

# Sustainable Social Housing

## Scope of New Alternative Building Materials

21<sup>st</sup> September 2016



Figure 1: Roundtable Conference on Sustainable Social Housing at Indian Islamic Cultural Center

## Proceedings Document

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## TARagram Yatra 2016

### Implementing the SDGs in India

The 2030 Global Agenda for Sustainable Development has moved into the year of implementation as several countries have set their priorities and course of implementing the Sustainable Development Goals (SDGs). The month of September in 2016, when the UN convenes for its 71<sup>st</sup> session, will be pivotal for policy makers across the world. The progress of nations on the SDGs would be reviewed more thoroughly as a follow-up of the recently concluded High-Level Political Forum (HLPF) meeting held in July 2016 in New York, USA. The 2030 Global Agenda is a transformative agenda as it calls for a systemic view policy strategies and implementation mechanisms by governments worldwide. This is explicit in the SDG target 17.14 of enhanced policy coherence for sustainable development. It also implied that nations would require moving beyond the purview of aligning national and local level policies and working in an integrated manner across sectors and stakeholders. The emphasis on the required policy transitions is advocated largely on the basis that the SDGs will be monitored, reviewed and the progress of development will be assessed at the national and global scale.

However, the congregation of nations convened in the HLPF, July 2016, put forth the sentiment that the current stature of policies in every country entails massive gaps in its scope and the scale of actions required to implement the SDGs. Policies are essential enablers for sustainable development as they define the sustainable choices of a society, for instance, policies entailing the utilisation of sustainable construction materials, advocating the intensive use of renewable energy coupled with incentives and subsidies, are some of the intrinsic elements of a coherent policy development. An inclusive, equitable policy also reflects the commitment of a nation at a global level on the trajectory that it has embraced towards sustainable development. It also reflects the transformative governance, the role of leadership that will be influential for effective mainstreaming of policy integration to achieve the necessary goals and targets.

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## Principles for Policy to Achieve SDGs in India

The Yatra will be held in diverse states of India highlighting the critical need of localising the SDGs and the imperative of connecting policy with practice. Localising will take into account sub-national contexts and relate to how local and regional governments will synergies work with national processes for implementing the SDGs. It will initiate critical thinking on specific SDGs addressing sectoral themes - Agriculture, Housing, WASH, Skills and Livelihoods, Integrated Village Development and Resource Efficiency. Through intensive discussions being taken up at the state level, the principle is to involve sub-national governance structures within the discourse of SDGs. The TGY 2016 deliberations seek to answer the following questions, among others:

- How do countries that have adopted the SDGs earlier with their current national policy framework, avoid the pitfalls of a 'single-out' approach?
- What critical political, social, and economic drivers and incentives have galvanized these nations to rapidly embed this agenda into their current national policies? What challenges and issues have been faced?
- How to bolster the integration of national sustainable development strategies for enhanced collaboration between the central government, local governments, and cities?

TARAGram Yatra is an annual event organised by the Development Alternatives Group where the practitioners and policy makers come together to discuss issues of sustainability and what more can be done to transform India into a greener, resilient, sustainable and inclusive economy.

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## Context

The Yatra focuses firstly, to comprehend the challenges pertaining to policy sectors that are essentially governed by the principles of horizontal integration among multiple sectors focusing on economic, social and environmental policies. Secondly, to address the policy levels and spatial scale challenges managed by vertical integration at multiple levels from sub-national and supranational levels. The overall agenda of the Yatra 2016 is to review national policies and programme and align them to the SDGs and targets.

### Sustainable Social Housing

Housing is primarily an energy and resource intensive sector. There is an imperative growing demand to find sustainable housing solutions that will not lead to a disproportionate increase in carbon emissions and resource use due to the production, transport, use and disposal of materials or products and the operational energy of the building. The emergent need and identification of appropriate building materials and technologies for social housing is an opportunity to address energy and resource efficiency, and devise means to embrace a greener development trajectory. In order to cater to the growing need of appropriate alternative building materials, four new alternative options of Marble Sludge, Construction and Demolition waste, Foundry Slag and China Clay stand out as viable options depending upon their regional availability. These alternative materials have demonstrated satisfactory performances in the production of cement, concrete, and concrete based products. The workshop aims to explore these new alternative building materials and their scope of use by integrating them with sustainable social housing.

Thus, while this growing housing gap needs to be met, there is a growing imperative to find sustainable housing solutions that will decouple the extraction and use of these resources and at the same time fulfill the housing needs. Given the fact that, living in a sustainable habitat is one of the basic premises for a healthier living, it is imperative that sustainable construction practices are given immediate attention.

There is a need for active engagements with policy-makers and practitioners (government officials, developers, architects, and building professionals) through policy briefings and regional workshops that address key issues on the barriers to mainstream sustainable social housing in India.

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Figure 2: Interactive discussion among the participants during the roundtable conference



Figure 3: Presentation of memento to the key participants

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## Objective of the Conference

Given the above context, this workshop aimed to explore these new alternative building materials and their scope of use by integrating them with sustainable social housing. The primary focus is to enhance sustainability in the construction of social housing through the adoption of suitable construction as well as operations and management practices.

The key concerns that the workshop proposes to address:

- What are the feasible alternative building materials that can be used in sustainable social housing constructions?
- How can the barriers to the market and user acceptance of these materials be overcome?
- What are the important criteria for selecting building materials and construction technologies keeping in mind economic, social and environmental factors?
- How can the policy instruments play an effective role in mainstreaming sustainability in social housing?

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## Session 1: Case Studies of New Alternative Building Materials and Sustainable Social Housing

By Soumen Maity, Mr. Shreedhar Pandeya and Mr. C.N. Jha

The speakers observed that government focuses its objective on saving virgin materials and trying to include green technologies to attain resource efficiency for fast and cost effective construction.

Both in terms of small as well as large-scale material usage, India is the second largest producer of building material in the world after China. By 2050, demand for resources will overshoot the available resources. The intensive usage patterns of resources around the globe that destroy the ecology were stressed upon. Massachusetts Institute of Technology (MIT) report establishes that sand will be second largest commodity after water. Availability of soil is higher than sand but only the agricultural soil which is already in scarcity is needed for the production of building materials like bricks. Moreover, limestone is available for only 40 more years. Thus, fly ash is a substitute for limestone. Due to the huge demand for aggregate, entire ranges of hills have been cleared.

The speakers felt that the feasible idea is not only to transform waste into wealth but to have technologies that are affordable. Malawi is one such example where higher investment in better quality bricks resulted in easier and thinner layering of cement, hence, lesser consumption of cement and eventually leading to 30% reduction in overall cost of production.

### Present Trends

Availability of multiple new alternate materials was discussed like self-healing concrete, carbon nanotubes, sand and bacteria bricks, anti-skid platforms made using repurposed waste plastics. 200 million tons of pond ash is piled up as waste which can be reused. Pond ash bricks reduce the cost of buildings by 20-30%, also achieve strength in 7 days. 716 million tons of C&D waste is produced per year which can completely substitute the aggregate. 7 million tons of marble sludge is dumped every year as waste in Rajasthan.

In other countries, it has been seen that tobacco waste is produced in large quantities which can be used in the process of burning bricks. China Clay waste (low-quality clay left over after the

### The road blocks

- Absence of surety of consistent availability of raw (waste) materials.
- Repurposing the waste is not a sustainable alternative as the demand would be still higher than the wastes produced.
- Unavailability of IS standards for recycled products.
- Lack of awareness in the industry.
- Unavailability of standard waste streams and management of waste.

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filtering) is rich in iron and can be reused for various things e.g. to make cement. This process reduces CO<sub>2</sub> emissions due to low calcination temperatures.

### Challenges highlighted by the speakers

Research and industry seem to have a gap that needs to be bridged. A need was ascertained that the government should promote alternative materials by utilising building materials in their building which will create visibility. Performance based incentives are required to help small and medium-sized enterprises (SMEs) to perform better.

### Opportunities

- Mainstreaming these energy saving technologies.
- Work towards affordable materials as well as technologies.

## Session 2: Policies in Sustainable Social Housing with respect to building material

The second session of the Roundtable Consultation focused on the role of policies in the housing sector. There is a fine balance between the demand of the construction industries in India and the actual need. It was pointed out that the methods used for cost cutting result in around 30% wastage during the traditional methods of construction. While Pradhan Mantri Awas Yojana (PMAY) agenda is a great push, there is scope for further policy intervention.

### Aiding factors

The things that work in our favour are Technology Sub-Mission (Sustainable Technological Solutions for Faster and Cost Effective Construction of Houses suiting to Geo-Climatic and Hazard Conditions of the Country) and PACS (Primary Agricultural Credit Societies) which promote usage of alternative materials by adopting new technologies, streamlining the emerging technologies, procurement schemes and creating schedule of rates.

### Challenges highlighted by the speakers

There is a need to consider construction technologies along with the services so that the adoption process becomes faster. Thus there is a need to concentrate on creating regional technology parks where sustainable technologies can be understood and exhibited.

### Housing finance very critical for public to buy houses

From the point of view of developers' experience, often customer's perspective overlooked. For e.g. the customers that belong to the informal sector of business don't have access to banks and thus all the scheme which are applicable with the help of bank cannot assist them in buying a house, even though they have regular incomes and can repay the loan.

### Market trends

The houses constructed on the outskirts of the city are viable only for the Lower Income Group (LIG). The construction industry has started catering to customers belonging to informal sectors of the market like plumbers, carpenters, drivers and many others. The original aim to cater private developers has shifted to catering the government sector now.

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## Key highlights of the panel discussion

### Existing trends:

80% of the housing shortage is contributed by the inhabitable congested colonies and not the homeless. Thus, alternate materials need to be in line with the social norms as people go for aspiration-based housing decisions.

### A need for a new sector based on diverse technology:

It was pointed out that the market acceptability relies on affordability, reliability, and proof of product in the mind of end users. Financing systems are critical for new technologies, as the market is already flourishing with the adoption of existing systems.

The panelists pointed out that there are 3 ways to build a home:

- People making homes (50%)
- Small developers and contractors (25%)
- Big developers (25%)

#### Standalone soldier houses are a good example

- Targeted to be self-sustaining
- Demonstrate how STPs (Sewage Treatment Plants) don't require complicated mechanisms

### Challenges:

The lifestyle we practice today which doesn't include waste management systems or takes into account the excessive use of energy, water, and other resources harms the environment and is a big cause of concern.

### Basic needs should include social connectivity:

Access to parks, green fields, and good transport facilities is an integral part of the basic need. Affordable housing should concentrate not only on operational cost but proper design with maintenance cost also.

### User acceptance

Creating user acceptability is an issue when people have a choice, but in the real scenario, the new alternate materials are the only resource we have. Thus the mainstreaming of these materials is integral.

### The solution for the high cost of alternative materials?

The need to prepare the construction industries for the next phase was apparent to the panelists. The shortage will come in future and hence substitutes should be ready. Price plays a small role in the grand scheme of things. People are left without any choice and end up paying more for less.

### Quality should not be compromised on

The choice is dictated by the market. Marketing experts create an aspirational image of the house to boost their sale. The shift that is required, needs to make its way via adopting appropriate marketing strategies as awareness of the end user is important. Homebuyers prefer luxuries over energy efficient commodities owing to lack of awareness.

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### R&D is expected from the government

Developers are only traders and not entrepreneurs. Government sector needs to take over the responsibility. Enterprises need to stay ahead in the market by incorporating alternative materials. Only a small shortage can be catered to in an organised manner. Finance companies have begun tapping into the informal sector.

The social aspect is equally important; Public Private Partnership projects are required in order to emphasise more on social sustainability of the affordable housing projects. There is a need for a regularised system that promotes house ownership. If individual homeowners and developers are able to get finances then 50% of the shortage can be realistically achieved.

### Focus should be on technology

The panel stressed that in order to ensure the regular functioning of the city, there is a need to compact city. Here, we face the enigma; when the mass production costs more and the embodied energy is also more. Alternatives methods like rat trap bonded bricks function well but mass production needs to be less resource intensive. Pre-existing alternative technologies are being adopted as they have plenty of literature to support its viability. Even though eco-friendly technologies are available, but for mass construction, faster construction techniques need to be adopted.

### Measures being taken:

- In situ slum redevelopment is being researched on
- Partnership and beneficiary led housings have been introduced
- Subsidies up to 6 lakhs are sanctioned

**Bureau of Indian Standards (BIS) says new technologies are free to be adopted if all the tests are done (except for cement and some materials which are critical). Institutions need to speed up in making new materials according to the needs of the market. There is also a need to see the past alternative techniques as they are promising even though they cannot meet the demands sustainably.**

### Renewable alternatives are the real solution to prepare for the eminent gap

“Solutions like allotting areas to grow trees that can be cut and regrown as per the requirements. Measures need to be taken to fix rural problems that cause Urbanisation.”

- **Uwe Becker** Senior Advisor GIZ India

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## Conclusion

### Concluding remarks, questions, and recommendations

**The insights brought forth during the roundtable discussions highlight the need for multiple areas to be catered in order to achieve sustained ecosystem**

#### Customer acceptability very critical

The panel agreed that HIGs need to be targeted to set an example; inspire aspirations and create acceptability; the trickle-down effect. Sustainability should be the primary focus and affordability should be a secondary focus for social housing. We need to bring these visions on the right side of the law. Developing homebuyers' acceptance is the key. Policy makers and stakeholder representatives need to be involved in Business to Business discussions so that more and more people adopt sustainable social housing.

**Not enough forecasts are being done; only working using estimations,** the panelists found the existing modeling systems to be insufficient.

Mechanisms need to be introduced to make the construction industry as sophisticated and innovative as the other nations. High rise buildings are a result of the land shortage. Usual parameters are structural stability and disaster resistibility and other basic parameters. BMPTC experts evaluate the evidence, and if not satisfied will be evaluated in recommended labs, then the tech will be accepted.

**How is communication done to stakeholders and what we are planning to say to attract them?**

Systems need to be made to ensure regular communication to facilitate catering the issues

**How do we influence the performance parameter in PACS?**

Performance parameters are only seen in technologies. Until now it's only BIS level but isn't there any performance indicators.

**How could technology parameters be measured?**

**Tech submission needs to open up to incorporate new tech developments**

Financial systems should look into aspects of triple bottom line reporting, **how it can be achieved?**

**Segregation needs to be done at source**

There is a need for a proper system to use the waste materials. Municipalities need to impose a fine and regularise waste disposal. We need to fix slackness in MSW systems

**Mindset shift is required**

Despite the availability of cheaper, durable technologies being available, financiers and developers shy away from trying the unconventional. Existing mandatory usage laws of such materials are not being imposed.

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## Annexure

### List of participants

S. No.	Name	Organisations
1	Mr. Devendra Mahajan	Supertech Limited
2	Mr. Snehanshu Mukherjee	TEAM
3	Mr. Abhishek Gaurav	RICS – SBE
4	Mr. Ashok B. Lall	Ashok B Lal Architects
5	Mr. Vaibhav Goel	Godrej & Boyce Co. Ltd
6	Mr. Sandeep Narang	ETI Dynamics
7	Mr. C.N Jha	BMTPC
8	Mr. Anil Sawhney	RICS
9	Mr. Nabarun Majumdar	JNU
10	Dr. Ekta Singh	Amity School of Architecture & Planning
11	Ms. Neha Pareek	Amity School of Architecture & Planning
12	Ms. Prakriti Mehta	Amity School of Architecture & Planning
13	Dr.T.G Rupa	Lady Irwin College
14	Ms. Sushma Goel	Lady Irwin College
15	Ms. Sonia Rani	TERI
16	Mr. Manikandan K.P.	Indian Housing Federation
17	Mr. Abhijit Banerjee	GIZ
18	Mr. Rajesh Shukla	Hindustan Prefab Limited
19	Mr. Uwe Becker	GIZ
20	Ms. Anurita Bhatnagar	Amity School of Architecture & Planning
21	Mr. Vikram Jain	FSG (Monitor Group)

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22	Mr. Shreedhar Pandya	Ahmedabad Enviro Project Pvt. Ltd
23	Mr. Rakesh Kapur	DNP Ltd
24	Mr. Sachin Khandelwal	Magma Housing Finance
25	Ms. Deepika Tuteja	Leed Green Associate
26	Mr. K.K Mitra	Lloyd Insulations India Ltd
27	Mr. Sashwat Ghai	Amity School of Architecture & Planning
28	Ms. Kanika Agarwal	Amity School of Architecture & Planning
29	Mr. Yash S Gupta	Amity School of Architecture & Planning
30	Mr. Dushyant Singh	Amity School of Architecture & Planning
31	Mr. Harshit Batra	Amity School of Architecture & Planning
32	Ms. Ankita Goel	Amity School of Architecture & Planning
33	Mr. Saif Shakeel	Amity School of Architecture & Planning

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