Workshop on Promoting Innovations in the Social Sector and their scale-up
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Fast & Affordable Housing:

Learnings in Design, Development and Delivery

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What drives Innovation

- Innovations do not happen in a vacuum.
- There is a need, a goal, a target or an objective.
- The target should emotionally touch the innovator.
- Think“ much beyond their present reach”.
- Eco-system that helps to Connect. Proliferate. Diffuse.
- Fertile eco-systems help innovations to tip.
- Re-innovate.

The Housing Need

- Housing is a personal and a social need.
- A house gives identity and brings a change.
- Shortage of quality housing
    - ~ 24 to 26.5 million *(various sources)*

- Population increase. Persistent Problem.

Issues and Barriers In Delivery

Issues/Barriers	1961-71 Third and fourth plan	71-81 Fifth and sixth plan	81-91 Sixth and seventh plan	91-2001 Eight and ninth plan	2001-11 Tenth and Eleventh plan	Total marks
Housing finance and affordability	20	20	20	15	10	85
Institutional and policy framework	15	15	10	10	10	60
Availability of land for housing	10	20	15	15	10	70
Advancement and availability of building materials	15	10	15	20	20	80
Speedier technology and housing system	20	15	15	20	20	**90**
Supply of skilled and unskilled labor	10	10	15	10	20	65

Mass-Industrialized Housing to Combat Consistent Housing Shortage in Developing Countries: Towards an Appropriate System for India - Ar. Uttam K. Roy, Dr. Madhumita Roy, Prof. Subir Saha; XXXVI IAHS World Congress on Housing, National Housing Programmes –New Visions, November 03-07, Kolkata, India, Year ?)

Challenges to meet the Housing Need

- Time
  - Need for speedier technology
  - Flexible Housing System addressing land issues
- Cost
  - Affordable
  - Value for money and long lasting
  - Availability of financing systems
- Sustainability
  - Green technologies
  - Easier supply chain
  - Easy availability
  - Acceptability

Speedy Construction Technologies

- Framed structures
- Easy to manufacture
- Easy to Transport
- Open and customisable
- Local manpower skill sets
- No power tools

Flexible Housing System addressing land issues

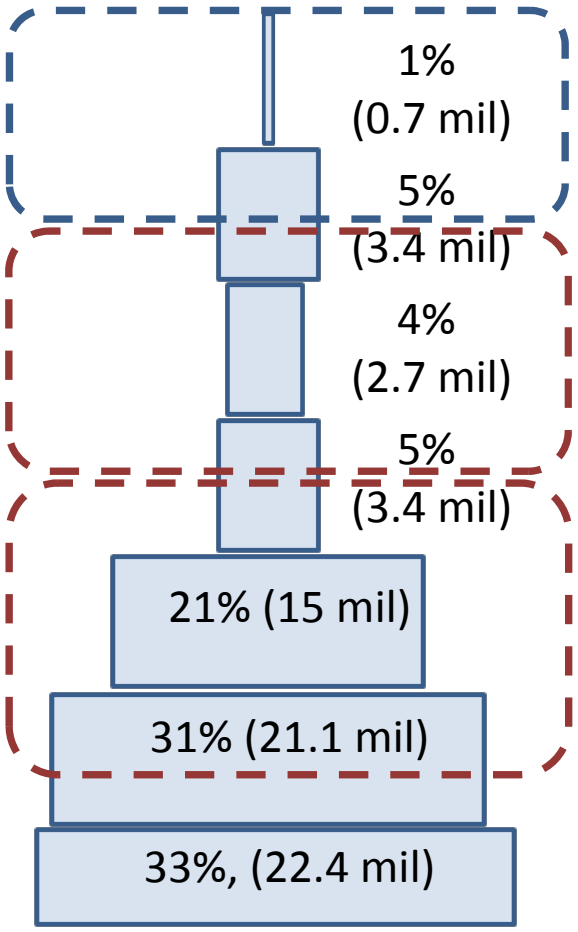
- G+ structures
- Steel Rods, Concrete and Bricks.
- Quality and Time.

Component	What does it seek to replace[+]	Enablers
1. Auto Aerated Bricks and Blocks *(Rs. 60 for a 300x 300x 100 mm block)*	Fired Clay Bricks (Rs. 5~9) Production (FY09): 140 billion. 100,000 plants • Uses 400 mT of good quality soil every year. • Uses 24 mT of coal. • Pollution.	• Policy needed • Training and Demonstration Units • Replacement behaviour • Acceptability • Training of "brick" makers
2. AeroCon Bricks and Blocks		
3. Sandwich Puf Panels *(Rs. 1500 per sq. m)*		

[+]www.flyashbricksinfo.com

Affordability

Monthly Household Income	*Income Pyramid*
> Rs. 80,000	1% (0.7 mil)
Rs. 40,000-80,000	5% (3.4 mil)
Rs. 30,000-40,000	4% (2.7 mil)
Rs. 20,000-30,000	5% (3.4 mil)
Rs. 10,000-20,000	21% (15 mil)
Rs. 5000-10,000	31% (21.1 mil)
< Rs. 5000	33%, (22.4 mil)



Market Potential

PREMIUM SEGMENT
Price of unit > Rs. 25 lacs
Potential Demand ~ 2 mil
Market size ~ Rs. 500,000 crores

MIDDLE SEGMENT
Price of unit: Rs. 10~25 lacs
Potential Demand ~ 5 mil
Market size ~ Rs. 900,000 crores

LOW SEGMENT
Price of unit: Rs. 3~ 10 lacs
Potential Demand ~ 21 mil
Market size ~ Rs. 1,300,000 crores

ULTRA LOW SEGMENT
Price of unit < Rs. 3 lacs
Potential Demand ~ ???
Market size ~ ???

Customer Segmentation and Market Potential *(Adapted from Monitor (2009)*

Affordability and Speedy Technologies

- Frame structure solutions and Pre-fab solutions meet the higher band of the LOW INCOME SEGMENT
- Product and Process INNOVATIONS are needed to reach the lower bands of the LOW and ULTRA LOW INCOME SEGMENTS
- Can we look at alternate technologies, particularly brewing in our research laboratories.
- Criterion: “Green” and “sustainable”

Green materials

Product	Prototype	Pilot	Commercial
Coir CSNL Board	Y		
Arhar Stalk Cement Board	Y		
Bio based sandwich composites	Y	Y	
Castor oil based Polyol foams*	Y	Y	

*** This list is not exhaustive*

- Waiting for Innovators to take to Pilot and Commercial scales

- Long gestation periods, sometimes 5+ years. Unattractive
- Supply chains and raw material availability

- Creating awareness of technologies
- Policy to encourage multi level entrepreneurs needed
- Design for G+ structures

Green Building Materials For Low Cost Housing, Science Tech Entrepreneur, 2009 (CBRI, Roorkee Publication). * Internal Project Report, Tata Steel Limited.

Commercial Options for Wall Claddings

Board Material	Srength	Advantage	Disadvantage	Price (Rs/Sq-m)
Coir Board	H	Strong & Aesthetic	Costly	**1250**
Bamboo Mat Board	H	Strong & Aesthetic	Costly	**1000**
Fibre Cement Board	H	Strong	Costly	600
Bison Board	H	Strong	Heavy	330
Dragon Board (MgO Board)	H	Strong	Chinese import	250
Calcium Silicate Board	M	Easy to handle	Low strength	330
Gypsum Board	L	Lighter	Absorbs Water	215

30 pilots pan India to see if the concepts work

2 nos.

2 nos.

2 nos.

4 nos.

- Work In Progress
- Scheduled
- Planned

Updated: 15th March2012

Others are beginning their journey

Building Materials & Technology Promotion Council (BMTPC), Ministry of Housing & Urban Poverty Alleviation – **Pilot Project on Confidence Building in Alternate Housing Technologies Through Demonstration Construction and Training (2011-2013)**
Plan: 60 units – houses, community centres etc.

And few more ….

Building the Eco-system (1)

- India is vast. One size does not fit all.
- Develop 10 Regional Champions & Collaborations
  - Fund Entrepreneurs for scale up. Freedom to Fail
  - Research Labs to be incentivised for scale-up technologies
  - Tax rebates / holidays for early adapters
  - Organisations can also play entrepreneurs
- Successful entrepreneurs and business luminaries to monitor progress

Building the Eco-system (2)

- Innovation awards for implementing solutions
- Training programs for building professionals in the formal and informal sector on the new methods of construction, alternate methods
- Combine technologies e.g. Solar, wind, water harvesting

Then the **Trilemma** can be solved

Fast

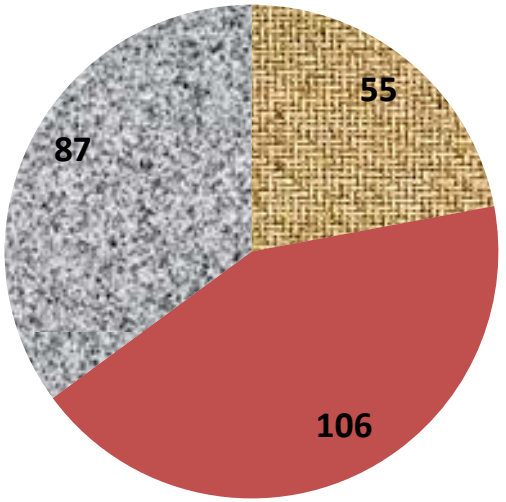
Affordable

Sustainable Housing Solutions for INDIA

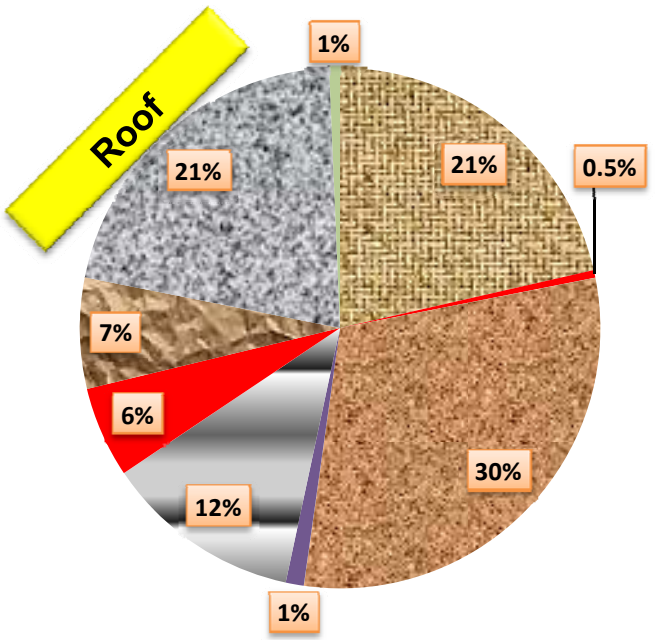
Thank you

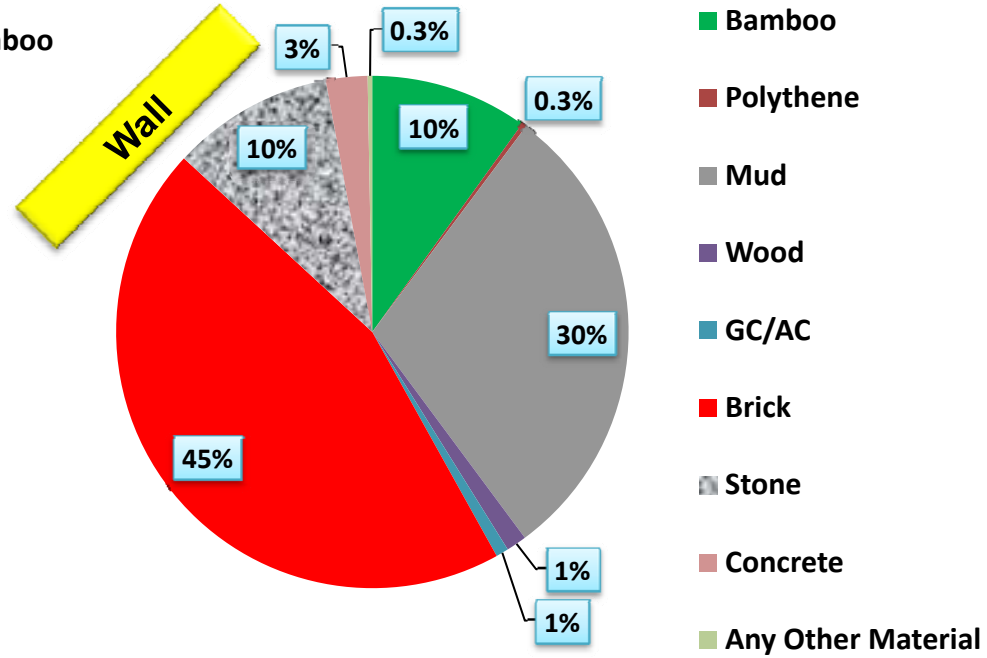
Back UP Slides

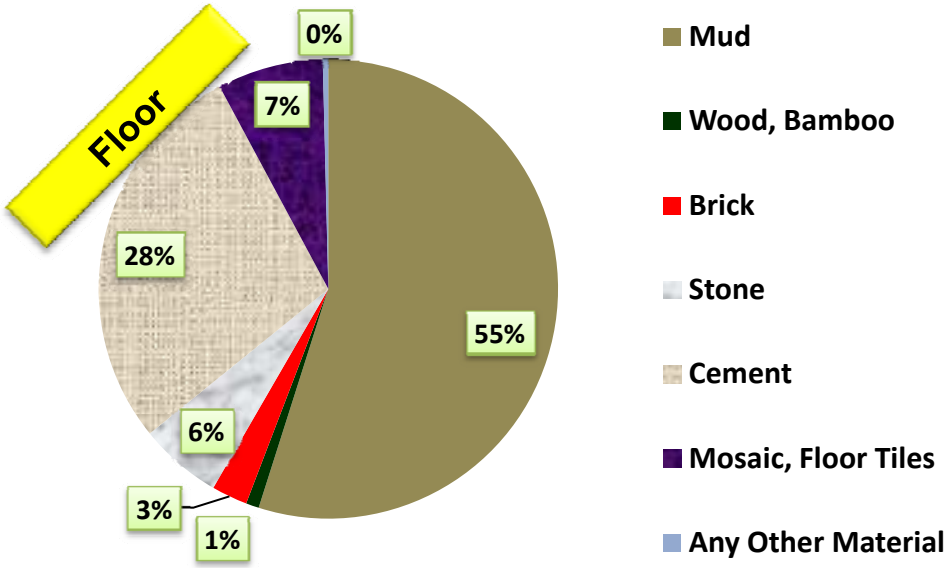
Distribution of house types



Material Usage in Indian construction







Source: census data 2001

Katcha structures

- **Katcha structure**: A structure which had walls and roof made of non-pucca materials was regarded as a katcha structure. Katcha structures could be of the following two types:

(a) 'Unserviceable katcha' which included all structures with thatched walls and thatched roof i.e. walls made of grass, leaves, reeds etc. and roof of a similar material. 10 million population lives in these types.

(b) 'Serviceable katcha' which included all katcha structures other than unserviceable katcha structures.

Size of house varies from 150-200 Sq Ft

Occupants:

-Daily wage earners

-Land labourers

-Susceptible to influence

-Monthly income Rs.1200 to 1800

-All working hands

-Greater societal bond & dependency

-Mostly tribal areas and C class cities

-No toilets. Traditional clay made Chulha

Semi-pucca structures

- **Semi-pucca structure**: A structure which could not be classified as a pucca or a katcha structure as per definition was a semi-pucca structure.Such a structure had either the walls or the roof, but not both, made of pucca materials.

Size of house varies from 180-250 Sq Ft

Occupants:

-Change oriented

-Calculative & Risk takers

-Land owners and have side businesses

-Most educated upto higher secondary

-May or may not have toilets and smokeless Gas burners

Pucca Structures

- **Pucca structure**: A pucca structure was one whose walls and roofs were made of “pucca materials”.

Size of house varies from 200-350 Sq Ft

Occupants:

-Rich farmers, irrigated land

-Traders in villages

-Lower inclination towards accepting change

-Risk averse

-Monthly income > Rs. 8000

-Mostly found in villages near the A class cities, reflection of city structures

-House contains, toilets and bathroom.

-Has smoke less and traditional chulha.

-Has provision of heating water using wood, in the backyard

* Excludes land cost

Low cost Housing & Affordable Housing

Low cost housing is used to describe dwelling where the total housing costs are affordable to the group of people within the "low income" bracket.

Affordable housing is a term used to describe dwelling units whose total housing costs are deemed "affordable" to those that have a low income.

Low cost Housing Projects: Examples

Developer	Project	Location	Unit type	Price
Shapoorji Pallonji	Shukho brishti	New Town Rajarhat, Kolkata	1BHK (320 sq. ft) and 2BHK (480 sq. ft)	Rs 3.85-6.35 lakh
Santosh Associates	Om Shanti Nagar-2	Batwa, Ahmedabad	1BHK (350 sq. ft) and 2BHK (450 sq. ft)	Rs 3.5-6.5 lakh
Sterling Developers	Janadhar	Atibele, near Electronic City, Bangalore	1BHK and 2BHK (area not decided yet)	Starting from Rs 4 lakh
Matheran Realty Co.	Tanaji Malusare City (TMC)	Karjat, Maharashtra	1 room kitchen (225 sq. ft), 1BHK (300 sq. ft) and 2BHK (375 sq. ft)	Rs 3-7 lakh