1- Bedroom
Row Housing
Third Floor

4a, 4b, 4c, 4d, 4e - Kitchen and Dining, 4d.1 - Altar
Roof Plan
Row Houses
6 monocrystalline solar panels and
2 solar collectors
Apartments

Ground floor
Efficiency

Third floor
Common Kitchen/Dining

Second floor
Common Living Room

First floor
Individual Bedrooms

Roof Plan
Older generation, newer generation, rich, middle class and poor live in one community in harmony....

And the orient meets the occident
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Bibliography:

