Upgrading Ayigya
The transformation of a low income neighborhood in Kumasi, Ghana

P5 presentation Kim Dekker
Introduction to Ghana

Ayigya
urban design strategies

The compound
architectural design strategies

Conclusion
Ghana - Colony and independence

Independence
6 March 1957
Ghana now
Kumasi vs. Amsterdam
Kumasi garden city
Ayigya - compound typology
Ayigya - new building blocks
Ayigya - design area
Daarnaast is een belangrijk iets de voetprint van ons leven. Ghana heeft nog weinig mee te maken, een stap over laten staan. Ze zijn er wel mee bezig op sommige punten maar bewust maken is goed. Ze kijken heel erg nar de westere wereld als ze daarvoor een voorbeeld kunnen zijn is antuurlijk mooi.
Self sufficiency
Ayigya
Urban analysis findings
The housing demand is growing

Kumasi was once called the garden city

Social structures are changing

Unsave and unhealthy streets

The soil suffers from erosion

Tight and dense grid
New building blocks
3 types of compounds

A. New compound

B. New extended compound

C. Existing compound with plug in layer
Common spaces
6 types of trees and plants as building material or food

Recycled elements used for sitting, playing, shelters for the rain.
Street pattern and water network
The loop of water

neighborhood level
dwelling level
Final plan
The compound
Compound history

Early Egyptians - 5000 b.c.

Early Greeks - 500 b.c.

Atrium housetype of Rome - 200 b.c.

Courtyards in North Africa -

Courtyard houses in North Ghana
Current appearance compound
Analysis compound - courtyard
Analysis compound - extensions
Analysis compound - materials
Themes

Basic needs

Division of space

Sustainability
Changing social structures
Target groups
From supply to demand

the supply
all dwellings

the demand
no dwellings
Basic needs

Division of space

Sustainability

Flexible/Adjustable
Three compound types

A. NEW COMPOUND

B. NEW EXTENDED COMPOUND

C. EXISTING COMPOUND WITH PLUG IN LAYER
Transition

traditional demand  transition phase  new demand

the supply  the demand

all dwellings  no dwellings
**Concept structure**

- Basic rectangular form
- Courtyard
- 6m width

- Shell
- 1.5 m width
- 2m height

- 2 ‘closed’ sides

- 2 ‘open’ sides

- House of
  - 2, 4 or 6 units

- Load bearing elements

- Organized with frames
The basic

- basic rectangular form
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- house of
  - 2, 4 or 6 units

- load bearing elements

- organized with frames
Type B
Type C
The courtyard
The courtyard
The courtyard
Shell

Basic rectangular form courtyard
6m width

Shell
1.5m width
2m height

2 'closed' sides

2 'open' sides

House of
2, 4 or 6 units

Load bearing elements

Organized with frames
Open roof and natural ventilation
Roof construction

- timber slat
- timber partition 100x50mm
- timber rafter 150mm
Roof construction

- thatch 80mm
- transverse tree trunk Ø50mm
- rope
- tree trunk Ø100mm
Roof construction

- timber slat
- halved bamboo trunk 50mm
- cavity 20mm
- thatch 80mm
- timber partition 100x50mm
- transverse tree trunk Ø50mm
- rope
- tree trunk Ø100mm
- timber rafter 150mm
Water loop

neighborhood level

dwelling level

- Gutters in the streets
- Eco pound-wetland (helofyten filter)
- Urban farming: Joeri Bijster

- Shower & cleaning water
  - Warm
  - Cold
- Gray water
- Sand/gravel water filter
- Drainage compound
- Ceramic filter
- Drink water
Ceramic filter - drinkwater
Closed sides

- Basic
  - Rectangular form
  - Courtyard
  - 6m width

- Shell
  - 1.5m width
  - 2m height

2 ‘closed’ sides

2 ‘open’ sides

House of
- 2, 4 or 6 units

Load bearing elements

Organized with frames
Closed sides
Organic waste loop

- Gutters in the streets
- Eco pound-wetland (helofyten filter)
- Urban farming: Joeri Bijster
- Organic waste
- Compost
- Food: vegetables
- Compost toilet
- Gray water
- Shower & cleaning water
- Cold
- Warm
- Sand/gravel water filter
- Ceramic filter
- Drink water
- Drainage compound

Neighborhood level

Dwelling level
2 open sides

basic rectangular form
courtyard
6m width

shell
1.5 m width
2m height

2 ‘closed’ sides

2 ‘open’ sides

house of
2, 4 or 6 units

load bearing elements

organized with frames
Open - extension side
House of 2, 4 and 6 units

- Basic rectangular form
- Courtyard
- 6m width

- Shell
- 1.5m width
- 2m height

- 2 'closed' sides

- 2 'open' sides

House of 2, 4 or 6 units

- Load bearing elements
- Organized with frames
House of 2, 4 and 6 units
Possible development for the housing blocks
Load bearing elements

- Basic rectangular form
  - courtyard
  - 6m width

- Shell
  - 1.5 m width
  - 2m height

- 2 'closed' sides

- 2 'open' sides

- House of 2, 4 or 6 units

- Load bearing structure

- Organized with frames
Column foundation
Exploded view foundation - column
Columns - beams
Exploded view columns - beams
The frames

- basic rectangular form
- courtyard
- 6m width

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- 2 'closed' sides

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- house of 2, 4 or 6 units

- load bearing elements

- organized with frames
Design frames - exterior
Design frames - exterior

- azobé
- adobe - plaster
- azobé - niangon
Design frames - shop awning
Design frames - interior

- bamboo
- woven bamboo
- bamboo louvres
Materials

- Recycled plastic
- Azobé timber
- Adobe blocks:
  - 7% cement
  - 80% laterite
  - 13% water
- Concrete
- Half bamboo trunks
- Tree trunks and thatch
- Bamboo
- (Adobe) plaster
neighborhood level

dwelling level

plants & trees in the urban plan

growth of bamboo & kunai grass

Skill center: Same Peleker

Kumasi:
- sand
- water
- wood

Ghana:
- wood
- clay
- cement
- steel
- recycled plastic
- thatch

use as building material

use as building material

Imported:
Conclusion
Questions?
Urban concept structure

- existing
  - tight and dense grid
- new compounds
- 2nd building layer
- common spaces
  - opening grid
- water/street network
  - regulating streams
Column foundation
Waste collection
Why open and closed shell?

2/2 sides
- commercial vs none
- dwelling vs none
- commercial vs dwelling
- common vs commercial & dwelling

4 sides
- commercial
- dwelling
- common/commercial/dwelling

3/1 side streetside
- dwelling 3 sides vs commercial streetside
- dwelling/common 3 sides vs commercial streetside

???
wel of niet erin
Street profiles with gutters
Options opening grid

BOUWMASSA'S IN GRID
OPENEN VAN HET GRID

BLOKKEN VAN 4 COMPOUNDS
ERG VAST, MET 1 BLOK OPEN TE WEINIG GEBRUIK VAN RUIMTE

BLOKKEN VAN 9 COMPOUNDS
GOEDE SCHAALGROOTTE. 1/2 A 1 BLOK OPEN RUIMTE

BOUWRICHTING KANT OP
OPENBREKEN GRID

BOUWRICHTING KANT OP
OPENBREKEN GRID
The 3x3m grid

square grid -> mass production, repeating, reuse

minimal dimension room -> 8.5m
The 3x3m grid

Daylight

Compound - courtyard ratio

current: 4.5m - 1.5m
wider grid: 1.5m - 3m - 4.5m - 6m - 7.5m
Fitting the grid
Roof design options
Construction options

(pre-fab) concrete

Wooden construction filled with adobe blocks

Timber construction columns and beams

Concrete construction columns and beams

Timber columns adobe brick walls

Balloon frame
exploded view construction
Conclusion