ARCASIA Committee on Social Responsibility (ACSR)
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Ar. Farhana Sharmin Emu
Country Representative
Institute of Architects Bangladesh

The 2019 one of the Winners of the Aga Khan Award for Architecture

One of the best examples of “Design for Resilience”

The Arcadia Education Project, in South Kanarchor, Bangladesh, is a modular building that includes a preschool, nursery and vocational training center. Because its riverfront site is flooded for months during the monsoon season, the architect, Saif Ul Haque Sthapati, of Dhaka, ingeniously designed “an amphibious structure” anchored to the ground with bamboo posts: it sits on the ground during the dry season or can float on 30-gallon steel drums, within bamboo frames, that form a substructure.

Monsoon is here and it floats

Water has receded.

Site transportation.

Declined the offer to use this machine.

Substructure and superstructure

Substructure work in progress.

Driving of Bollah posts

Roof of the mock up installed.

Trial of window options begins.

Test it out on water.

Successful attempt in prefabrication.

On a riverside where monsoon season submerges the landscape in up to three metres of water, this new school floats with the tide. The Arcadia Education Project utilizes bamboo to create a lightweight, cost-efficient, and low-carbon structure.

Bait Ur Rouf Mosque,
Faidabad, Uttara, Dhaka, Bangladesh.
Architect : Merina Tabassum.
Winner, Aga Khan award for Architecture, 2016
Award Cycle: 2014 - 2016 Cycle

Friendship Centre, Dhaka, Bangladesh.
Architect : Kashef Mahboob Chowdhury
Winner, Aga Khan award for Architecture, 2016
Award Cycle: 2014 - 2016 Cycle

Percentage distribution of urban households in terms of structural types is shown below in the Table.

Percent of Urban Households by Structure Type

Type of Structure	2001	2010
Jhuprie	7.58	1.56
Kutcha	47.15	41.85
Semi pucca	23.26	28.92
Pucca	22.01	27.67
Total	100	100

Source: 2010: Estimation from HIES Survey, 2010, BBS.

The Table above shows that nearly 44% of the urban households live in purely temporary structures while those living in semi-permanent structures comprise about 29 percent of the urban households. Only about 28 percent of the households live in pucca structures. These data suggest that overwhelming majority of urban households live in poor quality houses. So, in terms of both quantity (housing deficit) and quality, urban housing presents a major policy challenge for Bangladesh.

72% purely temporary or semi permanent structures
28% pucca structures
Source: 2010-estimation from HIES Survey, 2010, BBS.

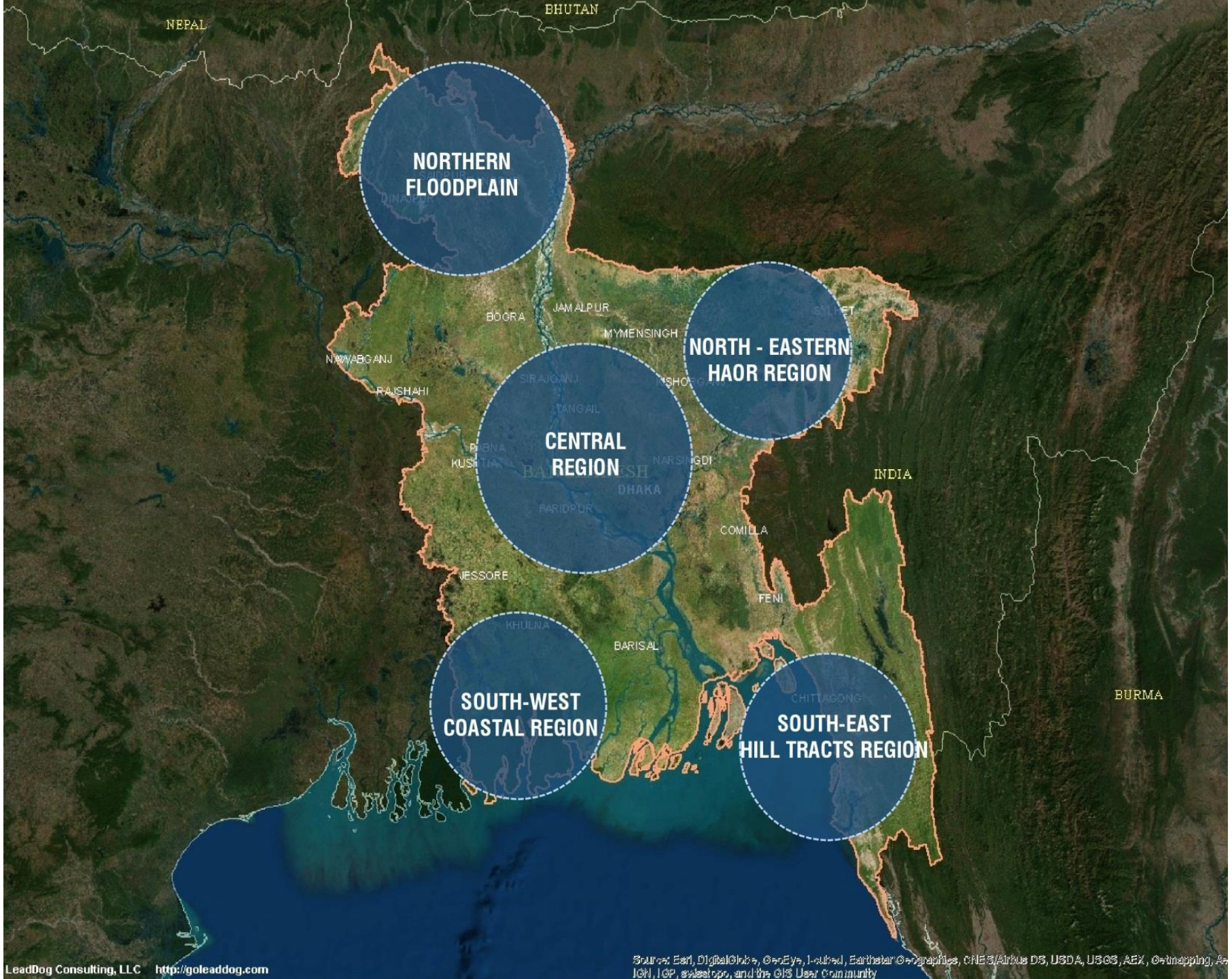
Permanent Structure : More than 96%

Temporary Structure : Less than 4%

COLOR CODING
overall critical threat
local critical threat
minor threat
no threat

		Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7	Type 8
	THREATS	Chars, beaches and river edges in the coastal area	Inland coastal area South	Inland hilly area South-east	River edges and chars Central and North	Distant from river edges Central and North	North-west border area	North-east low-lying area	North-east hilly area
1	Earthquake	Moderate & Low	Low	Moderate	Severe, Moderate & Low	Severe, Moderate & Low	Severe and Moderate	Severe	Severe
2	Landslide			Hilly area					Hilly area
3	Wind	cyclone area	cyclone area	cyclone area	southern central part	southern central part	regular tropical storms	regular tropical storms	regular tropical storms
4	Storm surge	cyclone area	still close to coast		due to regular storms			due to regular storms	
5	Regular flood	in context of cyclone	in context of cyclone	in specific locations	monsoon	monsoon	in specific locations	monsoon	in specific locations
6	Flash flood			in specific locations			trans border rivers		trans border rivers
7	River and coastal erosion	along rivers and coast	in specific locations	in specific locations	along river		in specific locations	in specific locations	in specific locations
8	Drought			in specific locations	in specific locations	in specific locations	in specific locations		
9	Tornado	in specific locations	in specific locations	in specific locations					

Figure 5.3: the hazard profile of Bangladesh:
(Source: Kaat Boon, 2015)


NEPAL
BHUTAN
NORTHERN FLOODPLAIN
NORTH - EASTERN HAOR REGION
CENTRAL REGION
SOUTH-WEST COASTAL REGION
SOUTH-EAST HILL TRACTS REGION
BOGRA
JAMALPUR
MYMENSINGH
NAWABGANJ
RAJSHAHI
SIRAJGANJ
TANGAIL
PABNA
KUSHTIA
NARSINGDI
DHAKA
FARIDPUR
COMILLA
INDIA
JESSORE
FENI
KHULNA
BARISAL
CHITTAGONG
BURMA
LeadDog Consulting, LLC http://goleaddog.com
Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, A
IGN, IGP, swisstopo, and the GIS User Community

Disaster Threats: Cyclone+Storm surge + River bank and coastal erosion+ Tornado

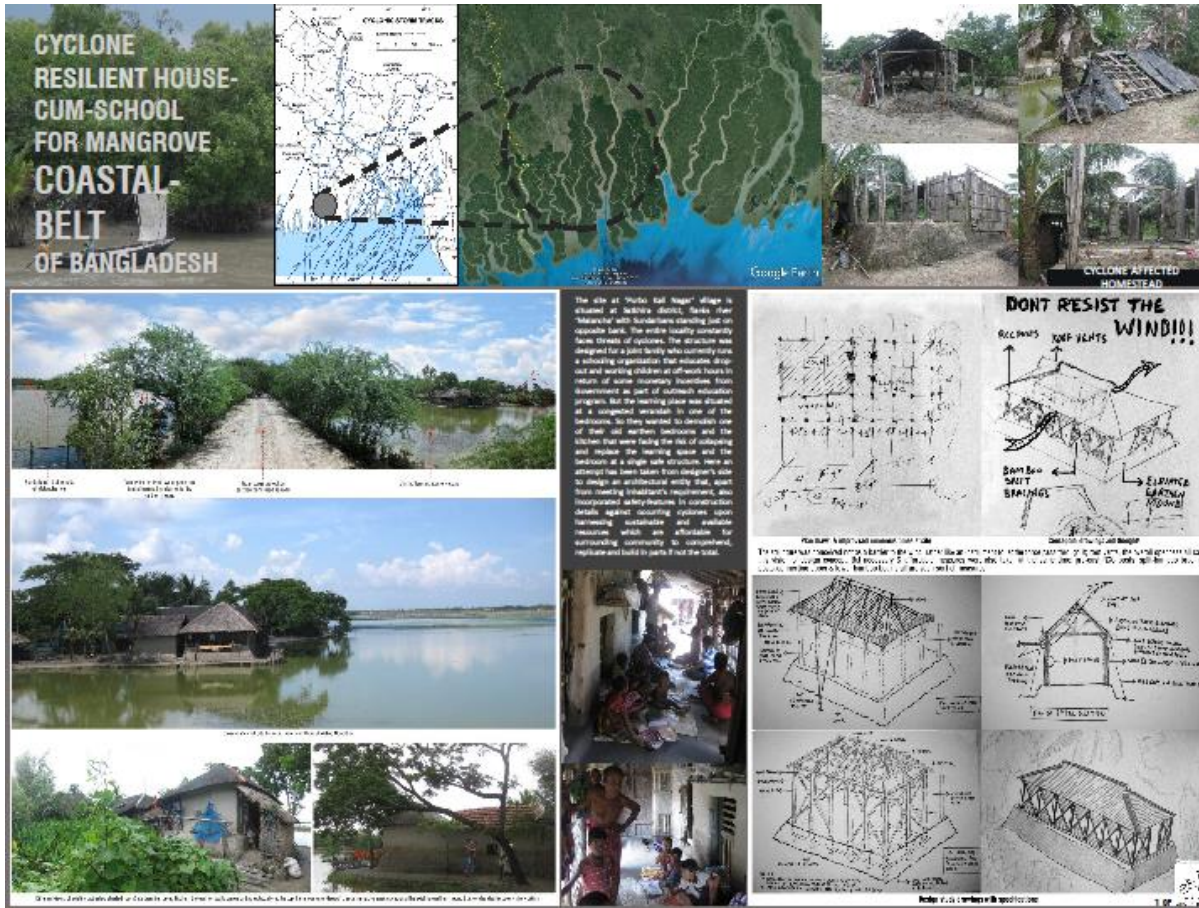
Location: Barisal+ Chittagong+ Khulna

Major housing design consideration:

i. Structural durability to withstand high wind pressure

- **Chou-Chala roof**
- **Closed varandah**
- **Low roof**
- **Bracing and ties**

ii. Use of trees as wind breaker



1. Coastal Area

Disaster Threats : Storm Surge + Flood + River Bank & Coastal Erosion +Tornedo + Earthquake

Location: Barisal+Chittagong+Dhaka+ Khulna + Rajshahi+ Rangpur

Major disaster consideration: **River and coastal erosion and flood resilient housing**

Major housing design consideration:

- **i. Homestead/plinth raising**
- **ii. Housing on moving land (portable housing)**

2. Char Area

Disaster Threats: Flood + Flash flood+ Tornado + **Earthquake +** Cold wave

Location: Barisal+Chittagong+Dhaka+ Khulna+ Rajshahi+Rangpur

Major housing design consideration:

- **i. Homestead/plinth raising**
- **ii. Housing resettlement (cluster village, linear housing on raised ground)**
- **iii. Integrated drainage system for the flash flood areas**
- **iv. Earthquake resilient construction technology**
- **v. Earthquake resilient building materials**

3. Flood-Plain Area

Disaster Threats: Earthquake + Flood + Flush Flood+ Tornado+ Cold wave

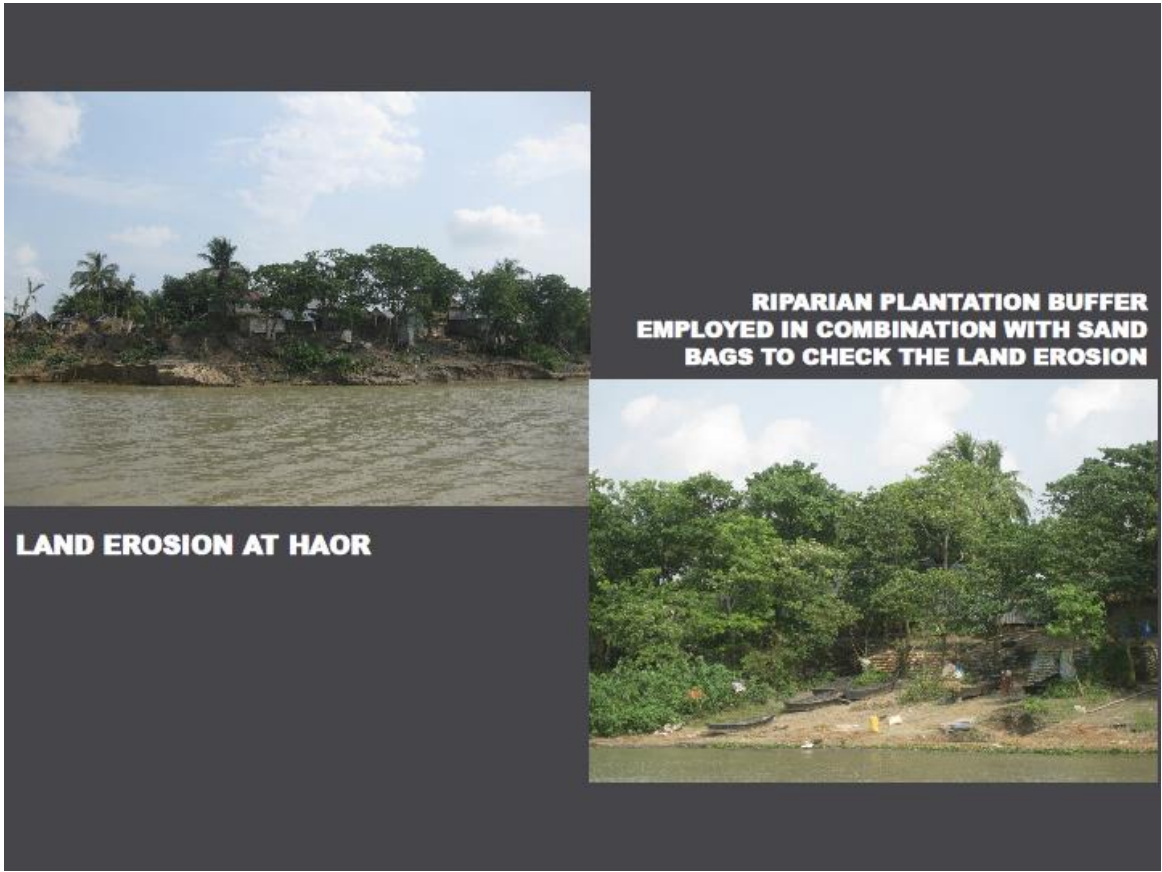
Location: Chittagong+ Sylhet

Major disaster consideration: **Flood and Earthquake resilient Housing**

Major housing design consideration:

- **i. Homestead/plinth raising**
- **ii. Housing resettlement (cluster village, linear housing on raised ground)**
- **Boat house for Bede**
- **iii. Ecological aspects**

4. Haor Area



Disaster Threats: Land slide + Cyclone + Earthquake+ Tornado+ Flash flood + Cold wave

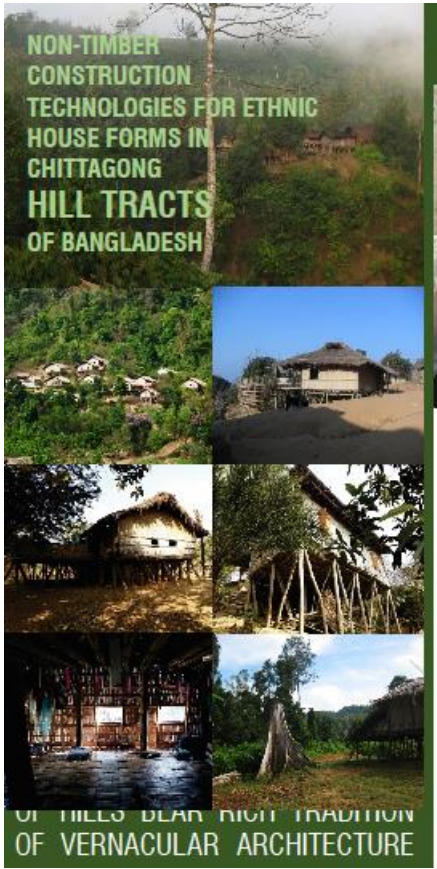
Location: Chittagong + Dhaka+ Sylhet

Major housing design consideration:

- **i. Earthquake resilient construction technology**
- **ii. Earthquake resilient building materials**
- **iii. Building construction guidelines for landslide prone areas**
- **iv. Cultural aspects**

Characteristics of housing in hilly areas:

- Stilts
- Built on bamboo and timber mostly



5. Hilly Area


THANK YOU ALL