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Cigondewah, peri-urban kampung with textile factories around
High population density
Scarce outdoor space
Limited living standards
Substandard building quality
A majority of the urban poor cannot afford to buy housing provided by either the public or the private sectors due to their low and unstable income. This condition forces them to various individual solutions including self-built inappropriate houses and squatting in slums and squatter settlements.

In Indonesian cities, most poor residents live in spontaneous informal settlements referred to as kampung. Kampungs are scattered throughout the city and have substandard infrastructure, small plots of land for each dwelling and low quality of building structure and materials. Many kampungs face persuasive problems of high population density, poor living conditions, and poor infrastructure and public facilities.
Highly connected community

Housing diversity
Traditional lifestyle
Home-based business
1.2

Potentials

In general, kampong have met the basic needs of millions of urban dwellers with the flexibility and the variety of housing arrangements, furthermore, the social environment of the kampong has also enabled new incoming migrants to adapt incrementally to urban lifestyles (Setiawan, 1998).
For improvements or interventions in kampungs, there are many types of possible approaches distinct by two main attitudes:

One based on total demolition and complete replacement of the area. The other is in the gradual transformation and requalification of the pre-existing situation.

1.3
What is the Future?

Problems

Potentials
“The main quality of incremental housing is the capacity to build a system based on simple rules of design and execution, able to define the first phase of installation, promoting qualitative evolution of the home environment and others areas, essential to next inhabitant’s sociocultural evolution.”

(Portas & Dias, 1972)

Following the preferred attitude of gradual transformation of pre-existing kampungs, incremental housing strategy can be the solution to a flexible intervention to the real needs of these areas.

Thus, the overall design question is, How to design and apply a feasible incremental housing strategy for kampung renewal based on existing context?

The thematic question is, How to construct the incremental building process in different time phases (initially built infrastructure & later built extensions)?

1.4 Incrementality as a Method
65% textile industries of Indonesia are located in Bandung and its surroundings. (Pena, 2015)
Bandung as one of the biggest cities in West Java has a lot of economic potential, with seven regional centers of industry and trade that could potentially be a business center as well as tourist attractions of world-class industry in the future.

One of them is Textile Industry Center of Cigondewah in Bandung Kulon Sub-district, Cigondewah Kaler Village, Cigondewah Kidul Village, and Cigondewah Rahayu Village. The industry centers focus on producing various kinds of materials such as fabrics for garments, bags, hats, dolls and so on. (Baso and Astuti, 2015)
The site is triangularly shaped, with the main road going east-west direction in the north. To the other side of the main road situates the big textile factory. A highway goes along the south-east border. In the west part there are some rice fields and small factories. Further to the west locates other kampung houses.

A polluted river runs through the kampung in north-south direction that separates the kampung into two parts. Generally speaking, the road system of this area is quite informal, except the roads around can be accessible by car, the inner roads are so narrow that only scooters and bikes can go through. But the network of walking system naturally formulated here and works very well.

2.2 Site Structure
2.3 Evolution of Houses on Site

House 1- facing the factory

House 2- in kampung fabric

House 3- along the river

House 4- near warehouses

House 5- facing football field
In 2006, the house owner bought this land and built 2 shops along the road.

Big warehouses were built for expanding the scale of business.

24 rooms for rent were built mainly for the workers of the shop.

Family of the house owner moved to live here.

A new floor is planning to be built for more rents.
In 1980, a couple bought the one-floor house with 2 bedrooms and a back yard.

In 1996, a couple bought the one-floor house with 2 bedrooms and a front yard.

The front yard was occupied by a two-floor extension with a small workshop on the ground and bedrooms above.

4 rooms rent for factory works were extended and occupied the back yard.
In 1980, one floor house with 2 bedrooms and a workshop

Horizontally extended and rooms re-arrangement

Another floor was built, family started to move upwards and rooms on ground level were transformed for rent. Home-based food business started off

8 family members all lived in this house

Extensions occupied the whole ground area for more rent

A new floor for rent is planning to be built
One floor house with 2 bedrooms and temporary kitchen and toilet.

A front shop was extended later.

A new living room and bedroom were built above the front shop.

Rooms for rent on the first floor are under plan.
2.4

Call for a Mix-function Community

The urgent issue is to provide housing units that can meet the diverse and varied needs of mixed functions and mixed group of people, while, the reality is the capacity of current community cannot accommodate the growing mix-functional demands for local people.
2.5

Problem of Self-build Extension

Density
In terms of each incremental construction with no shared rules, house owner always wants to occupy almost the whole land area which results in there are little public space left on ground level.

Security
The house that have the ability to build incrementally are structured with brick walls and concrete structural column. However, this building method will not be applicable if house owner wants to continue extending in vertical direction due to lack of reserved structural consideration and substandard building materials.
INCREMENTALITY AS A SOLUTION
Flexibility of extension (direction)

Scale of extension (compared with initials)

Personalization (kinds of materials)

Spacial level (reserved for extension)

Durability of construction (fire safety, hazard protection)

Complexity of construction (kinds of connection)

Source of material (price)

Process of material (availability)

little much

small large

few many

small large

bad good

hard easy

rare abundant

hand machined
**Aranya Community Housing**  
India, 1989

- **Finance:** government  
- **Extension rules:** site boundary-front space-upper floor  
- **Scale:** individual, 1-2 floors  
- **Spatial level:** hierarchy of open spaces, small courtyards shared by 3-4 families, larger green spaces shared by bigger group  
- **Personalization:** front stairs, color, brick & steel patterns  
- **Materials:** brick, stone and cement / free of choice for decoration  

**Assessment:**

![Image of Aranya Community Housing](image)

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**Quinta Monroy Housing**  
Chile, 2003

- **Finance:** government  
- **Extension rules:** infrastructure in half side, later extension in the other half  
- **Scale:** individual, 2-3 floors  
- **Spatial level:** collective courtyard for 20 families, lifted up semi-open ground space, half void  
- **Personalization:** color, half built extensions  
- **Materials:** concrete block for initials / wood or recycled materials for extensions  

**Assessment:**

![Image of Quinta Monroy Housing](image)

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**Manufactured Sites**  
Mexico, 2005

- **Finance:** industry / cooperative / NGO  
- **Extension rules:** ground space, lifted up partly  
- **Scale:** individual, 2-3 floors  
- **Spatial level:** lifted-up ground space as work or shop units  
- **Personalization:** color, prefabricated component, recycled material  
- **Materials:** reinforced concrete structure / local cheap material  

**Assessment:**

![Image of Manufactured Sites](image)

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**Incremented Kaccha Housing**  
India, 2008

- **Finance:** 90% government, 10% users / NGO  
- **Extension rules:** 3 types, top-middle-ground  
- **Scale:** individual, 2-3 floors  
- **Spatial level:** street, semi-open ground space partly  
- **Personalization:** 3 types, color, rooftops, free choice of finishing  
- **Materials:** lightweight prefabricated steel frame unit, rubber tires, pallets, building waste  

**Assessment:**

![Image of Incremented Kaccha Housing](image)
Problems solved & Potentials promoted
With the investment by local government, cooperation between local community, NGO and surrounding industries, the upgrade program of problematic living environment can start off. Under an overall plan and design by architects, incremental housing strategy involves residents in the process of development, regulate the self-build phenomenon, promote the quality of indoor and outdoor space and boost the home-based economy.

For higher density context
However, all the selected cases do not deal with the trend of vertical development or collective housing for the rapid growth of population, which is quite significant in Indonesia.
Social Housing, Jakarta

Urban Kampung Kosenda, Jakarta

collective area

private space
3.2

Incrementality in Collective Housing

People live together in collective housing for reacting to the density problem, for shared infrastructure, for better living quality and environment, but will not sacrifice the community connection and traditional lifestyle in old kampungs through incremental housing strategy.
3.3

Conclusion on Incrementality: Need

Finance
Government / Developer
Community cooperative
Private owner

Function
Housing, rent, textile workshop, warehouse of textile waste, shop, community center......

Identity
Change over time adapting to changing need
Participation in the rehousing process

INCREMENTALITY

Prerequisites

NEED
Why do people extend their houses?

Finance*
External Support

Function
A bigger house

Identity
A unique house

- How can the residents, within the limits in actual conditions, get the greatest possible freedom to extend their houses?

- How to design sets of rules, organizing potential variations that are intuitive for the residents to visualize the possible options for extensions?

- How to apply the proper building methods for the phased incremental construction process?
3.3

Conclusion on Incrementality: Space

Autonomy vs Order

Extension vs Capacity

Introverted development

Extroverted development

Level of Space

Public vs Semi-public vs Private

Semi-private
3.3

Conclusion on Incrementality: Construction

- Initially built infrastructure
  (community controls)

<table>
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<tr>
<th>Durability</th>
<th>Availability</th>
<th>Price</th>
<th>Additional Values</th>
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- Later built extensions
  (individual decides)

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Light wood frame construction

Conclusion on Incrementality: Construction

- Initially built infrastructure
  (community controls)

- Later built extensions
  (individual decides)

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3.4

Study Case on Material and Structural Feasibility

The country is developing fast growing plantations to decrease exploiting in natural forest. For instance, of the approximately 3 million hectares of national forest estate managed by PT Perhutani in Java, production forests accounts for 1.92 million hectares (0.64per cent), among which 0.57 million are pine trees, which is widely used in producing light structural wood.

Total Area: 3.01 Million hectares

<table>
<thead>
<tr>
<th>Production Forests</th>
<th>1.92 Million ha</th>
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<tbody>
<tr>
<td>Teakwood</td>
<td>1.09 Million ha</td>
</tr>
<tr>
<td>Pine tree</td>
<td>0.57 Million ha</td>
</tr>
<tr>
<td>Damar</td>
<td>0.08 Million ha</td>
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<tr>
<td>Mahoni</td>
<td>0.07 Million ha</td>
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<tr>
<td>Meranti</td>
<td>0.02 Million ha</td>
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<tr>
<td>Snokeling</td>
<td>0.02 Million ha</td>
</tr>
<tr>
<td>Acacia Mangium</td>
<td>0.02 Million ha</td>
</tr>
</tbody>
</table>

National forest estate managed by PT Perhutani in Java (Nemoto, 2002)
Foundations
- Support of ground floor

Floor Frames
- Place joists to girders

Wall Frames
- Arrangement of corner studs
- Arrangement of intersection studs
- Support of wall openings

Roof Frames
- Eave attachment
- Ridge connection

Floor Dimension
- 2x6 up to 3050
- 2x8 2440 to 3660
- 2x10 3050 to 4265
- 2x12 3660 to 5485
4.1 Phase One

1. The community got subsidized from the government.

2. The community invested in this small collective housing unit infrastructure. (density, solar energy, water collection & storage)

3. The ground area should be shared by the community as a center of home-based textile business

- Government
  - Investment
  - Appreciation

- Community
  - Investment
  - Appreciation

- Individual
  - Investment
  - Appreciation
Solar panels
Wood frame
Rainwater collection core & Vertical greens
Concrete frame / Recycle mold
- Cast on site (cheap labors)
- Concrete block with wood aggregate or textile sludge
Flood buffer
Design of bottom structure - 16 columns

Design of bottom structure - 4 columns

Design of bottom structure - 8 columns

Design of bottom structure - columns & wall system
Reasons for choosing columns & wall system:

1. Open up the closed center core.
2. Structural efficiency & stability is guaranteed and spatial organization is indicated.
We have a place for table tennis now!

Welcome to my restaurant!

This is my fashion shop!

I would like to buy some clothes!

I will live here soon!

Let's produce our fashion here!

Community
Investment
Appreciation
4.2

Phase Two

1. The community got profits from the textile business that can help people build houses above.

2. Individuals also need to pay for a preferred housing unit if he wants to move in.

3. The small housing complex will attract more people to come and invest

- Government
  - Investment
  - Appreciation

- Community
  - Investment
  - Appreciation

- Individual
  - Investment
  - Appreciation
“Higher density should not reduce, but enhance, the quality of private and public life”
“Higher density should not reduce, but enhance, the quality of private and public life”
**Initial type 1:**
kitchen, toilet, dining room, 2 small bedrooms

**Initial type 2:**
kitchen, toilet, dining room, 1 big bedroom

**Extension type 1:**
kitchen, toilet, dining room, living room, 1 big bedroom

**Extension type 2:**
kitchen, toilet, dining room, 3 bedrooms
Initial type 3:
kitchen, toilet, dining room, 3 bedrooms

Extension type 3:
kitchen, toilet, dining room, 3 bedrooms, living room

Initial type 4:
kitchen, toilet, dining room, 1 bedroom, living room with balcony

Extension type 4:
kitchen, toilet, dining room, 1 bedroom, 1 room for rent
Initial type 5:
kitchen, 2 toilets, dining room, living room, 3 bedrooms

Extension type 5:
kitchen, 3 toilets, dining room, living room, 3 rooms for rent
Group A - Mixed Housing Types
Group B- Minimal Housing Types
Water overflow into soil after a certain level.

Raise the ground floor for flood protection.

- Rainwater collection pipe
- Concrete block infills
- Solar panels
- Wooden frame roof
- Double height terrace
- Sand filter (diffuse plate, biolayer, fine sand, coarse sand, gravel)
- Drain pipe
- Trench
- Water overflow into soil after a certain level
- Main water tank
- Main water tank
We will extend my terrace for bigger living room!

This room can be changed into 2 small bedrooms for rent.

I like the greens!

I think I will keep my terrace.
Phase Three

1. The residents started to change and extend the houses according to their needs.

2. With the money from rent and textile business, people can invest more in their working and living style.

3. The small housing complex becomes the activity generator for the community.
Self-build pattern 1
wooden frame with 4 panels to close a facade

Self-build pattern 2
Free to open doors and windows in wooden panels

Self-build pattern 3
Use local material to cover the finishing

Self-build pattern 4
More choices of wooden frame panels

Self-build pattern 5
Flexible window for sun shading & rain protection

Self-build pattern 6
Translucent material with wooden grill
Expanded facade view of extension 1:150 - A3
I am going to extend this terrace!

I can have my own workshop now!

This is a nice room for our workers.

I will put more greens on my terrace!

It really changed a lot here!
In the Future

With the improvement of local community in good live and work environment, more people will gather here for opportunities. The increasing density with more “smart units” plugging into kampungs, it will not only help enhance the value of the land, but also the quality of local people’s life.