

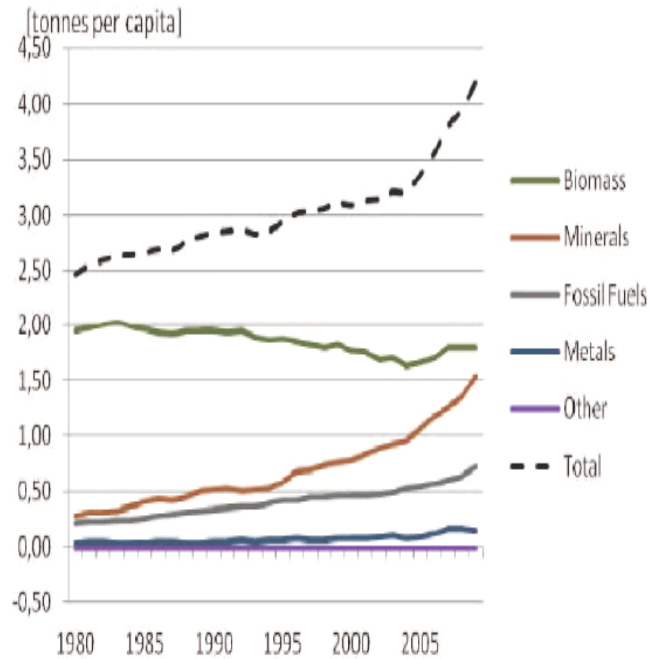
Mainstreaming Sustainable Affordable Housing in India

Link to video: <https://www.youtube.com/watch?v=iycimdjUCNw>

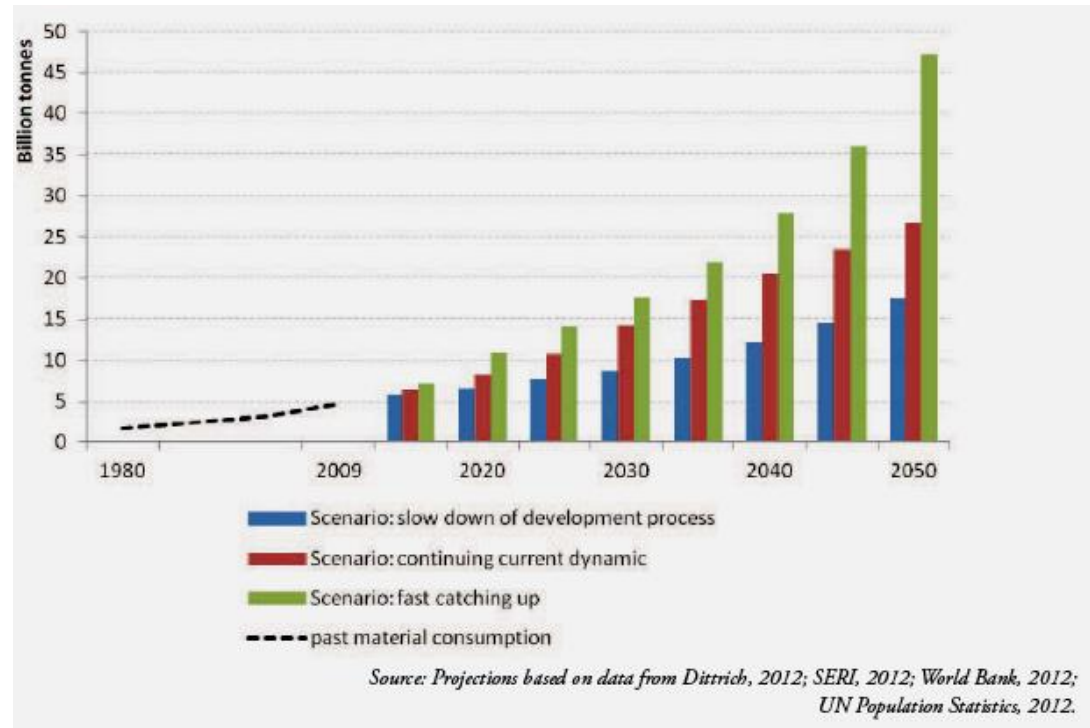


Urbanisation

pressure for more and new materials



Sources: Dittrich et al., 2012; SERI, 2012; World Bank, 2012.



Source: Projections based on data from Dittrich, 2012; SERI, 2012; World Bank, 2012; UN Population Statistics, 2012.

Per capita Material Consumption of India (1980-2009)

India's Past Material Demand and Future Projections until 2050

Construction Materials

criticality

Parameters → Resource ↓	Scarcity	Cost	Environmental Impact	Embodied Energy	Supply Risk	Lack of Recyclability	Opportunity cost / value / conflict of use
Soil	**	*	***	***	**	***	***
Iron	*	**	***	***	*	*	*
Limestone	*	*	***	***	*	***	**
Sand	***	***	***	***	***	***	***
Stone	**	*	***	**	**	***	***
Marble/Granite	*	*	***	**	*	***	**
Copper	*	**	***	***	*	*	*
Bauxite (Aluminum)	*	**	***	***	*	*	*
Petroleum (PVC)	*	*	***	**	*	*	*
Silica (Glass)	*	**	***	**	*	*	*
Wood	**	**	***	**	**	**	*



Critical Resources

Soil

- ❖ Bricks-the most important building material
- ❖ Second largest producer of red bricks
- ❖ 150,000 kilns produce 150-200 billion bricks annually (Maithel et al. 2012)
- ❖ Fertile top soil used for brick production
- ❖ Majority of bricks present in Gangetic plains due to the availability of alluvial soil
- ❖ Utilise 350 million tonnes of soil every year
- ❖ Exerts pressure on agricultural land and food security

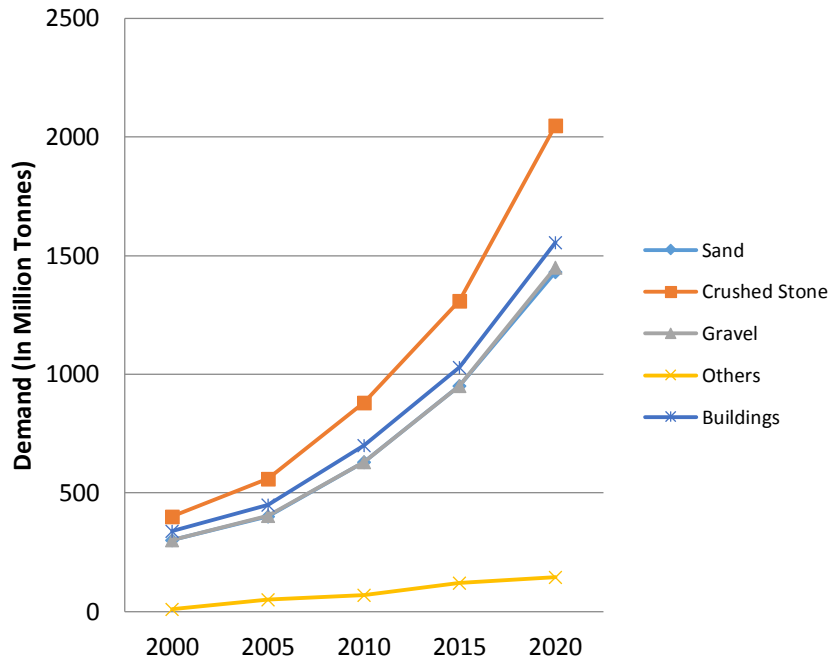
Sand

- ❖ Sand is classified as a minor mineral
- ❖ Contributes 9.4% to minor minerals mined
- ❖ Valued at Rs 18,734 crore in 2012
- ❖ 12th in sand and gravel production
- ❖ MoUD projected sand shortage of 91,666.7 million tonnes by 2011
- ❖ Housing accounts for 1/3rd of the demand



Critical Resources

Stone



Limestone

- ❖ 67% of cement utilized in housing
- ❖ 2nd largest producer of cement and bricks
- ❖ Cement production is estimated to double to reach almost 550 million tonnes by 2020
- ❖ No apparent gap in supply but limestone deposits in inaccessible areas

What are Green Materials?

- ❖ Low in embodied energy
- ❖ Low in resource footprints
- ❖ Cleaner production processes
- ❖ Contribute to thermal comfort
- ❖ Recyclable / Reusable – low life cycle costs
- ❖ Low or nil conflicts with other uses of greater ecological and economic value

...low environmental impacts, small ecological footprints



Some movement towards adoption of green materials...

- ❖ Cement industry decreased its emission intensity from 1.04 MT CO₂/MT to 0.79 MT CO₂/MT . Share of blended cement increased to 75%
- ❖ Steel industry modernized to adopt energy efficient technologies
- ❖ Alternate brick production technologies and products introduced in the market. Bans on polluting technologies. Use of fly ash bricks.
- ❖ Industry collaborations for green building centres. Demonstration buildings.
- ❖ Area of certified forests increased since 1990s to 350 million hectares in 2010
- ❖ 20% growth in water based paints
- ❖ USD 73.3 Million LED Lighting Market expected to reach USD 470 Million by 2015
- ❖ Wastewater reuse and recycling equipment market valued over \$140.0 million



Imperatives for Mainstreaming

Research

Capacity

Information

New Knowledge

Existing Knowledge

Consumer Engagement

Materials

Models

Curricula
Revision

Vocational
Skills

Public
Disclosure

Decision
Support



Imperatives for Mainstreaming

Technical Specifications

Regulatory Norms

Priority Finance

Standards & Codes

Behaviour Change

Performance Incentives

Certification & Labelling

Sustainable Procurement

Regulated Use / Bans

Incentives

Easy Credit & Grants

Tax Reform



Thank you