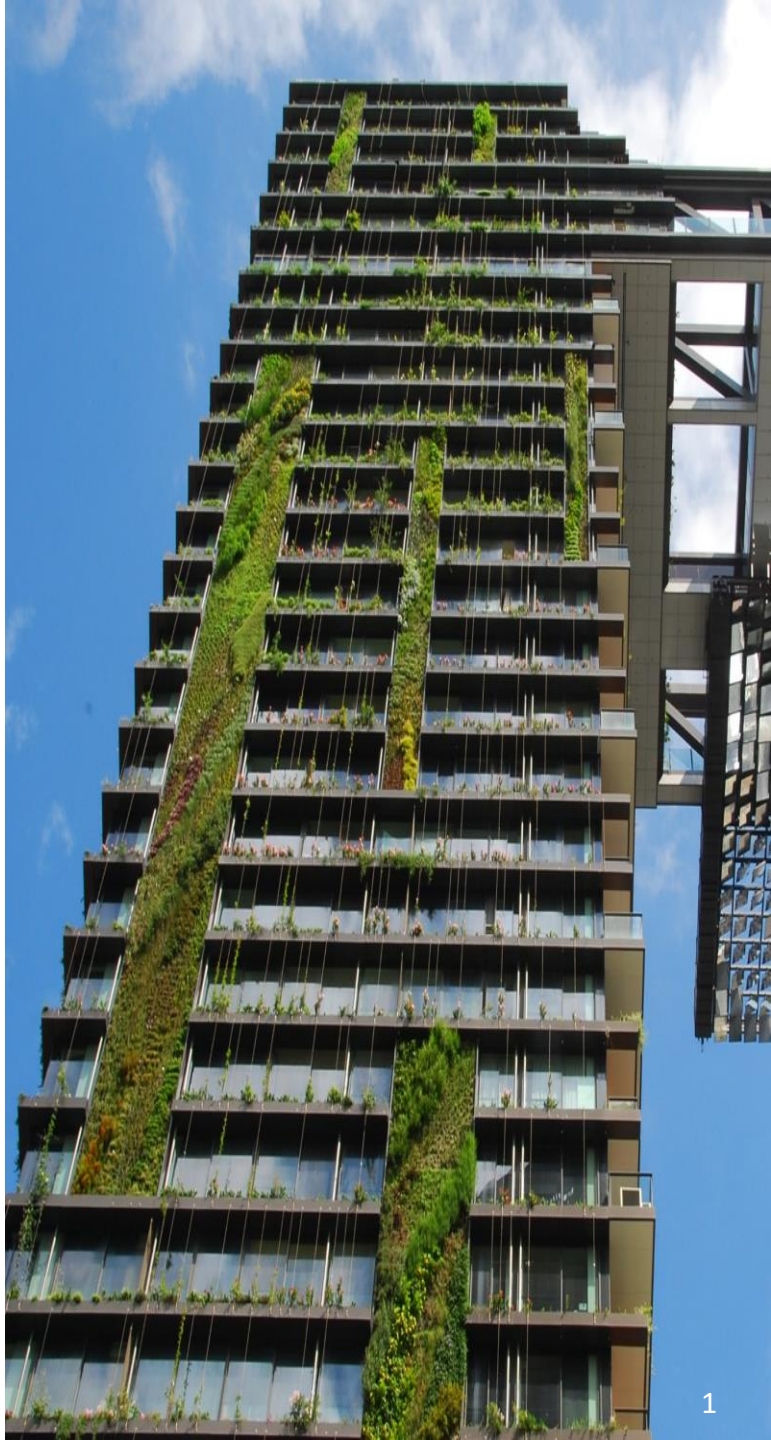
CONSTRUCTION AND DEMOLITION WASTE

South Asia

Co-funded by the Erasmus+ Programme of the European Union



WE

Prakash Nanthagopalan

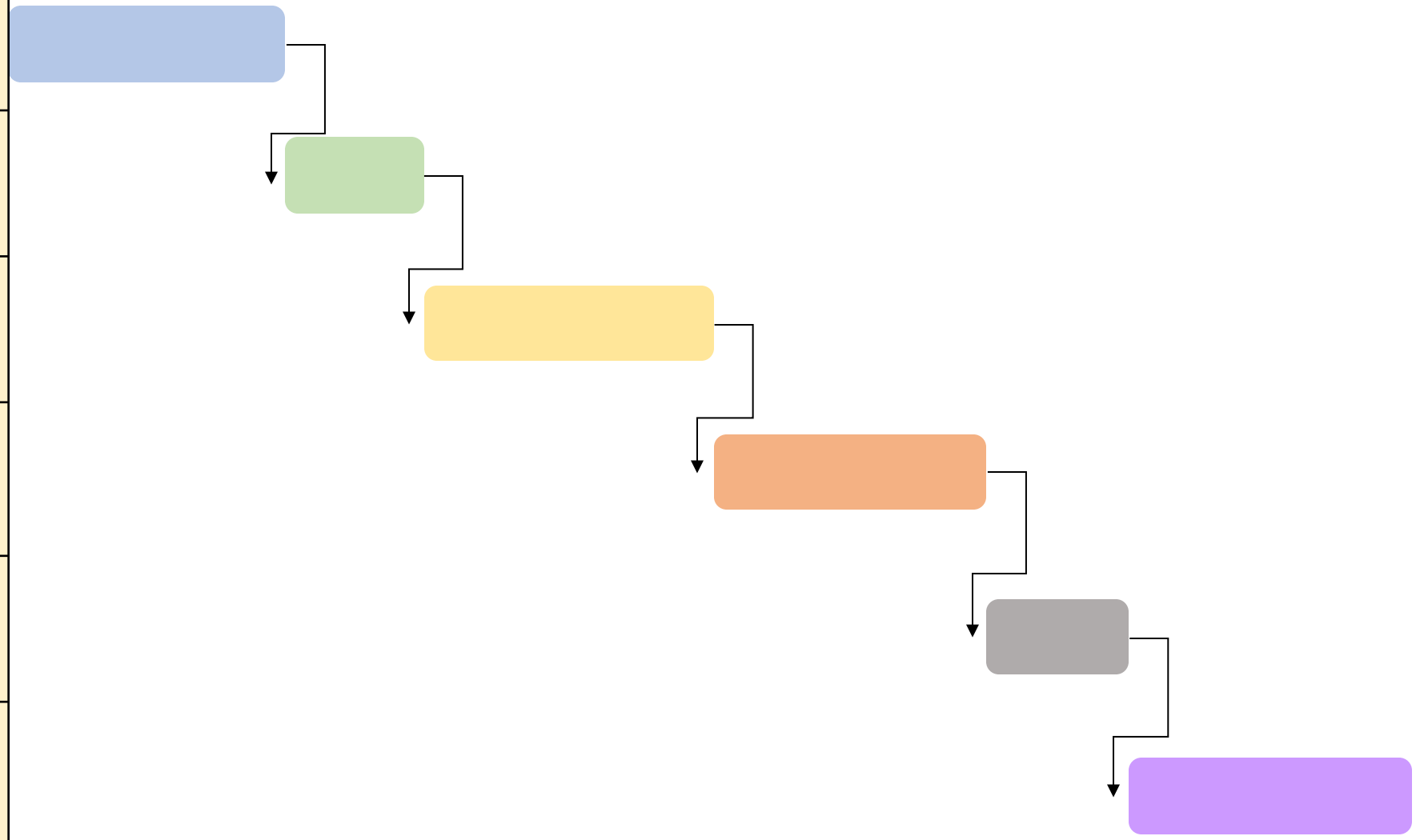
Dakshina Shrestha

Brajesh MishraNarayan Prasad Acharya

Ajay Agrawal

Evelina Lekesiute

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
Getting acquainted with C&D waste										
Preparing concrete using C&D waste										
Site Visits and finding existing applications										
Identification and prioritization of requirements										
Brainstorming and ideation										
Solution finalization and presentation making										

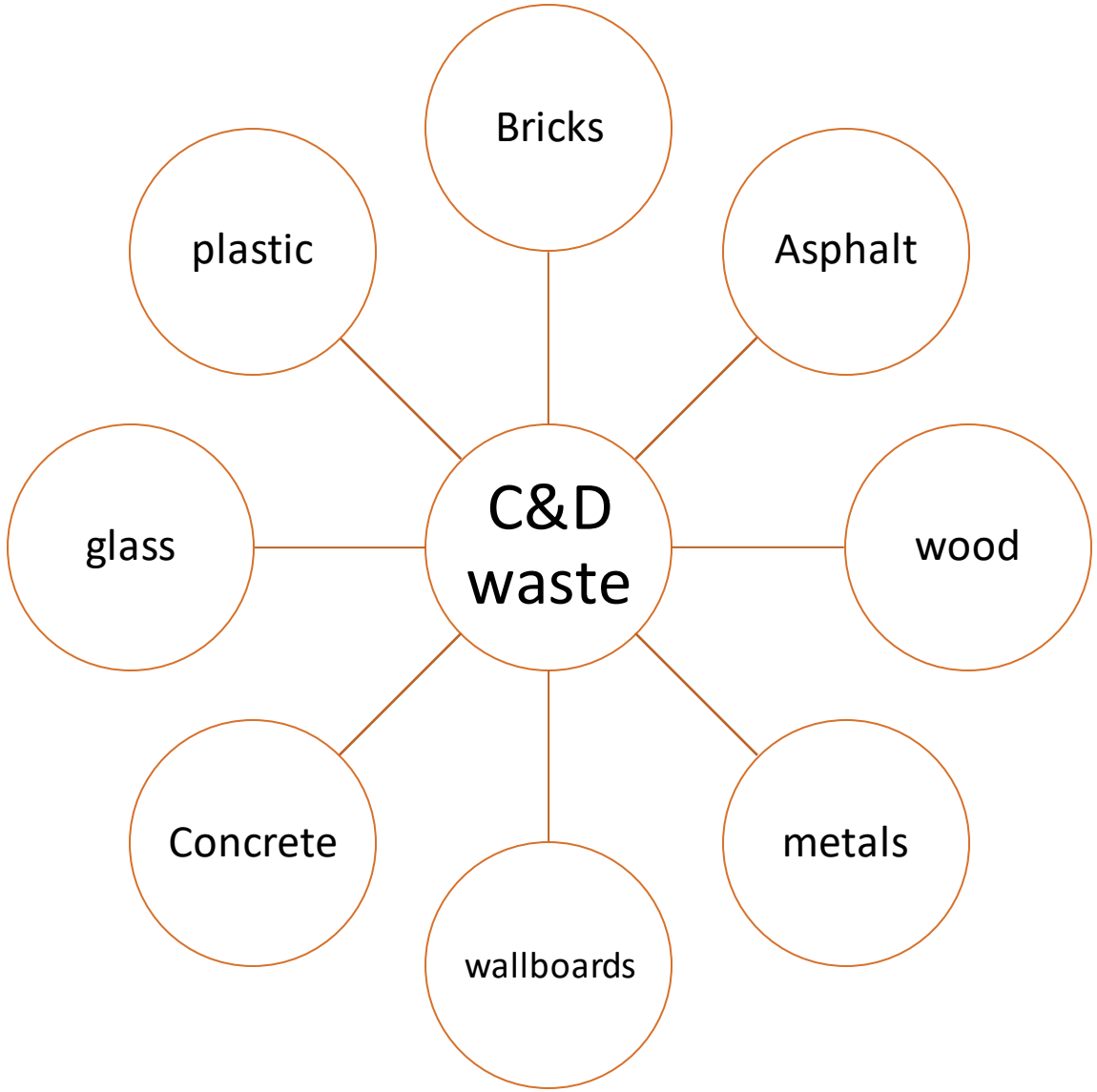


WHAT IS C&D WASTE?

- Waste material produced in the process of:
  - Construction
  - Demolition
  - Renovation

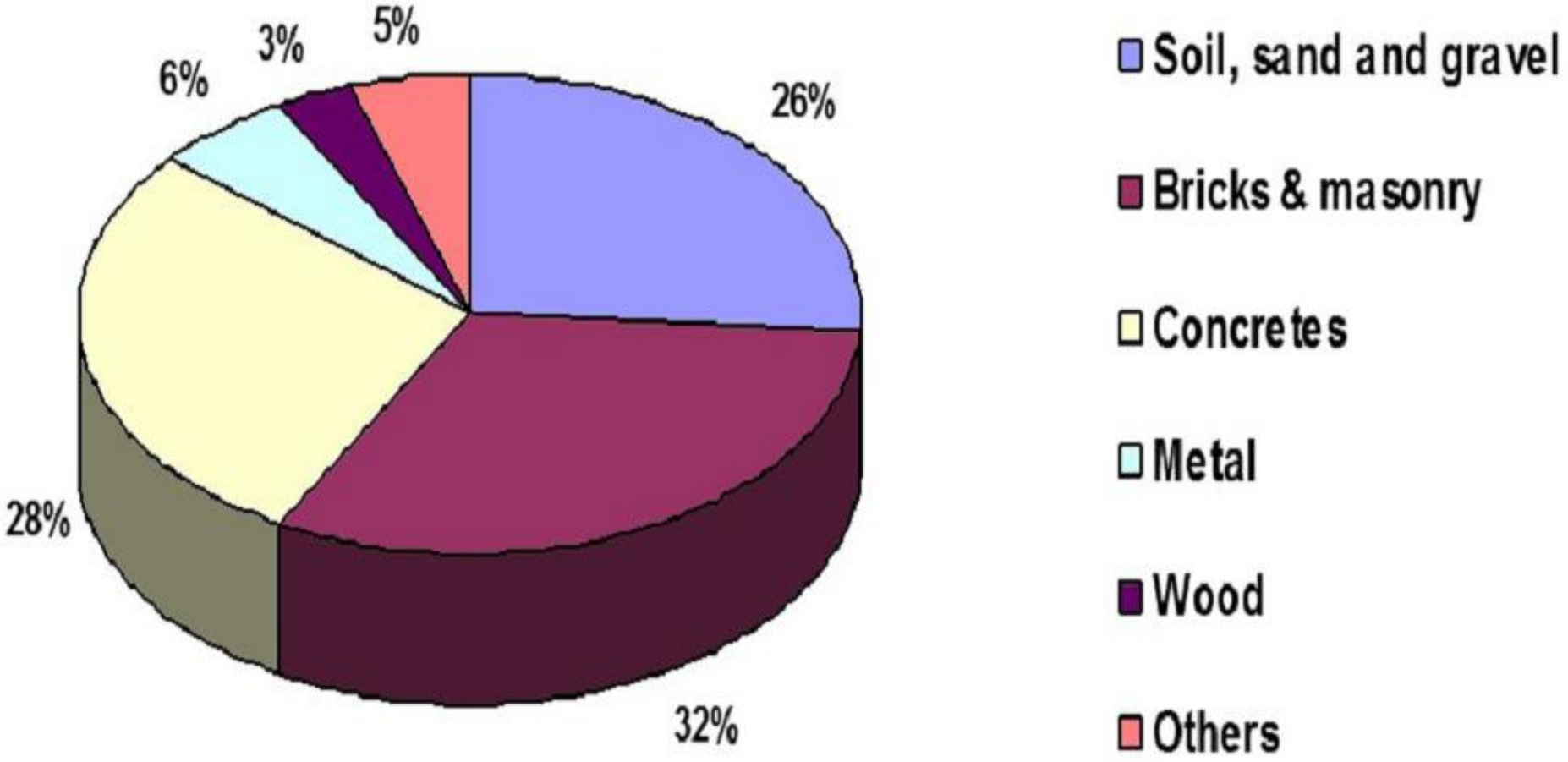
  of any civil structure.
- Sources can be classified as:

Bulk Generators	Small Generators
Roads Bridges Flyovers Parks Malls Multi-storey Buildings	Houses Small Buildings



Source: BMTPC, 2018

WHAT IS C&D WASTE?



C&D Waste Composition : Indian Urban Areas

Source: BMTPC, 2018, Niti Aayog, 2018

CURRENT SCENARIO OF C&D WASTE IN INDIA

GENERATION

City	Daily CDW generation (tonnes/day)
Mumbai	2,500
Delhi	4,600
Bengaluru	875
Chennai	2,500
Kolkata	1,600
Jaipur	200
Patna	250
Ahmedabad	700
Bhopal	50
Coimbatore	92

- As per BMTPC, 2018, estimated annual generation is 100 MnT

UTILIZATION

- Only 4 registered recycling plants in India

Plant	Capacity
Burari, New Delhi	2000 TPD
Shastri Park, New Delhi	500 TPD
Ahmedabad, Gujrat	1000 TPD
Vikhroli, Mumbai	1000 TPD

Source: BMTPC, 2018, Niti Aayog, 2018

PREPARING CONCRETE USING C&D WASTE

Recycled Aggregate Concrete

Replacing natural aggregates with recycled aggregates in concrete

Step 1

Collecting samples from different places in IITB

Step 2

Crushing the collected samples

PREPARING CONCRETE USING C&D WASTE

Step 3

Sieving to required sizes

Step 4

Weighing ingredients according to mix design

PREPARING CONCRETE USING C&D WASTE

Step 5

Step 6

Mixing

Casting

PROPERTIES OF PREPARED CONCRETE

Fresh Properties

Slump Value = 120mm (w/c = 0.45)

Hardened Properties

Compressive Strength:21.6 Mpa (at 7 days, f_{ck}=30MPa)

SITE VISIT:GODREG RAC PLANT, MUMBAI

Key Learnings-

RAC blocks are successfully used as masonry blocks

Debris is supplied directly by the demolition contractors

Fine and coarse aggregates can be completely replaced by recycled materials

Manufactured blocks satisfy the strength and durability requirement

SITE VISIT:GODREG RAC PLANT, MUMBAI

Key Learnings-

Blocks are manufactured in different sizes as per requirement

Superior than other AAC blocks because of recyclability

Supplementary Cementitious Materials should be used as much as possible

Provide advantages to builders in getting green building certifications

SITE VISIT:GODREG RAC PLANT, MUMBAI

Key Learnings-

- Cost is slightly higher than the other type of blocks
- 100% replacement can not be done for structural applications
- Segregation is a major challenge
- No Government Support till now
- Getting permissions for setting up plants inside the city is difficult
- Traditional customer base, convincing new people is a challenge

APPLICATIONS OF RAC INSIDE IIT BOMBAY

Parking Lots

Staff Hostel Parking

Paving Blocks

Hostel 1 canteen

APPLICATIONS OF RAC INSIDE IIT BOMBAY

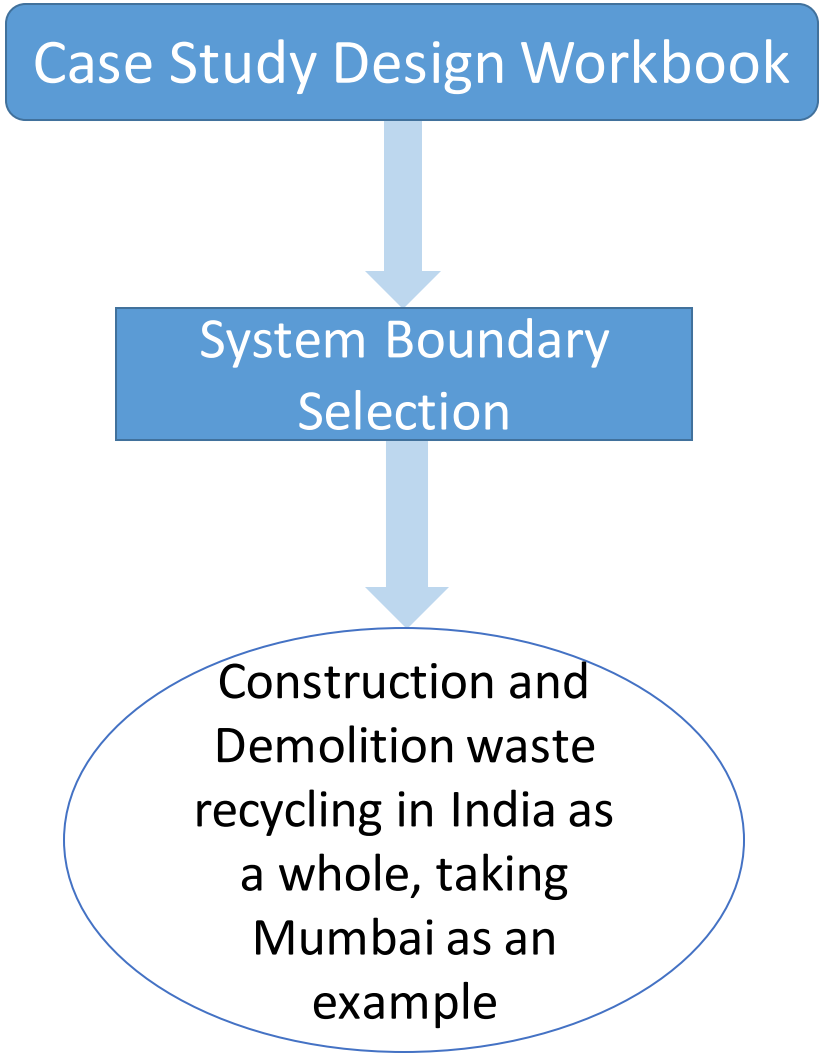
Masonry Blocks

Estate Office

Tree Guards

Department of Civil Engineering

PROCESS OF ANALYZING THE CASE



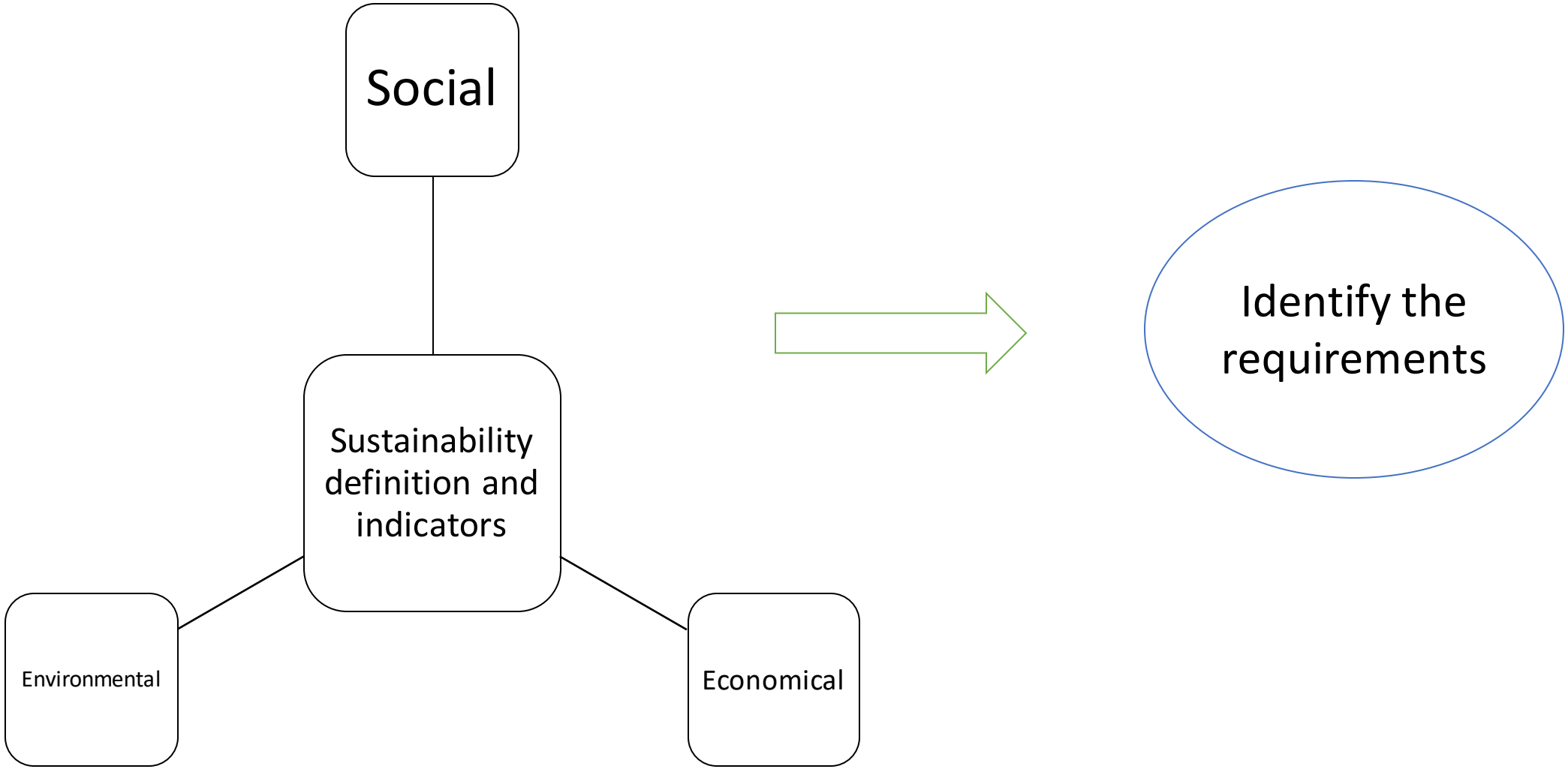
PROCESS OF ANALYZING THE CASE

Facts we know

Analysis of current situation to identify the issues

Existing solutions

PROCESS OF ANALYZING THE CASE



PROCESS OF ANALYZING THE CASE

- Individual
- Combined

PROCESS OF ANALYZING THE CASE

Solutions

Solutions

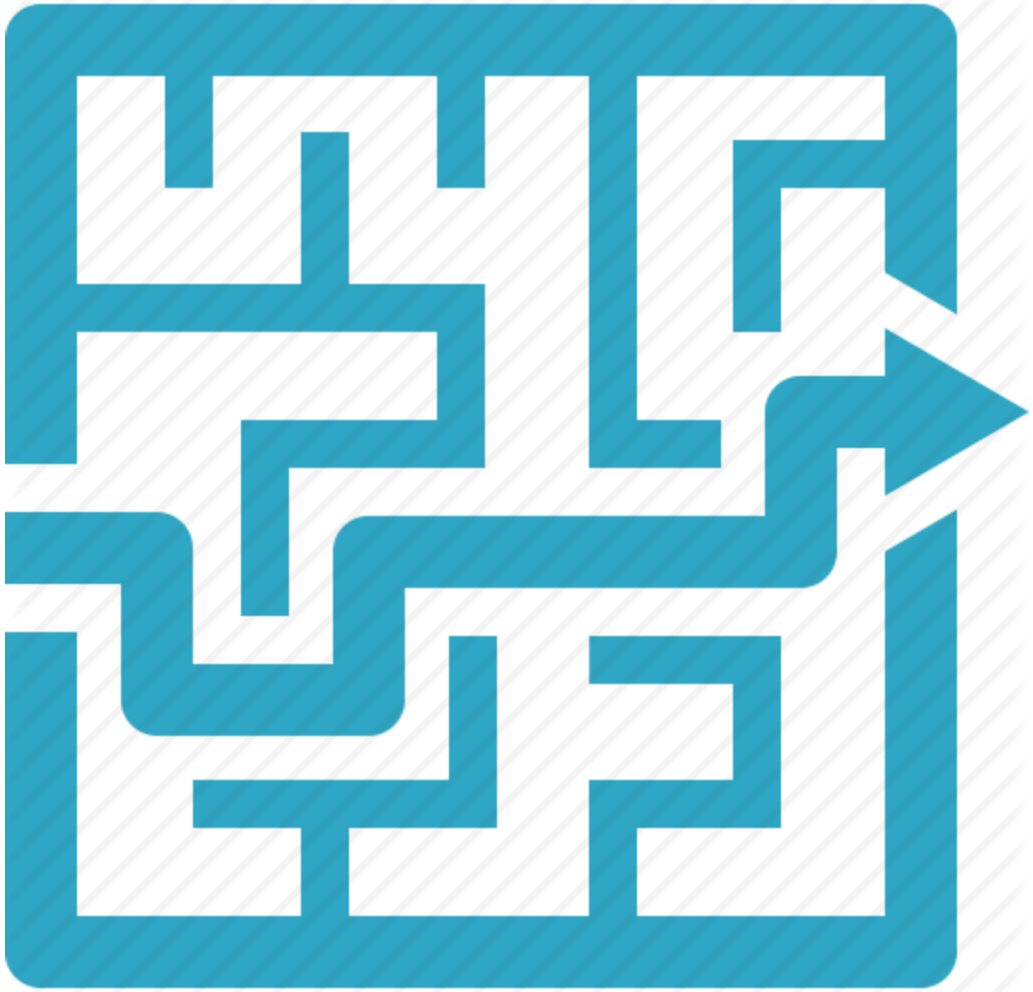
Solutions

Solutions

Solutions

PROCESS OF ANALYZING THE CASE

Finding one



Out of Many

PROPOSED APPLICATIONS OF RAC IN INDIA

Dividers

Kerb Stones

Street Furniture

Irrigation Channels

PROPOSED APPLICATIONS OF RAC IN INDIA

Tetrapod

Public Toilets

Kitchen Slabs

Lean Concrete

LINKING THE CASE TO NEPAL

Huge dumps of C&D waste after earthquake

WHAT WE LEARNT

As a team

- Team Building
- Idea Sharing
- Coordination
- PBL Process

Challenges we faced

- Difference of fields
- Lack of site visits
- Lack of PBL expert in team


Thank
You