

# DAR

courtyards and chinampas for urban water  
management in Dar es Salaam

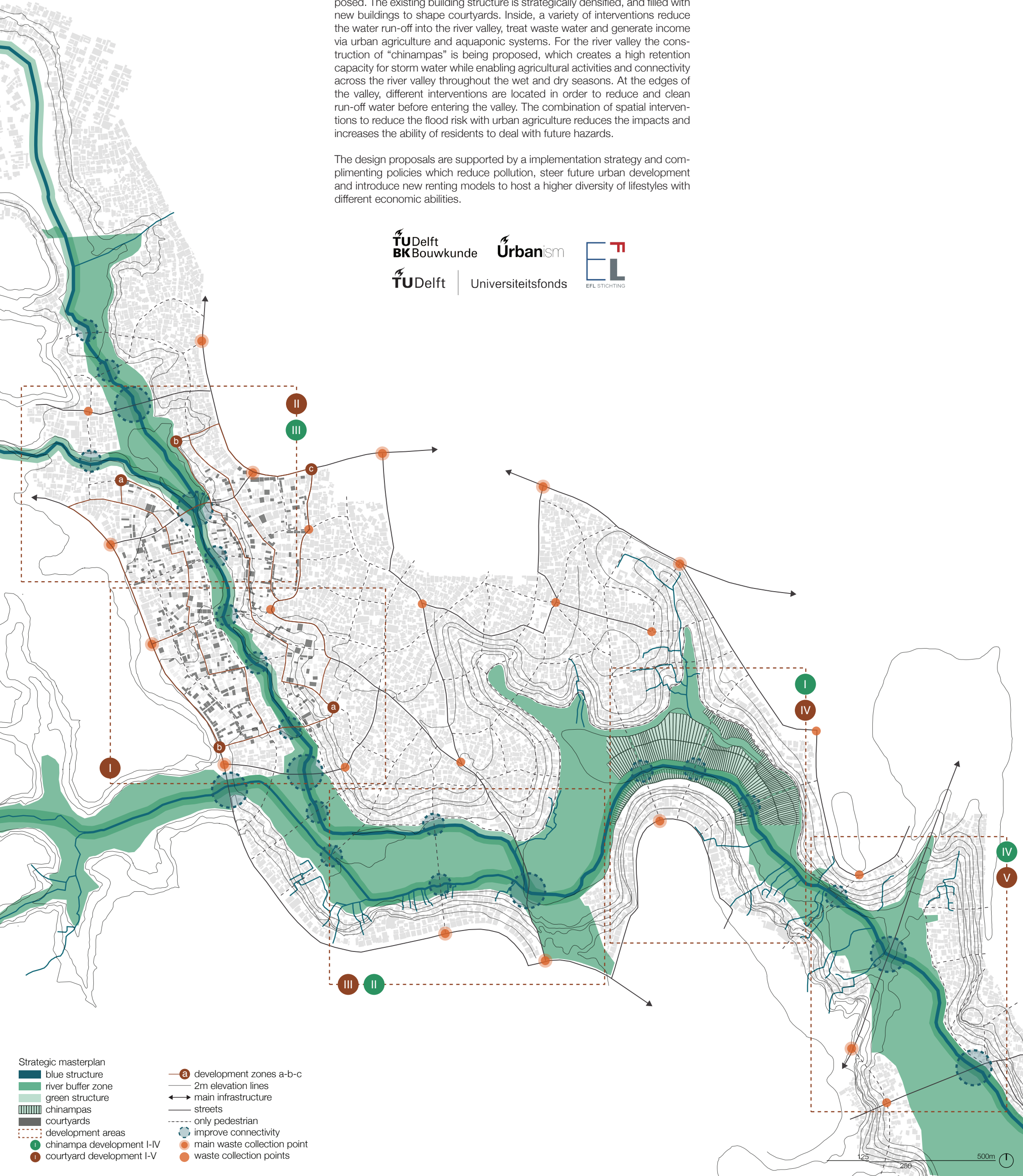
The biggest city of Tanzania, Dar es Salaam, faces increasing flood risk, causing frequent sickness, loss of life, and widespread damage to property. Dar es Salaam is one of the fastest growing cities in the world. More than 70% of the residents live in informal settlements. Many of them are located in flood prone areas like river valleys and floodplains, which flood annually. Because of their limited coping capacity, residents are not able to recover from the impacts of this flooding. Due to the change of precipitation patterns, the flood risk is likely to increase in the future, putting even more people and assets at risk during more frequent and intense floods. This graduation project seeks to answer the main research question: How can urban form and landscape help to mitigate the effects of floods on citizens in Dar es Salaam, Tanzania?

For areas with a high density of buildings, multifunctional courtyards are proposed. The existing building structure is strategically densified, and filled with new buildings to shape courtyards. Inside, a variety of interventions reduce the water run-off into the river valley, treat waste water and generate income via urban agriculture and aquaponic systems. For the river valley the construction of "chinampas" is being proposed, which creates a high retention capacity for storm water while enabling agricultural activities and connectivity across the river valley throughout the wet and dry seasons. At the edges of the valley, different interventions are located in order to reduce and clean run-off water before entering the valley. The combination of spatial interventions to reduce the flood risk with urban agriculture reduces the impacts and increases the ability of residents to deal with future hazards.

The design proposals are supported by a implementation strategy and complimenting policies which reduce pollution, steer future urban development and introduce new renting models to host a higher diversity of lifestyles with different economic abilities.



Universiteitsfonds



## Strategic masterplan

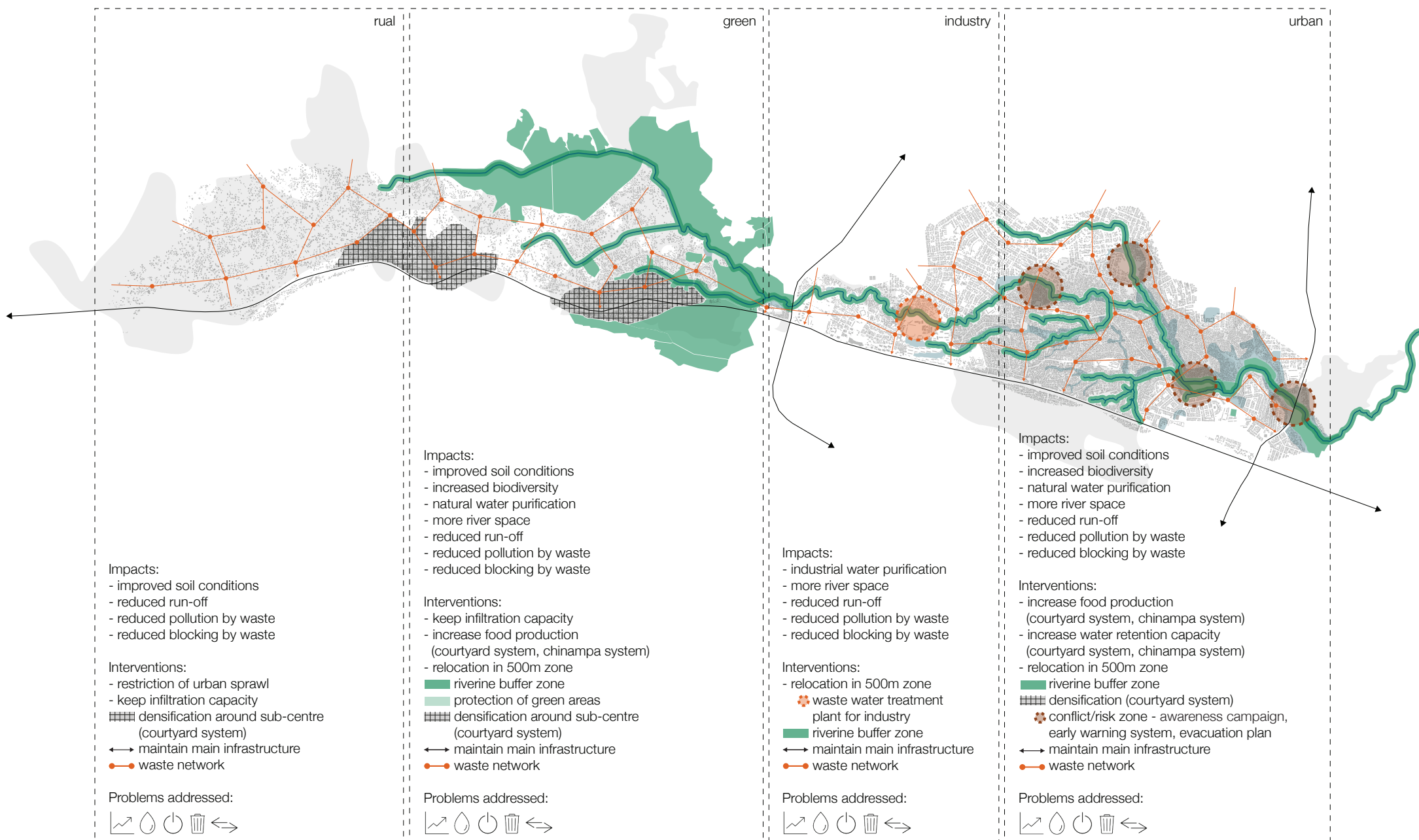
- blue structure
- river buffer zone
- green structure
- chinampas
- courtyards
- development areas

- a development zones a-b-c
- 2m elevation lines
- main infrastructure
- streets
- only pedestrian
- improve connectivity
- main waste collection point
- waste collection points

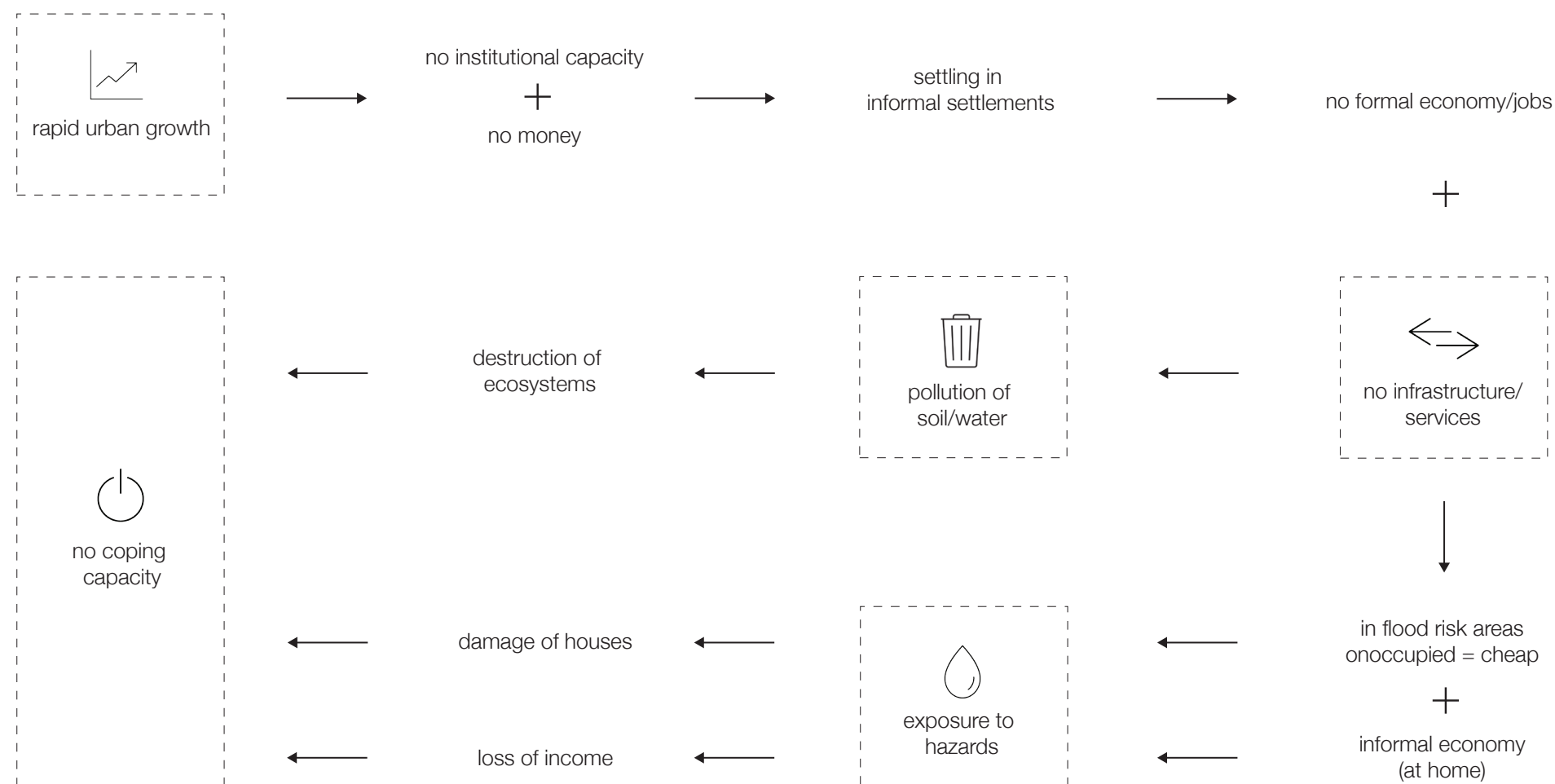
- chinampa development I-IV
- courtyard development I-V



► sinza river basin strategy



► main problems





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Beke-Marleen Hörmann

Master Thesis 2018 - Department of Urbanism - TU Delft

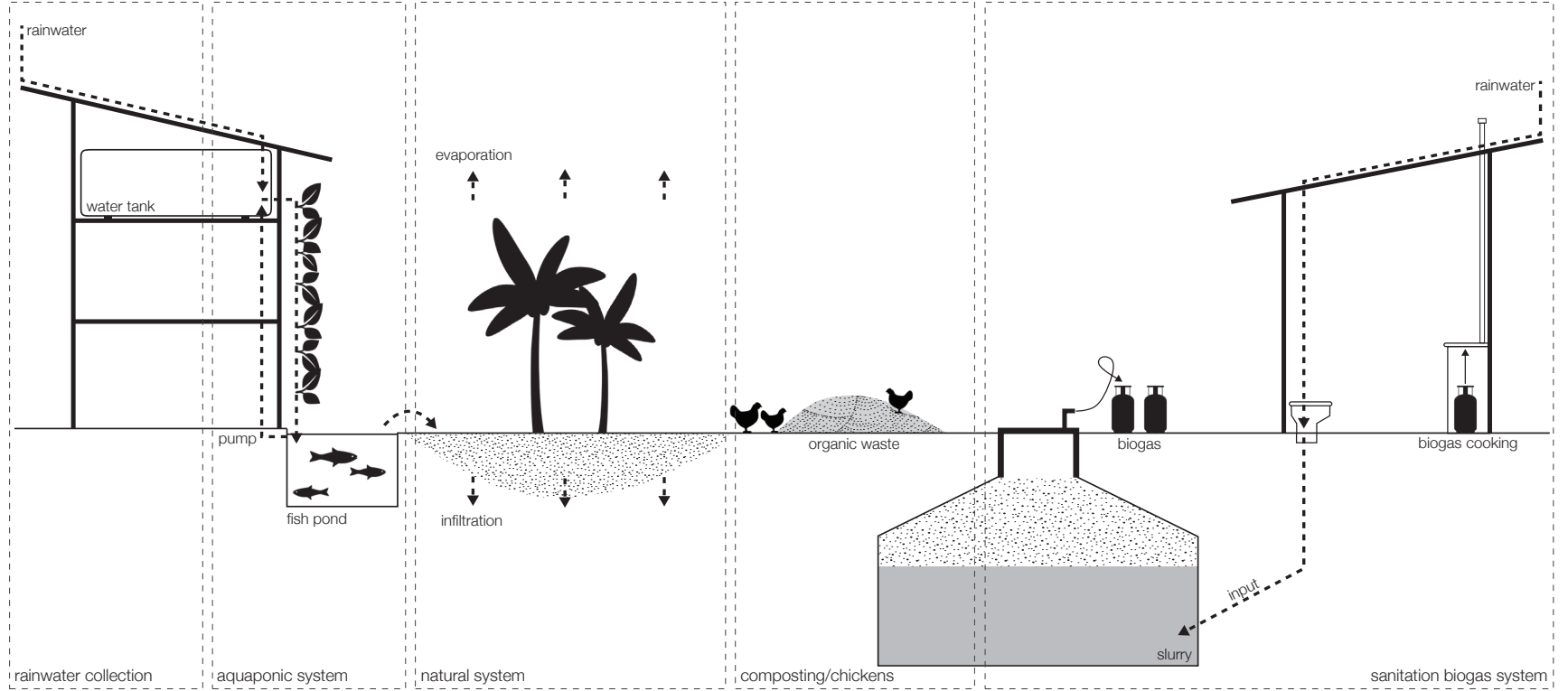
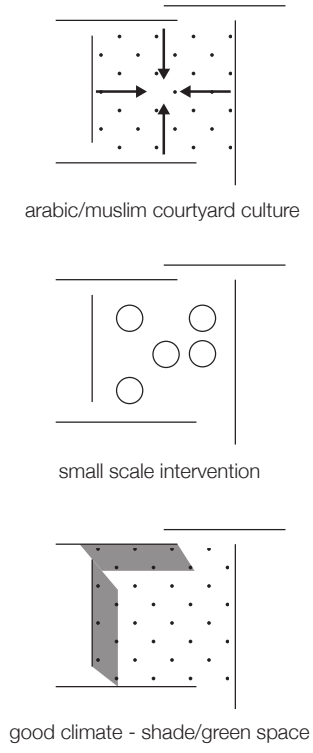




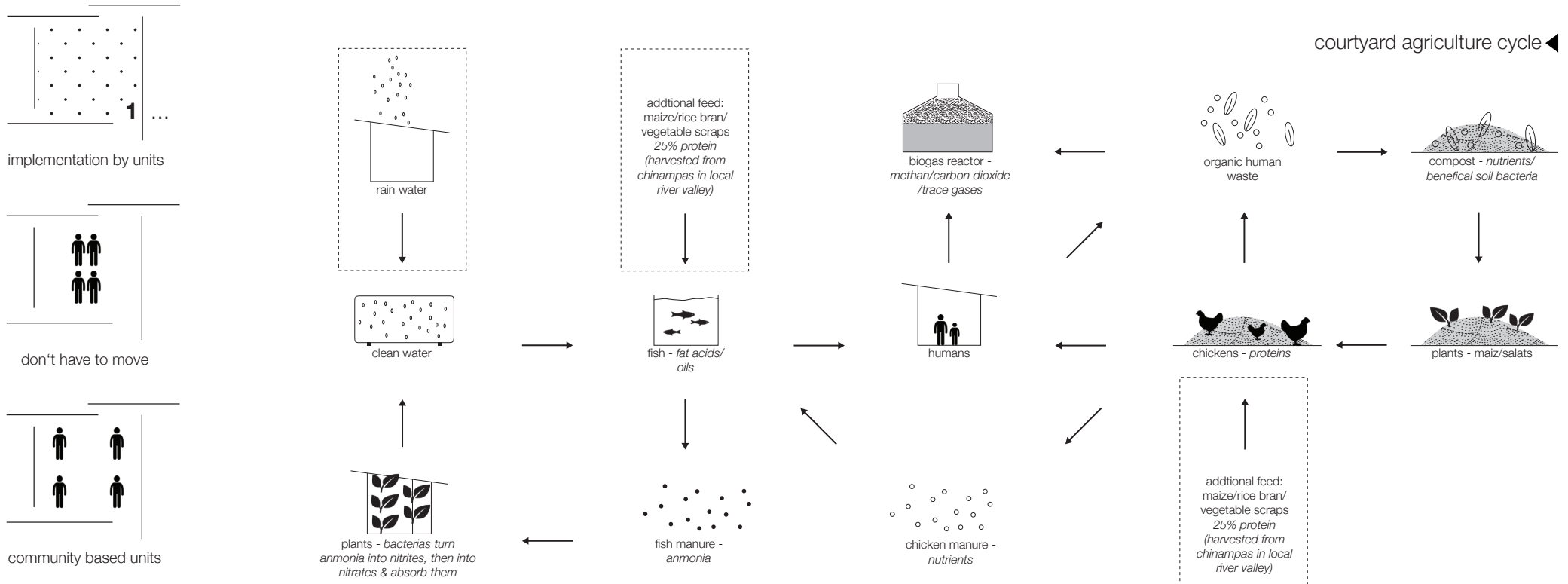


► why courtyard?

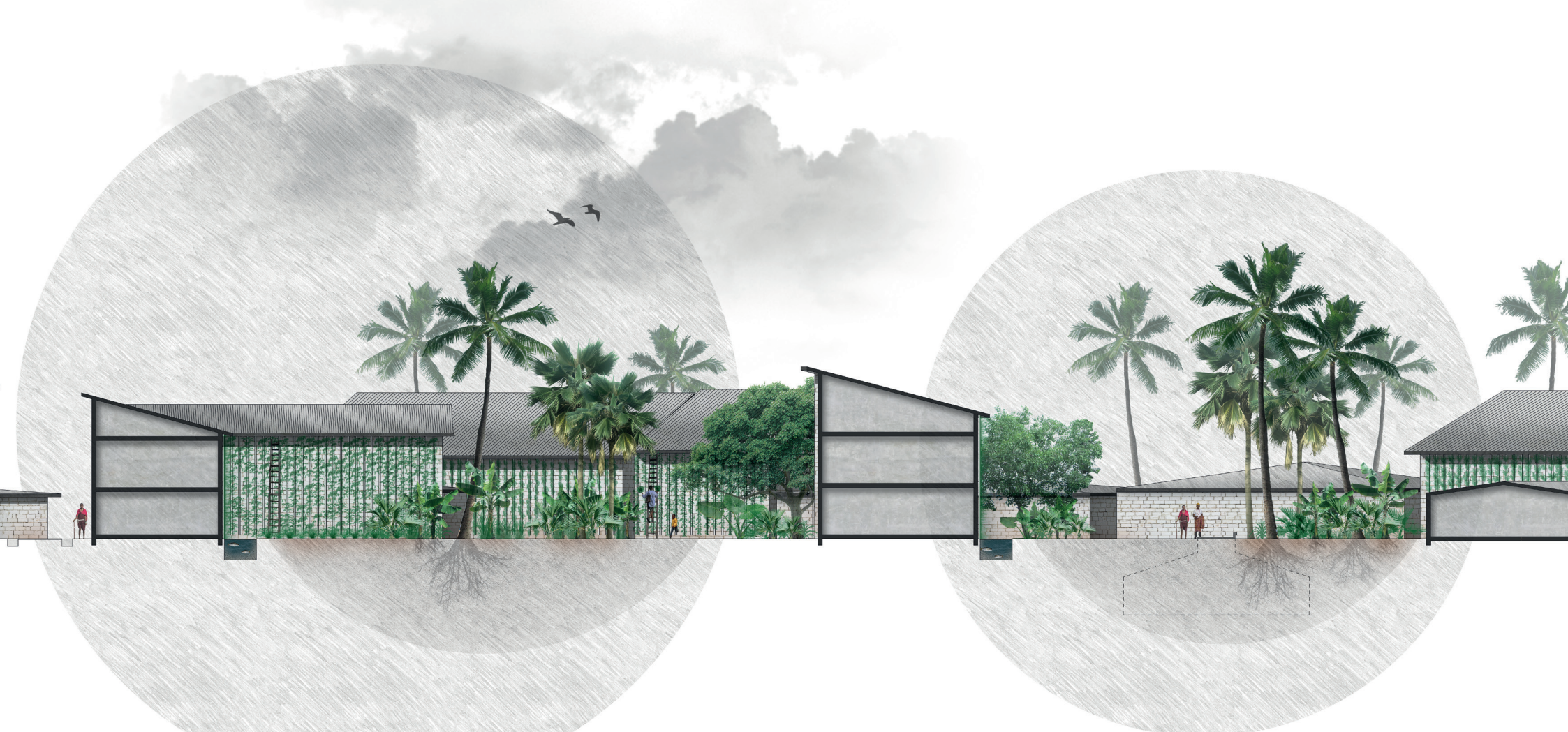
courtyard concept ◀



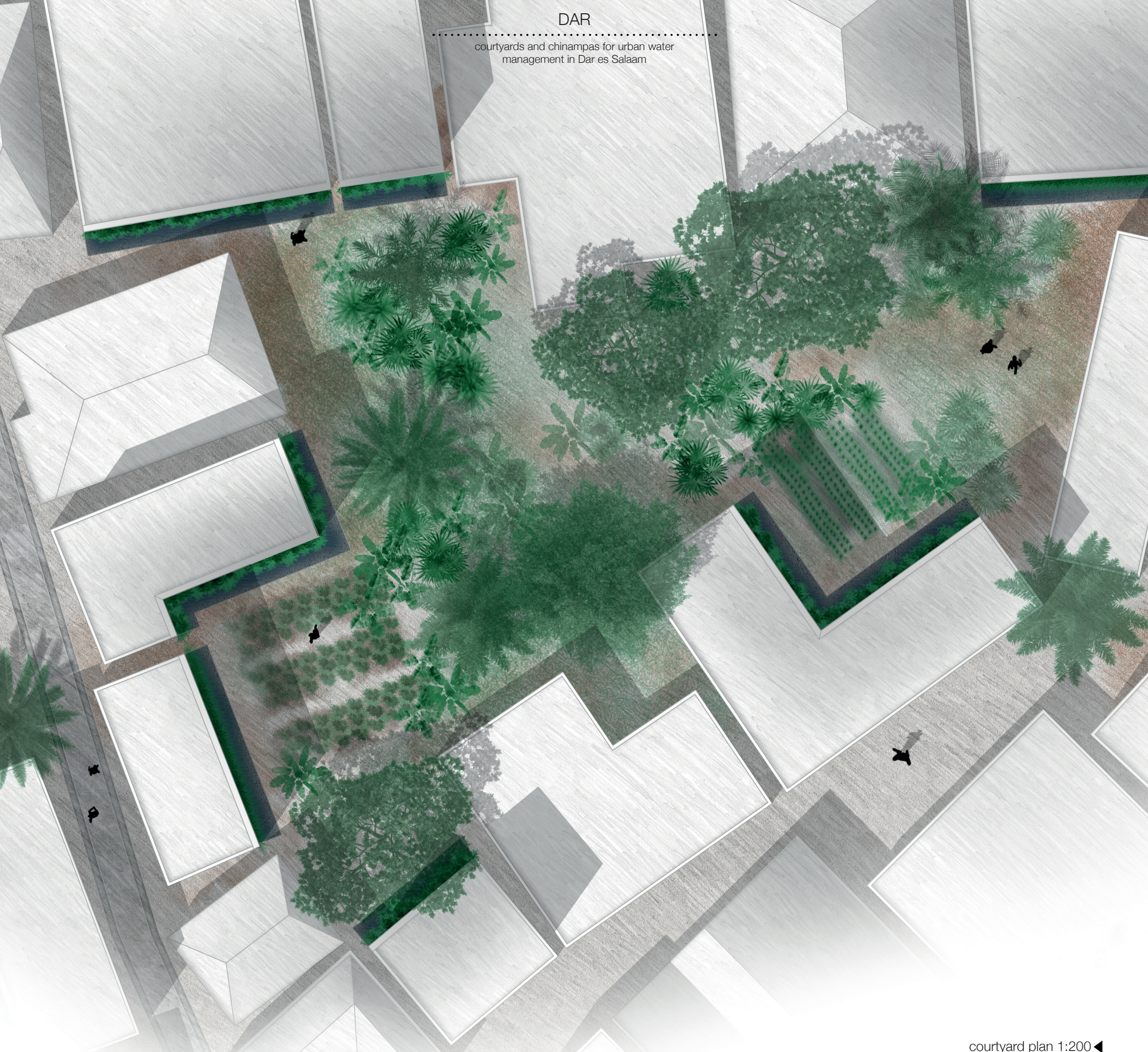
courtyard agriculture cycle ◀



► cross section west- and east side 1:250







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courtyard plan 1:200 ◀



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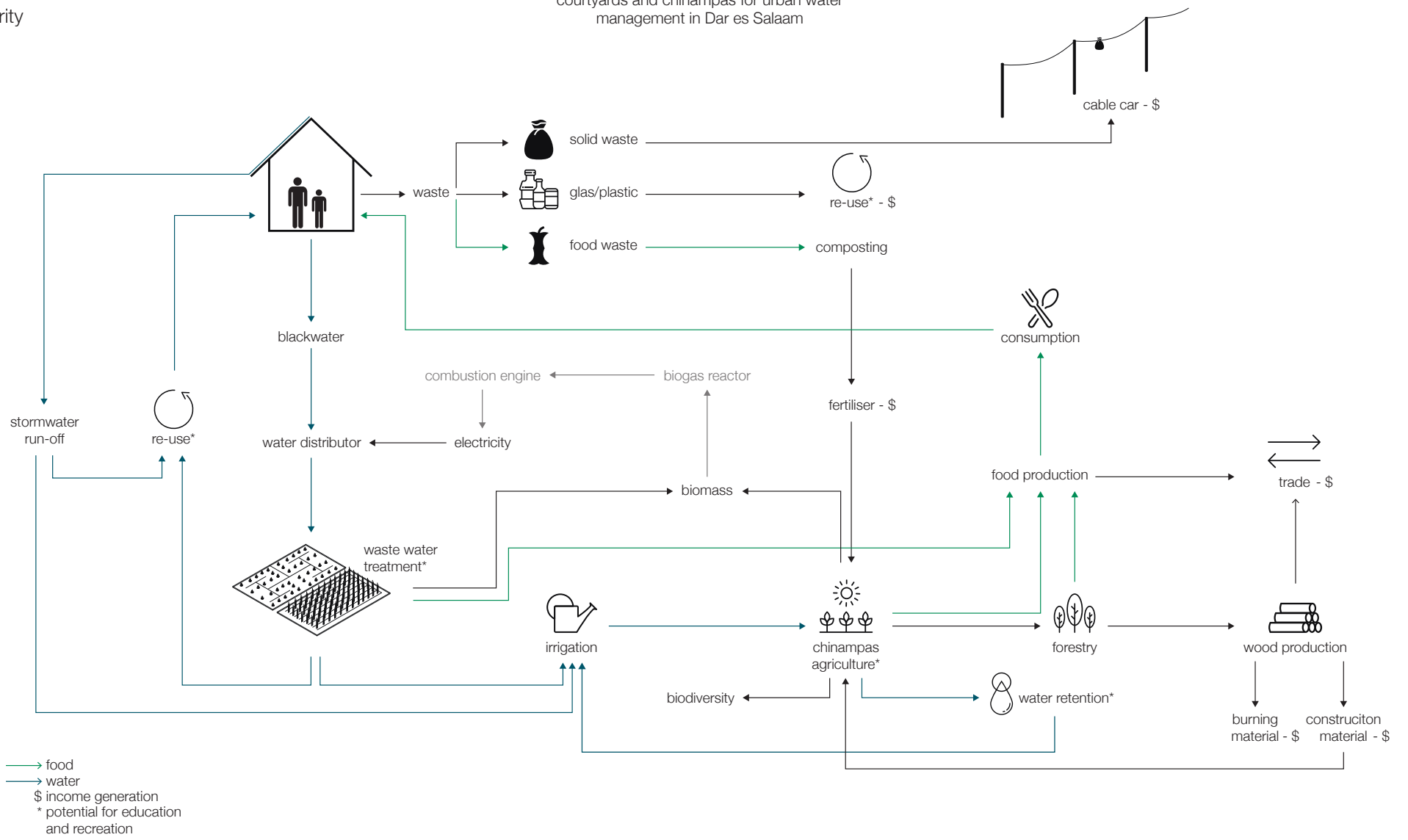




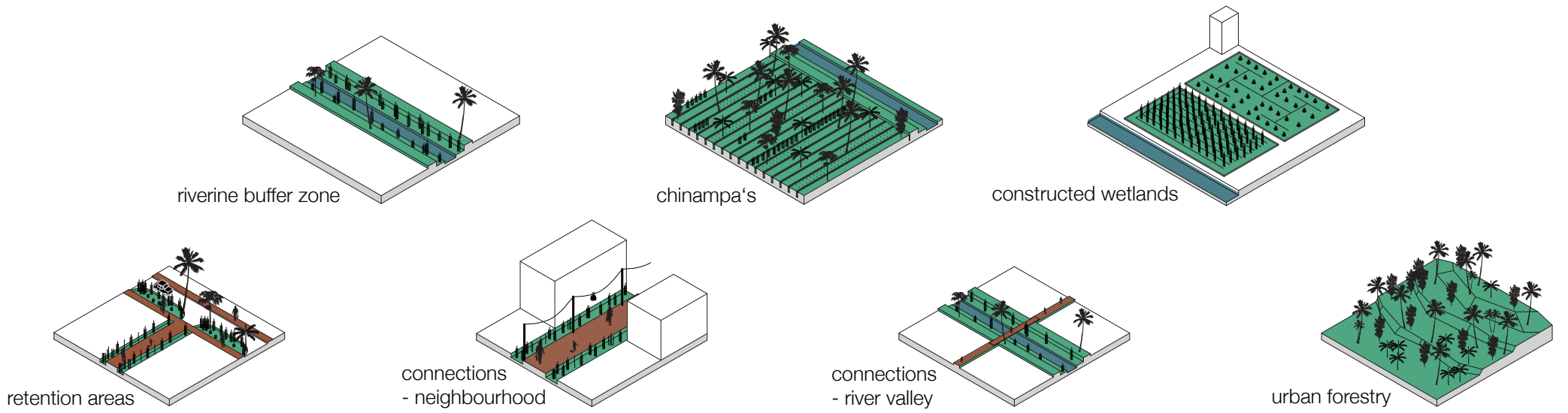
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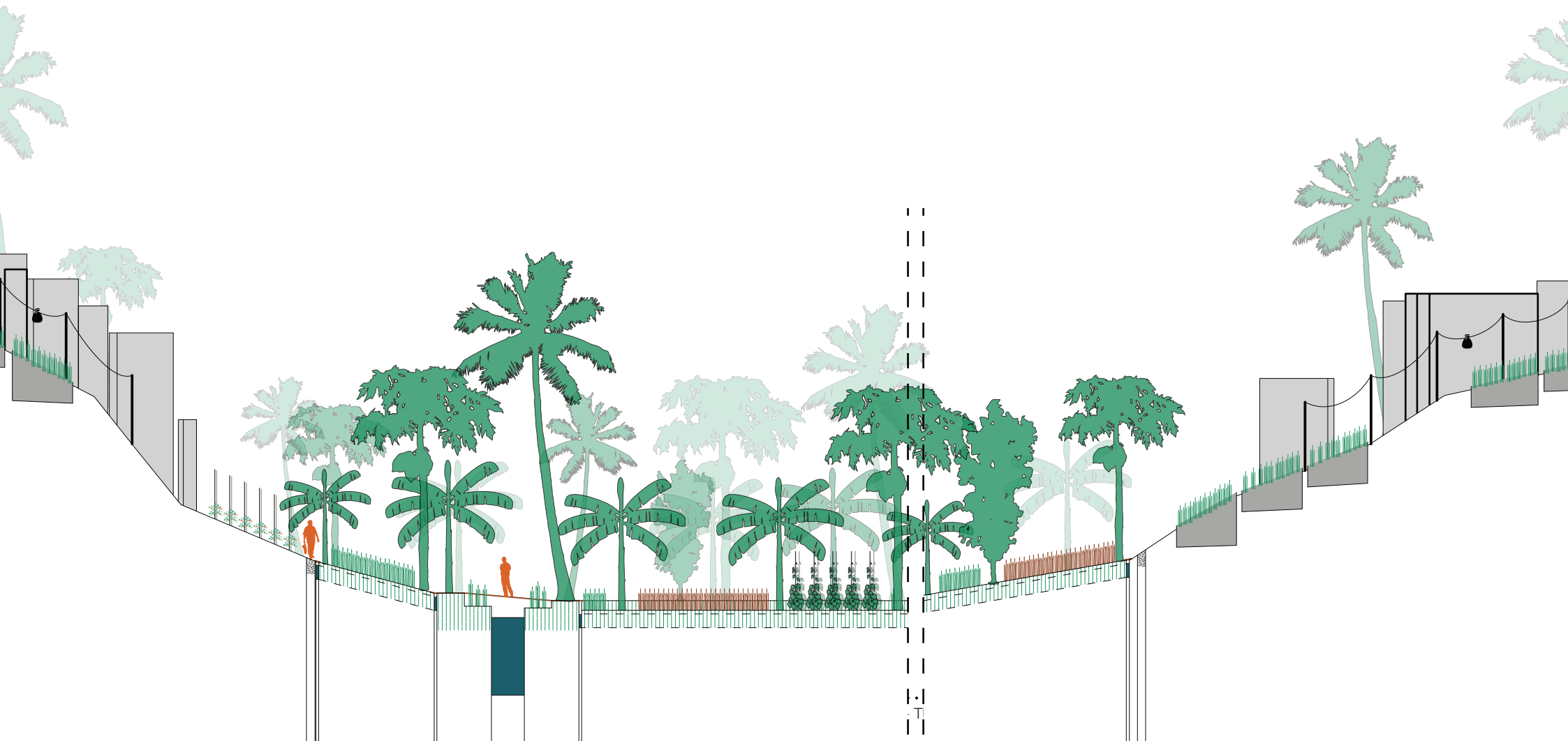
## ► circularity



## ► intervention schemes

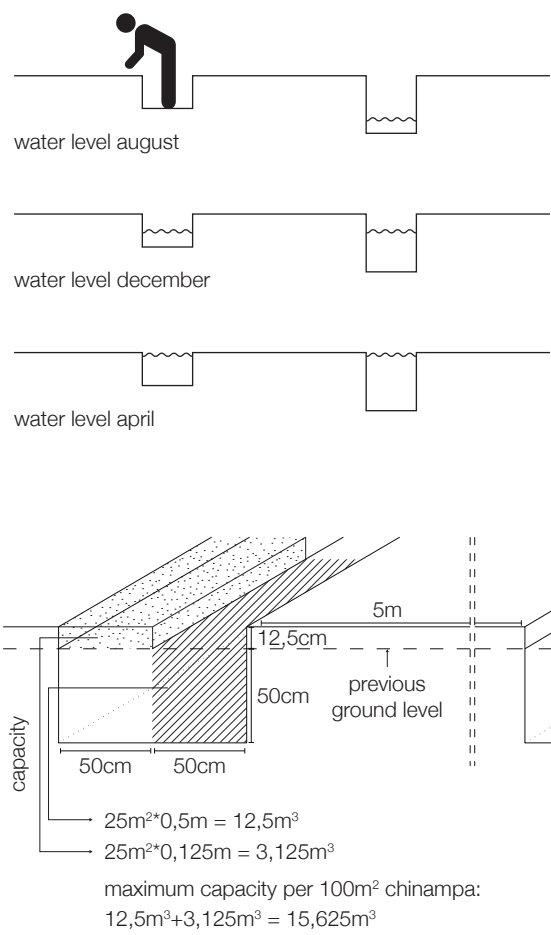


## ► south-north section 1:1000/1:200



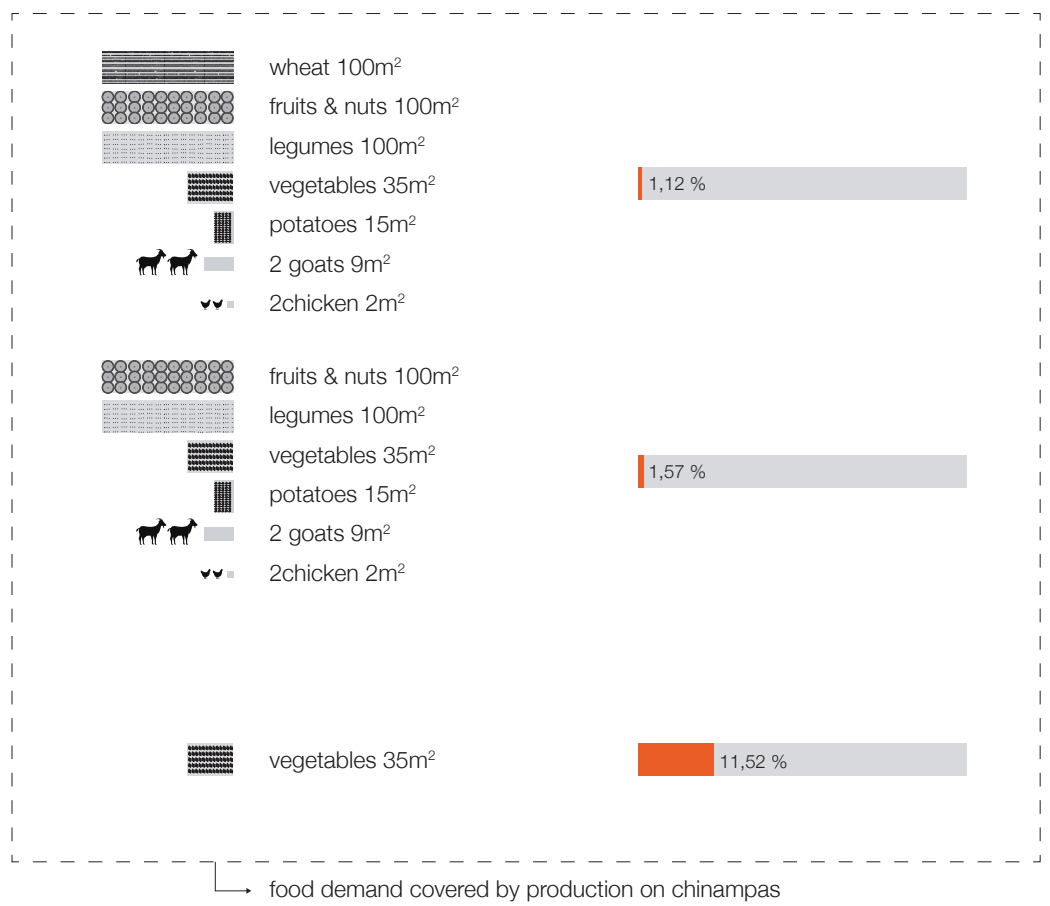


► chinampa water capacity



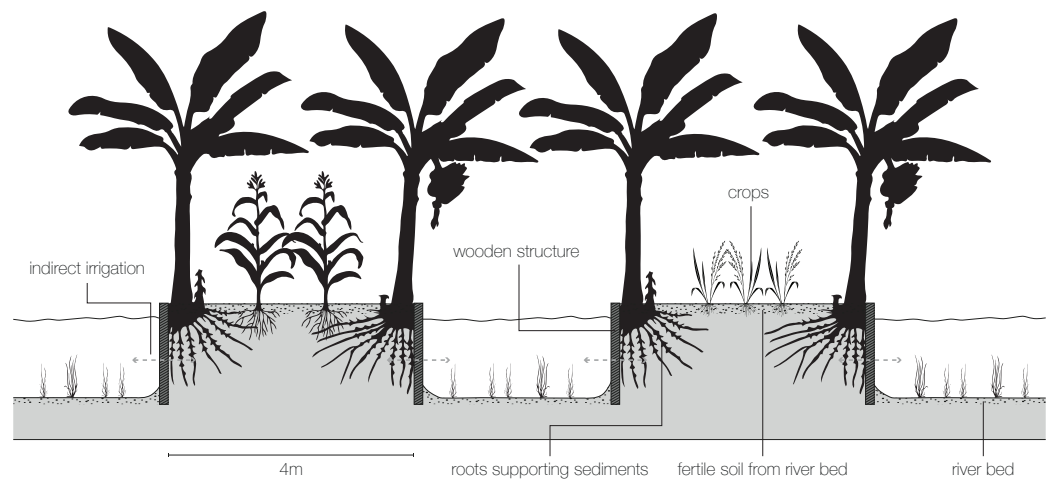
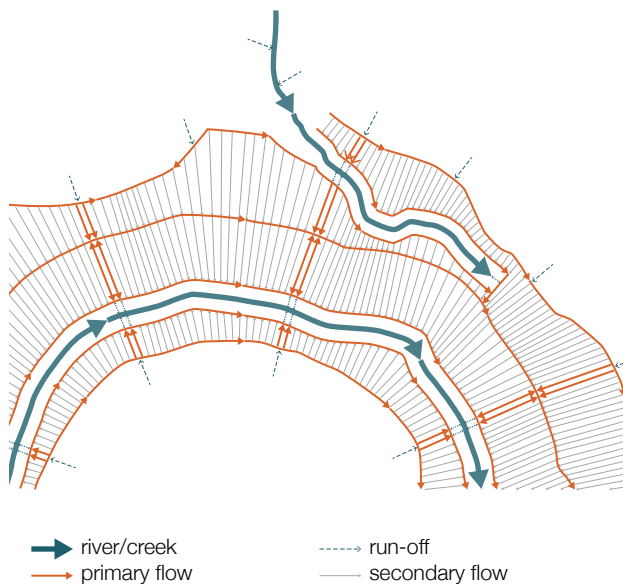
spatial requirements for 1 person/year

contribution to food demand of neighbourhood



► chinampa water flow

chinampa section ◀



chinampa plant scheme 1:200 ◀

