DESIGN METHODOLOGY

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- PROGRAM OF SEMESTER COURSE
- 0. PREFACE - WELCOME - INTRODUCTION
- 1. WAY OF DESIGN
- 5. DESIGN FACTORS
- 6. DESIGN PHASES AND MEMBERS
- 7. ARCHITECTURE AND THE ARTS
- 8. SUSTAINABILITY - ENVIRONMENTAL MANAGEMENT IN ARCHITECTURE
- 9. DESIGN WITH ARCHITECTURAL MONUMENTS
- 10. NEW TRENDS, NEW CONCEPTS OF DESIGN

- Environmental management
- - Physical - natural environment
  - - earth
  - - waters
  - - air

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- - Physical - natural environment
  - - earth
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Cause of pollution:

- wasting

- Environmental management
- - Physical - natural environment
  - - earth
  - - waters
  - - air

Cause of pollution:

- wasting
- prodigality

(to consume, to pile more than necessary)

- materials
- energy
- water

- Environmental management
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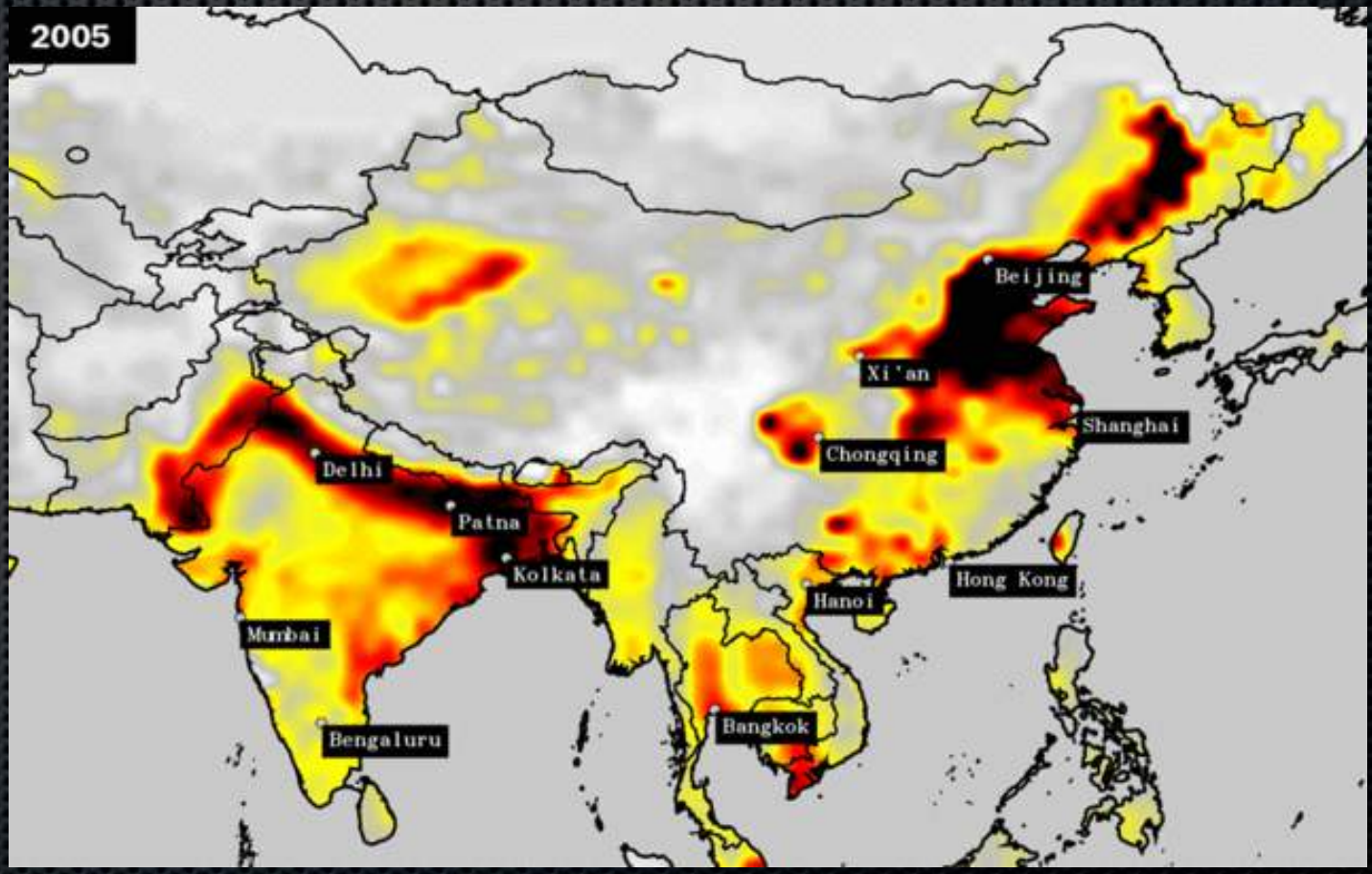
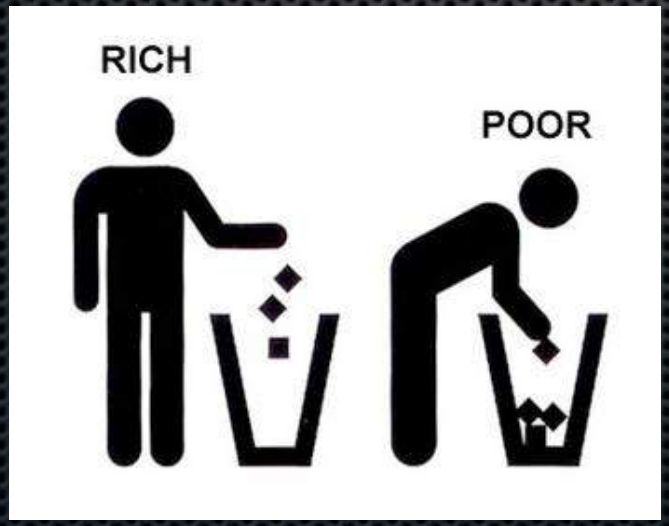
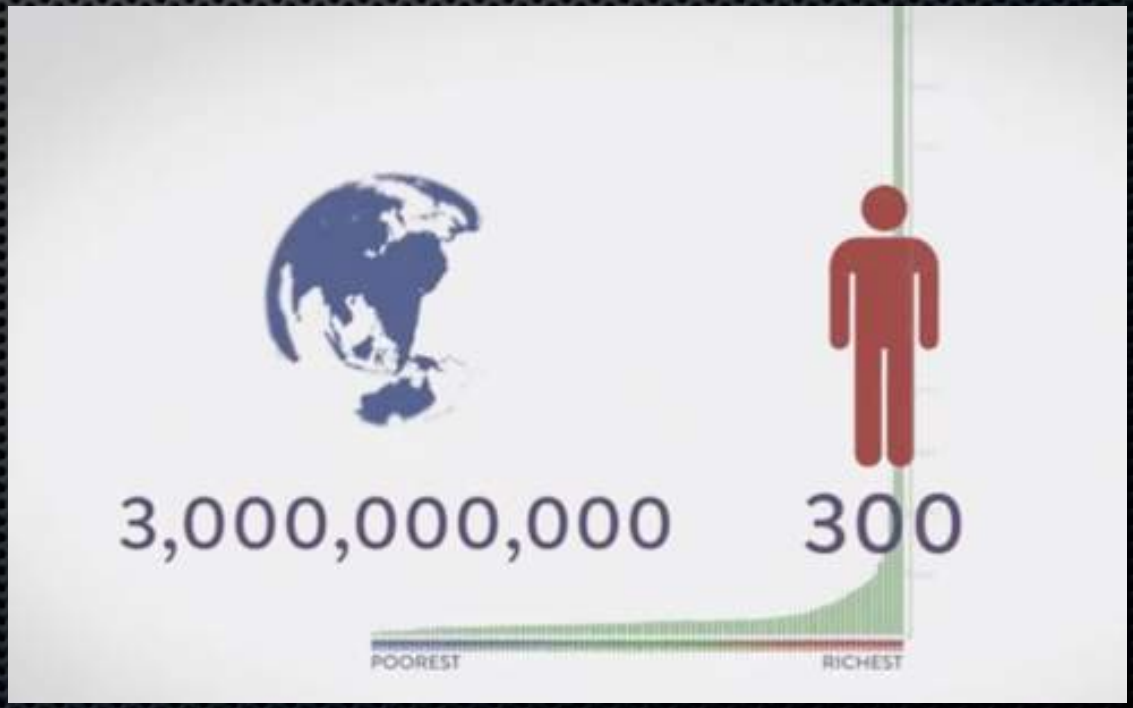
  - - waters
  - - air

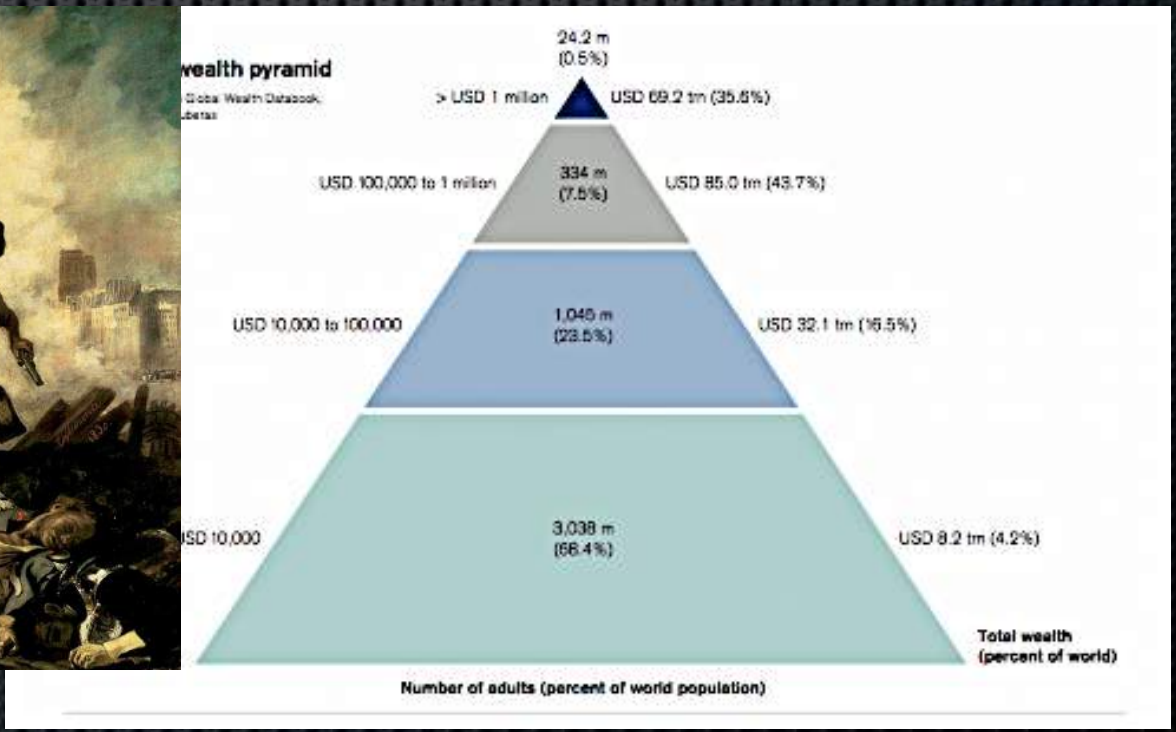


- Environmental management
- - Physical - natural environment
- - Economic milieu
  - - increasing gap between poor and rich

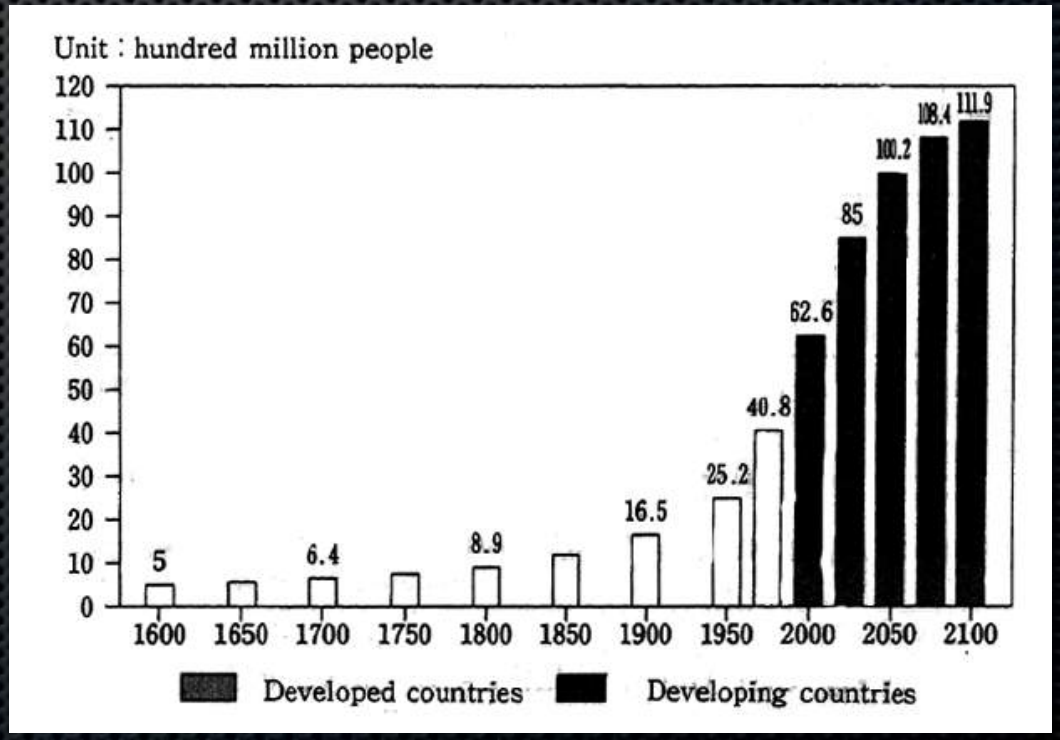




- Environmental management
- - Physical - natural environment
- - Economic milieu
  - - increasing gap between poor and rich
    - - stress, violence



- Environmental management
- - Physical - natural environment
- - Economic milieu
- - Social milieu
  - - dynamic growth of global population



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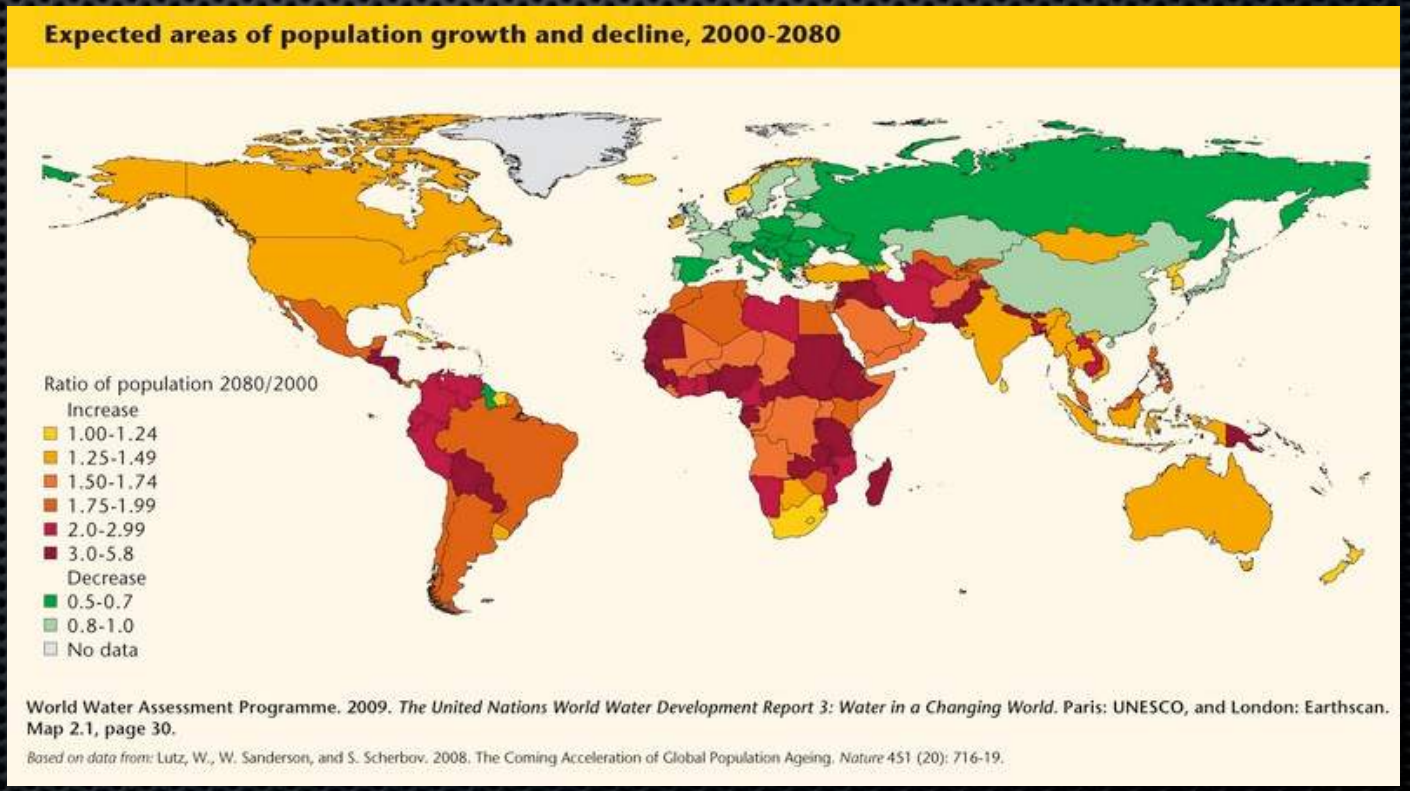

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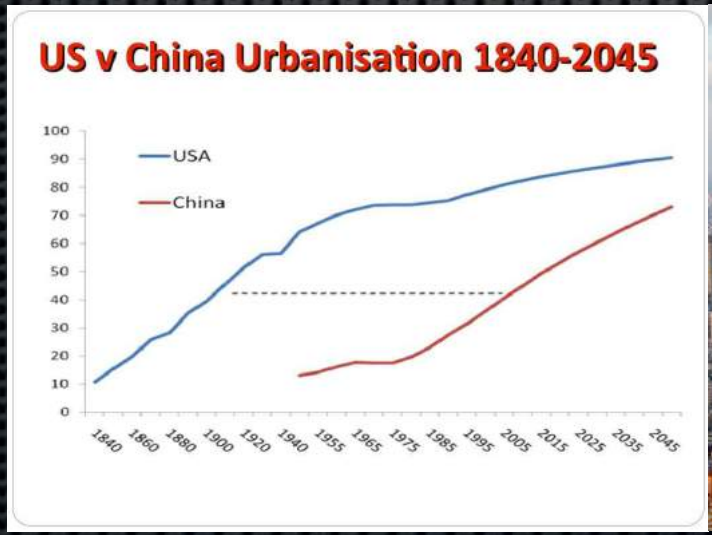
  - - dynamic growth of global population
    - - intensive migration to cities
      - - rising urbanisation



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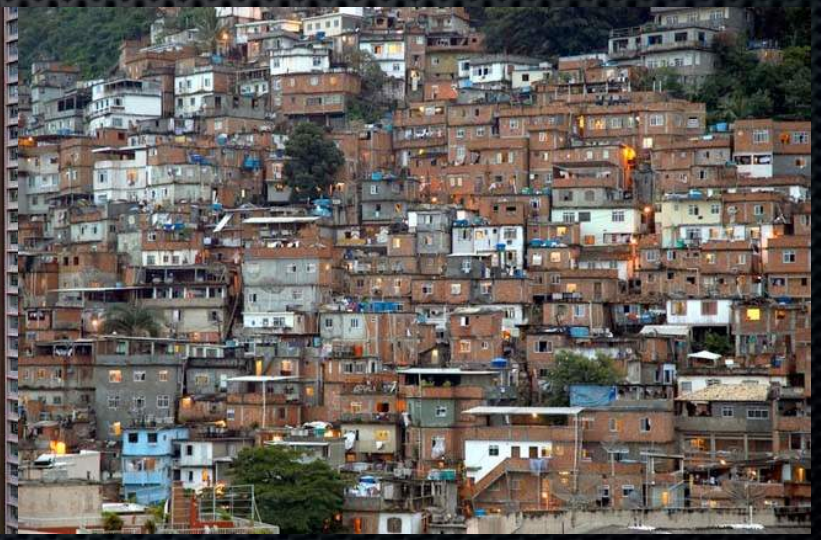

- Environmental management
- - Physical - natural environment
- - Economic milieu
- - Social milieu
  - - dynamic growth of global population
    - - intensive migration to cities
      - - rising urbanisation
        - - alienation
        - - individualism
        - - egoism
        - - lost

- Environmental management
- - Physical - natural environment
- - Economic milieu
- - Social milieu
- - Cultural milieu
  - - religions
    - - are in crisis because of worldly minding (materialism..)
  - - moral
    - - are in crisis because of social stress
  - - arts
    - - are in crisis because of previous and the commercial media
  - - media
    - - are the new power has commercial control over

- Architecture plays important role in all 4 factors,
- in
- - Physical - natural environment
- - Economic milieu
- - Social milieu
- - Cultural milieu

therefore it's responsibility is extraordinary!

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therefore it's responsibility is extraordinary!

What does it mean: “sustainable” for us, architects?

In 1987, the United Nations released the Brundtland Report, which included what is now one of the most widely recognised definitions:

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." It contains within it two key concepts:

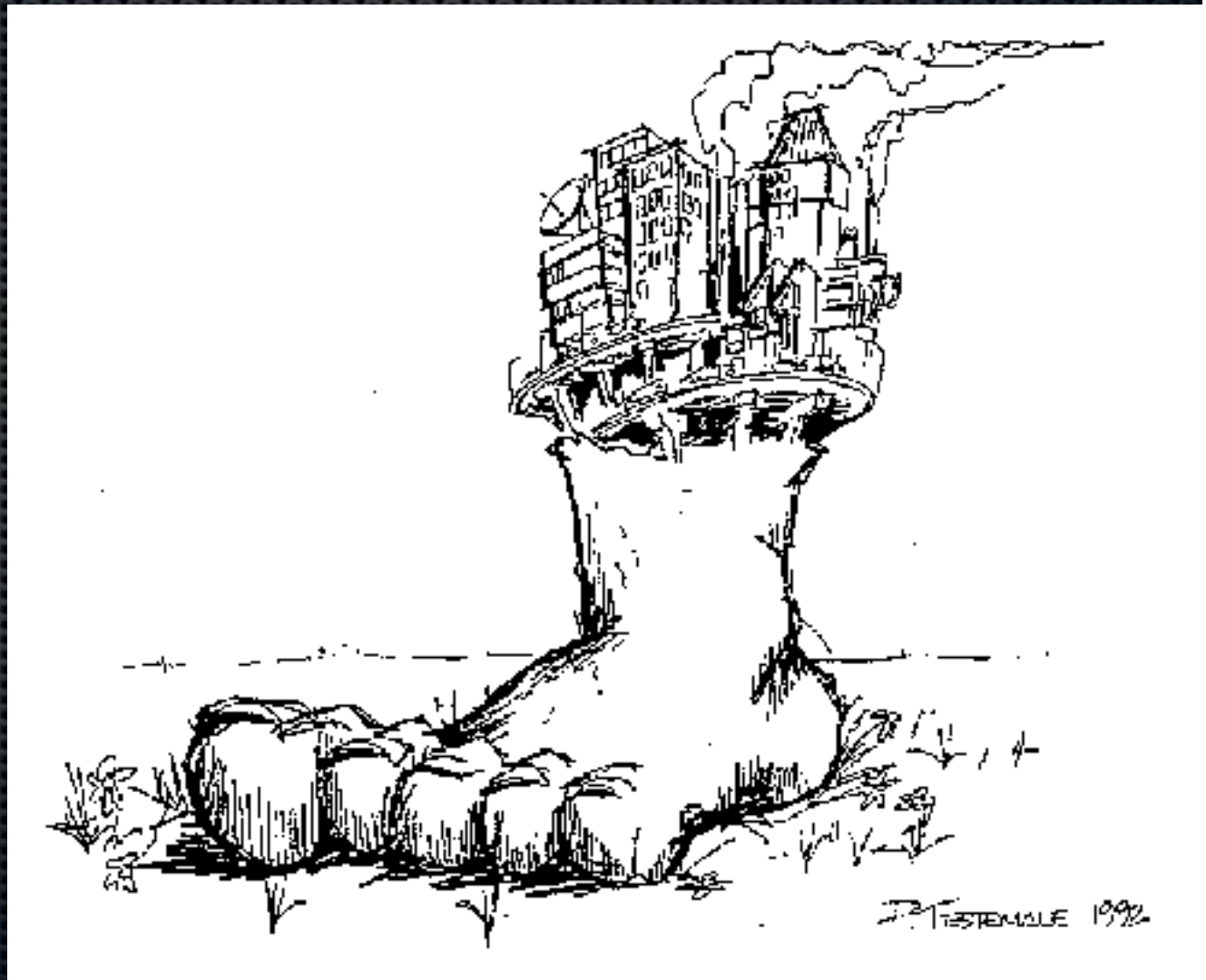
- the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given;

and

- the idea of limitations imposed by the state of technology and social organisation on the environment's ability to meet present and future needs."

Sustainable architecture is a general term,
that describes environmental-conscious design techniques in the field of architecture.
Sustainable architecture seeks to minimise the negative environmental impact of buildings by enhancing efficiency and moderation in the use of materials, energy and development space.
Most simply, the idea of sustainability or ecological design is to ensure, that our actions and decisions today do not inhibit the opportunities of future generations. This form can be used to describe an energy and ecologically conscious approach to the design of the built environment.

- Ecological footprint
- x = $\frac{\text{global hectares effected by humans}}{\text{population}}$



MŰEGYETEM 1782

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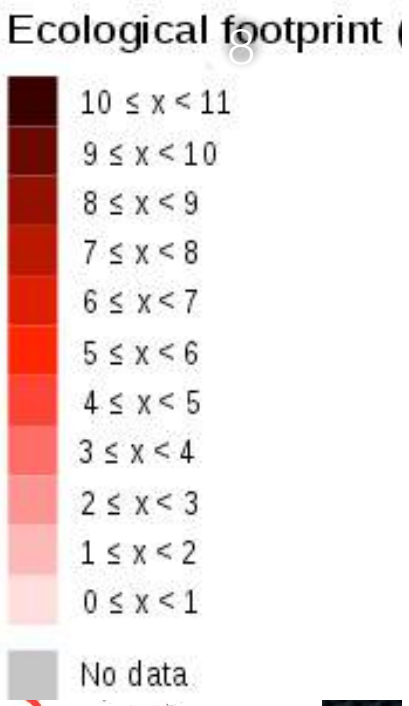
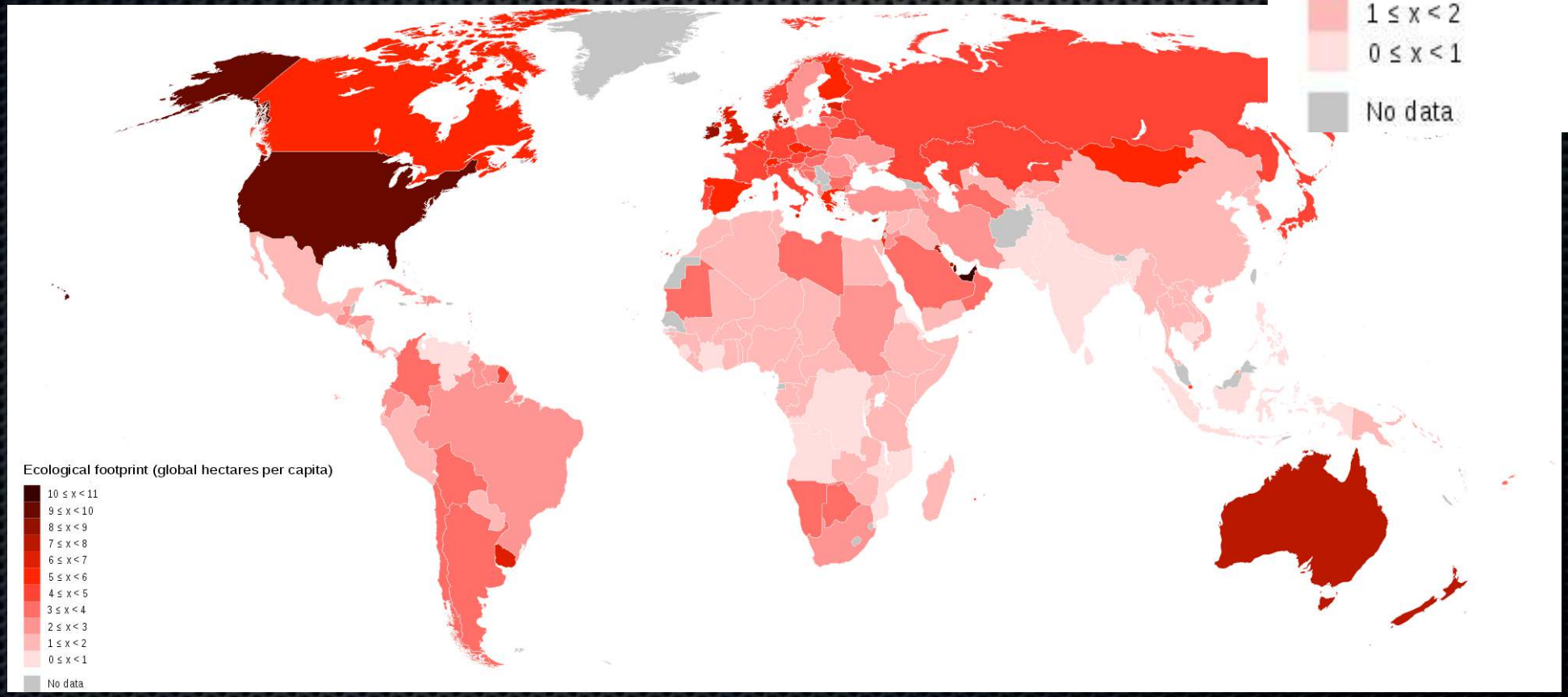




- (Wackelnagel, Rees)

THE HANNOVER PRINCIPLES by William McDonough

1. Insist on rights of humanity and nature to co-exist in a healthy, supportive, diverse and sustainable condition.

2. Recognise interdependence. The elements of human design interact with and depend upon the natural world, with broad and diverse implications at every scale. Expand design considerations to recognising even distant effects.

3. Respect relationships between spirit and matter. Consider all aspects of human settlement including community, dwelling, industry and trade in terms of existing and evolving connections between spiritual and material consciousness.

4. Accept responsibility for the consequences of design decisions upon human well-being, the viability of natural systems and their right to co-exist.

5. Create safe objects of long-term value. Do not burden future generations with requirements for maintenance or vigilant administration of potential danger due to the careless creation of products, processes or standards.

6. Eliminate the concept of waste. Evaluate and optimise the full life-cycle of products and processes, to approach the state of natural systems, in which there is no waste.ems. Those who create and plan should practice humility in the face of nature. Treat nature as a model and mentor, not as an inconvenience to be evaded or controlled.

7. Rely on natural energy flows. Human designs should, like the living world, derive their creative forces from perpetual solar income. Incorporate this energy efficiently and safely for responsible use.

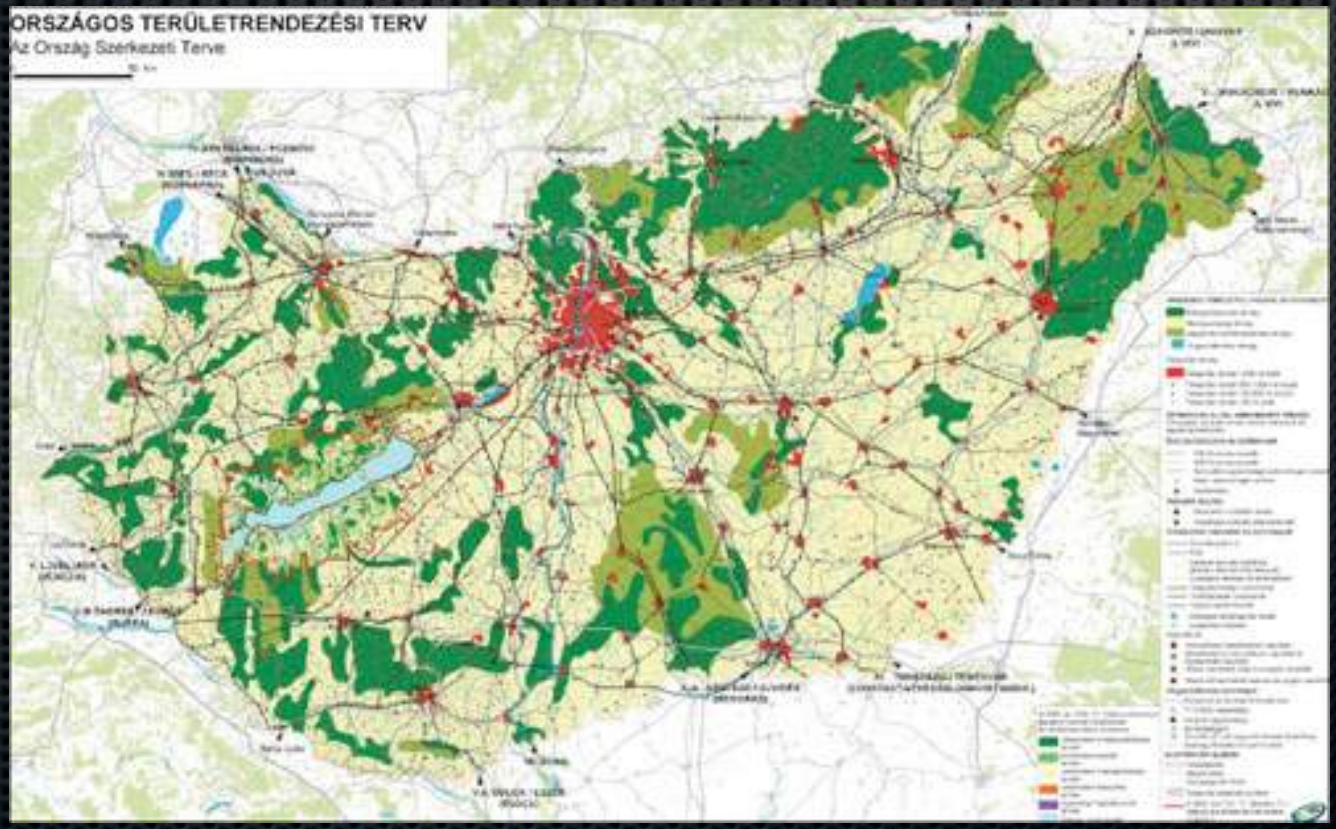
8. Understand the limitations of design. No human creation lasts forever and design does not solve all problems. Those who create and plan should practice humility in the face of nature. Treat nature as a model and mentor, not as an inconvenience to be evaded or controlled.

9. Seek constant improvement by the sharing of knowledge. Encourage direct and open communication between colleagues, patrons, manufacturers and users to link long term sustainable considerations with ethical responsibility, and re-establish the integral relationship between natural processes and human activity.

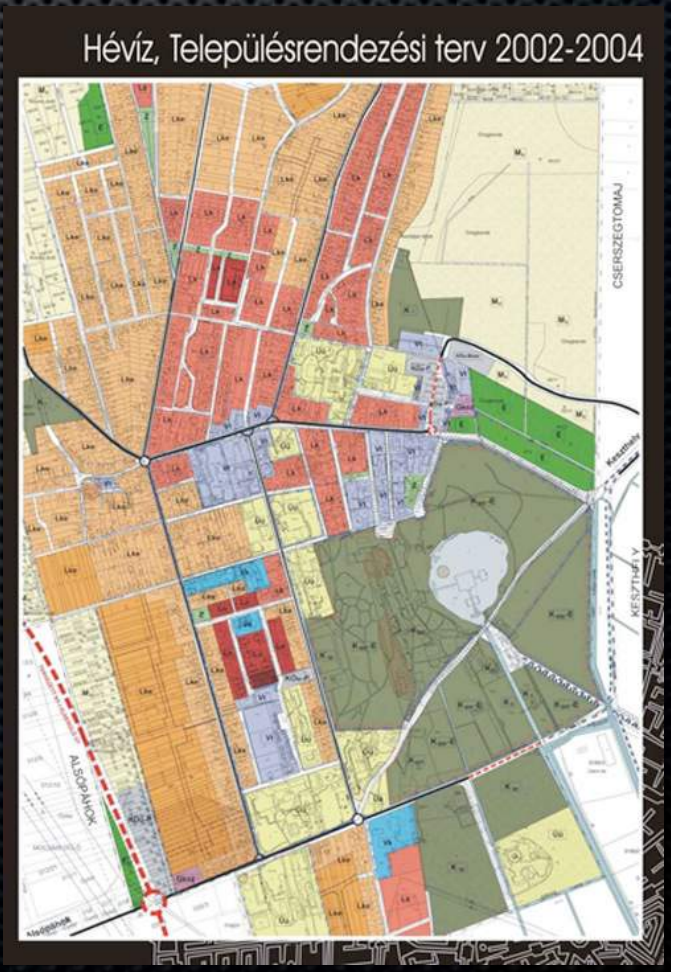
The Hannover Principles should be seen as a living document committed to the transformation and growth in the understanding of our interdependence with nature, so that they may adapt as our knowledge of the world evolves.

- Design considerations
- - LAND DEVELOPMENT

  - necessary area for agriculture and recuperation
  - reduction the need of transportation
  - alternative energy sources (natural, sun, bio)



- Design considerations
- - LAND DEVELOPMENT
- - URBAN DESIGN
  - bio active areas
  - minimum transportation
  - reduction of energy and water consumption
  - wastewater recirculation
  - garbage recycling



- Design considerations
- - LAND DEVELOPMENT
- - URBAN DESIGN
- - RATIONAL PROGRAM
  - not larger than needed
  - flexible
  - rational durability

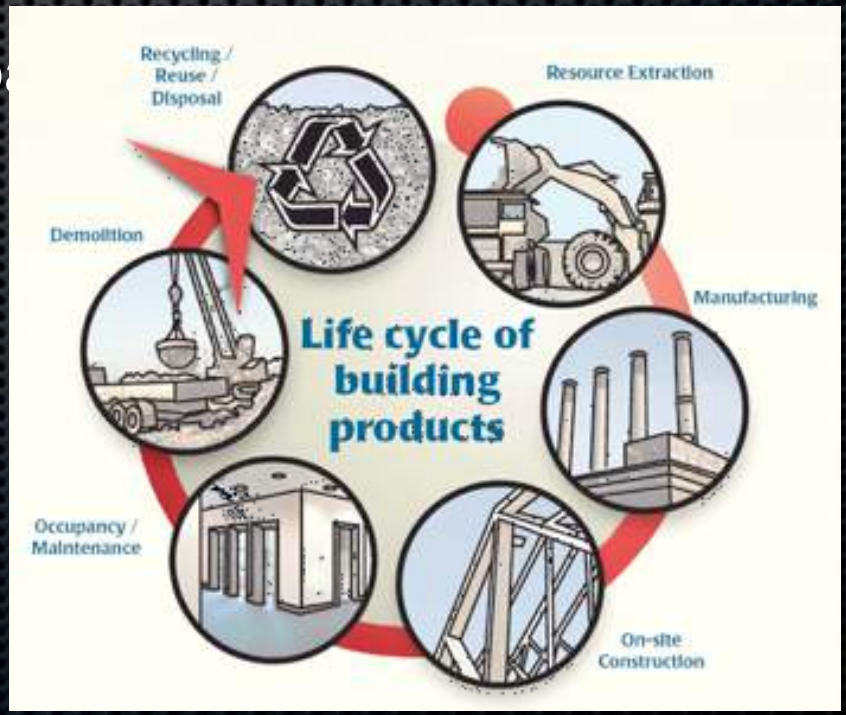
- Design considerations
- - LAND DEVELOPMENT
- - URBAN DESIGN
- - BUILDING PLACEMENT

- orientation
- morphology (transportation, lifting)
  - vertical placement - earth sheltering
- environmental effects:
  - noise
  - view
  - trees
  - light
- wind
- traffic connection
- infrastructure connection

- Design considerations
- - LAND DEVELOPMENT
- - URBAN DESIGN
- - BUILDING PLACEMENT
- - RATIONAL PROGRAM
- - RESPONSIBILITY OF CHOICE OF BUILDING MATERIALS

Environmental and human health impa
materials during their:

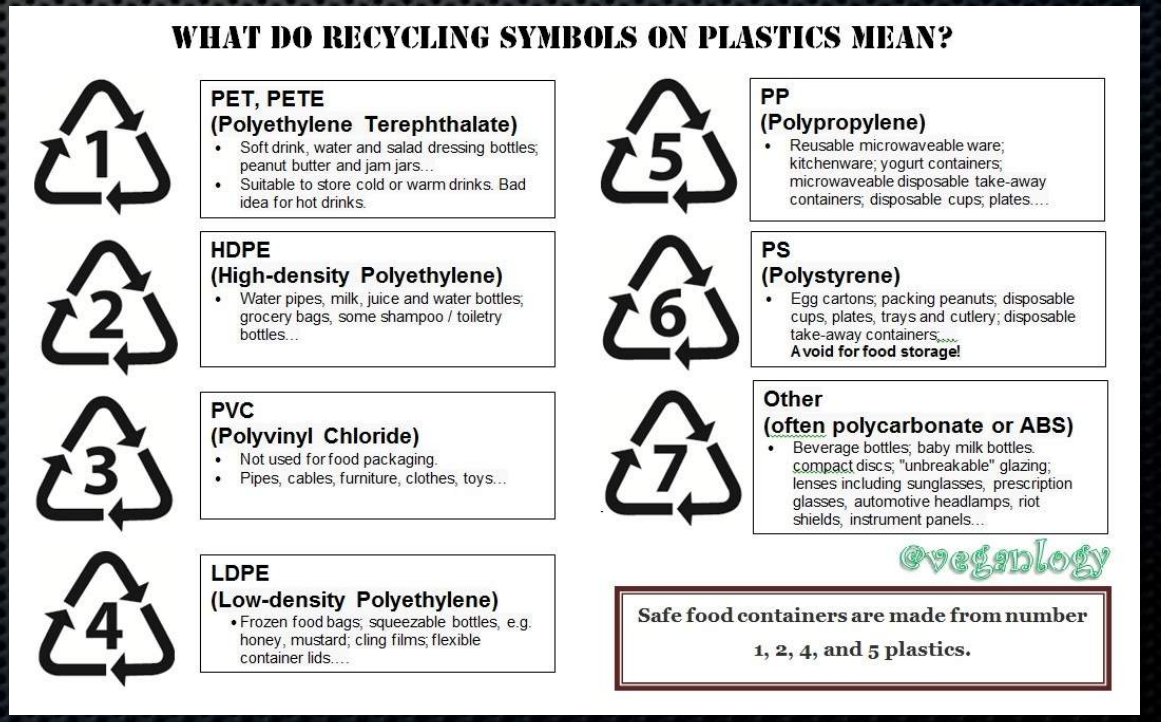
- manufacture
- transport
- installation
- use
- disposal
- recycling capacity



- Design considerations
- - RESPONSIBILITY OF CHOICE OF BUILDING MATERIALS

Environmental and human health impact of construction materials during their:

- recycling capacity



- Design considerations
- - LAND DEVELOPMENT
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- - RESPONSIBILITY OF CHOICE OF BUILDING MATERIALS

according to

EMBODIED ENERGY

"EMERGY"

Table 1. Embodied energy for new construction by building type

New Building Construction 1967 Input/Output 399 Level	Btu/sq. ft.
Residential – 1 family	702,047
Residential – 2-4 family	625,050
Residential – Garden apt	648,445
Residential – High rise	735,978
Residential – Alter and addn.	-
Hotel/Motel	1,128,655
Dormitories	1,430,724
Industrial buildings	972,551
Office buildings	1,641,748
Warehouses	558,432
Garages/Service stations	771,489
Stores/Restaurants	941,353
Religious buildings	1,257,766
Educational	1,386,046
Hospital buildings	1,722,200
Other non-farm buildings	1,449,216
a. Amusement, social and rec.	1,379,793
b. Misc. non-residential bldg	1,101,991
c. Laboratories	2,074,056
d. Libraries, museums, etc.	1,743,588
Farm residences	554,703
Farm service	149,071

Data from *Energy Use for Building Construction.*

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Embodied energy for common building materials
PER embodied energy MJ/kg

Kiln dried sawn softwood	3.4
Kiln dried sawn hardwood	2.0
Air dried sawn hardwood	0.5
Hardboard	24.2
Particleboard	8.0
MDF (medium density fibreboard)	11.3
Plywood	10.4
Glue-laminated timber	11.0
Laminated veneer lumber	11.0
Plastics — general	90.0
PVC (polyvinyl chloride)	80.0
Synthetic rubber	110.0
Acrylic paint	61.5
Stabilised earth	0.7
Imported dimensioned granite	13.9
Local dimensioned granite	5.9
Gypsum plaster	2.9
Plasterboard	4.4
Fibre cement	4.8*
Cement	5.6
In situ concrete	1.9
Precast steam-cured concrete	2.0
Precast tilt-up concrete	1.9
Clay bricks	2.5
Concrete blocks	1.5
Autoclaved aerated concrete (AAC)	3.6
Glass	12.7
Aluminium	170.0
Copper	100.0
Galvanised steel	38.0

alternative materials:

- adobe
- rammed earth
- straw
- wood

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- adobe
- rammed earth
- straw
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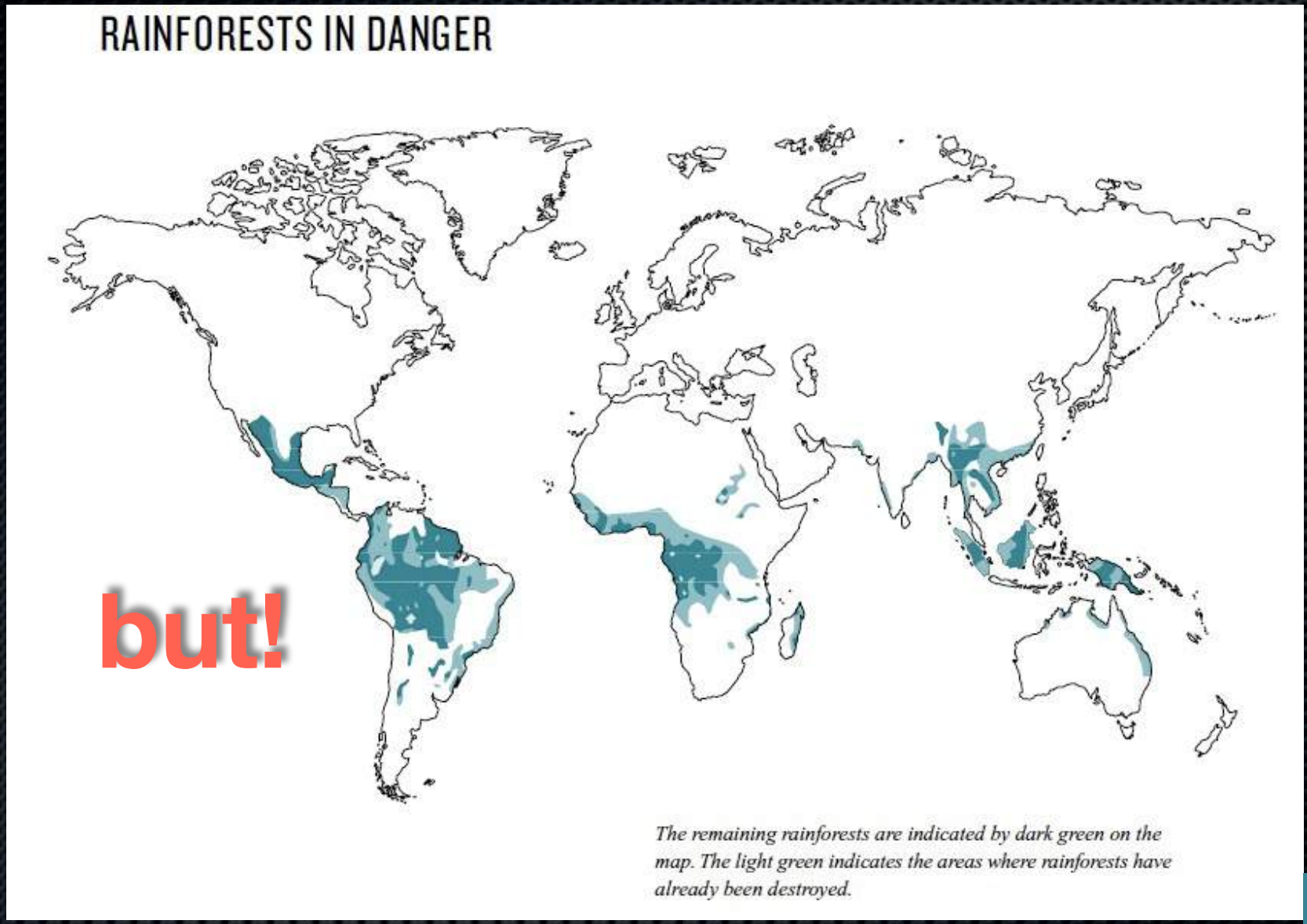
alternative materials:

- adobe
- stabilised rammed earth - SRE
- straw
- wood

Boltshauser Architekten
Family house, Schlins A

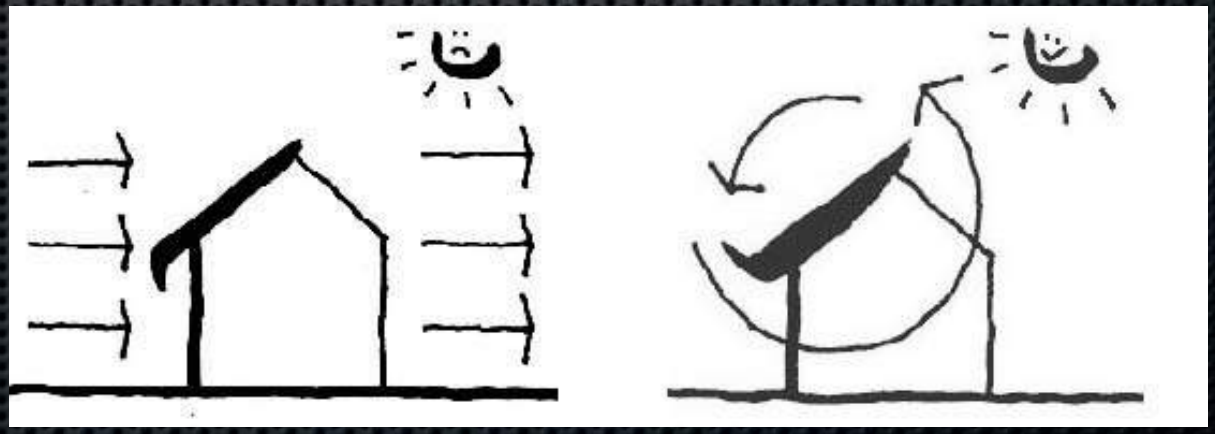
alternative materials:

- adobe
- rammed earth
- straw
- wood
- bamboo



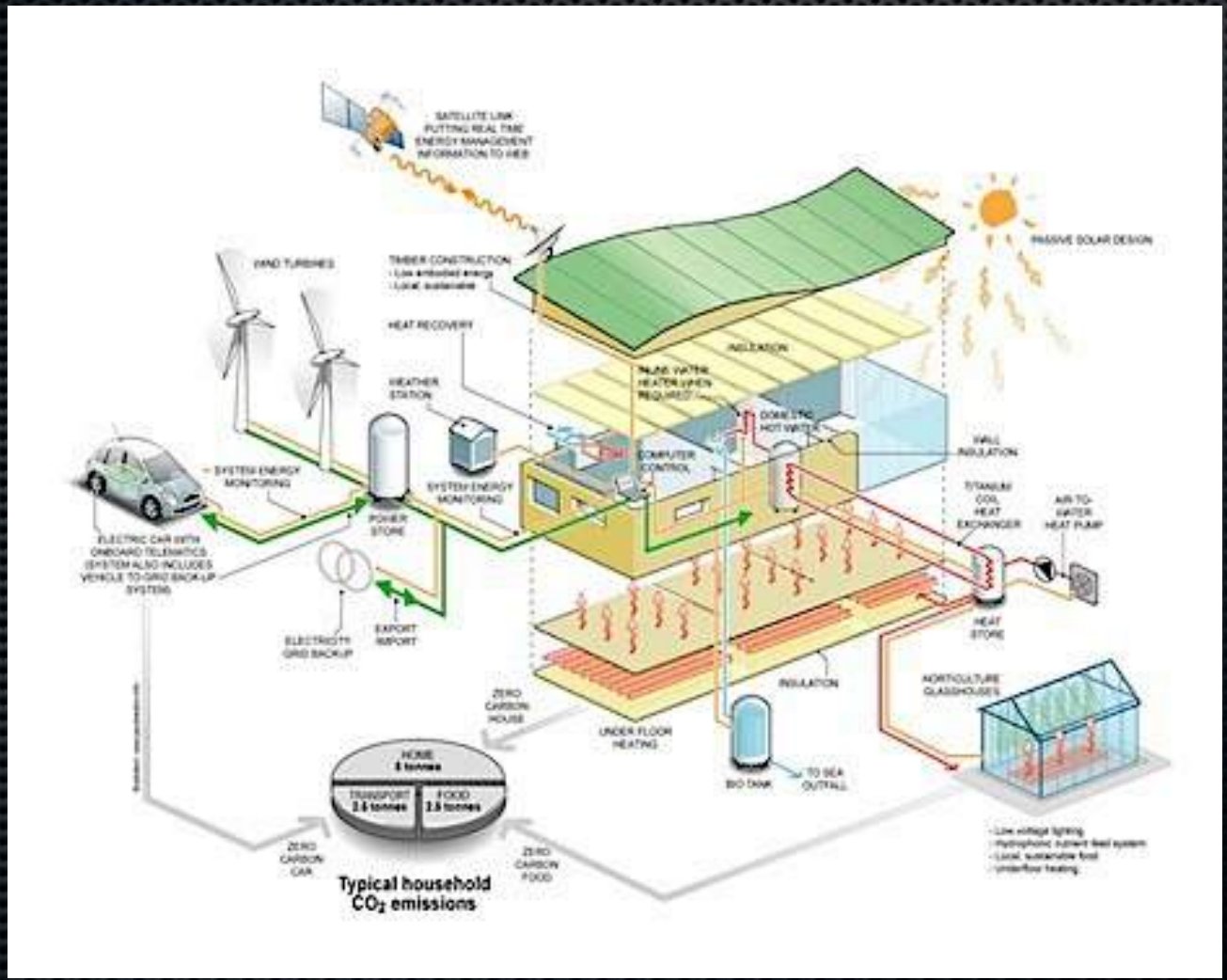
- wood - check the source!
look for sign of FSC - Forest Stewardship Council

- Design considerations
- - LAND DEVELOPMENT
- - URBAN DESIGN
- - RATIONAL PROGRAM
- - BUILDING PLACEMENT
- - RESPONSIBILITY OF CHOICE OF BUILDING MATERIALS
- - RESPONSIBILITY OF CHOICE OF BUILDING SYSTEMS
  (heating, cooling, ventilation, water, drainage, electricity)



instead of linear system (re)circular one is preferred

- Design considerations
- - RESPONSIBILITY OF CHOICE OF BUILDING SYSTEMS
  (heating, cooling, ventilation, water, drainage, electricity)



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- - RESPONSIBILITY OF CHOICE OF BUILDING MATERIALS
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- - LIFE CYCLE APPROACH
  - to stand against fashionable trends
  - to check the program (is everything necessary?)
  - size!!!
  - durability of materials and systems
  - life-cycle calculations
    (investment+maintenance+operation + renewal+removal)

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- FLAK tower, Hamburg 1944.

- Design considerations
- - INNOVATION
  - experimental projects
  - education

- Workshop in Horsens for students 2015.

HARMONY

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Fabrizio CAROLA
Kaedi Hospital, Mauritania

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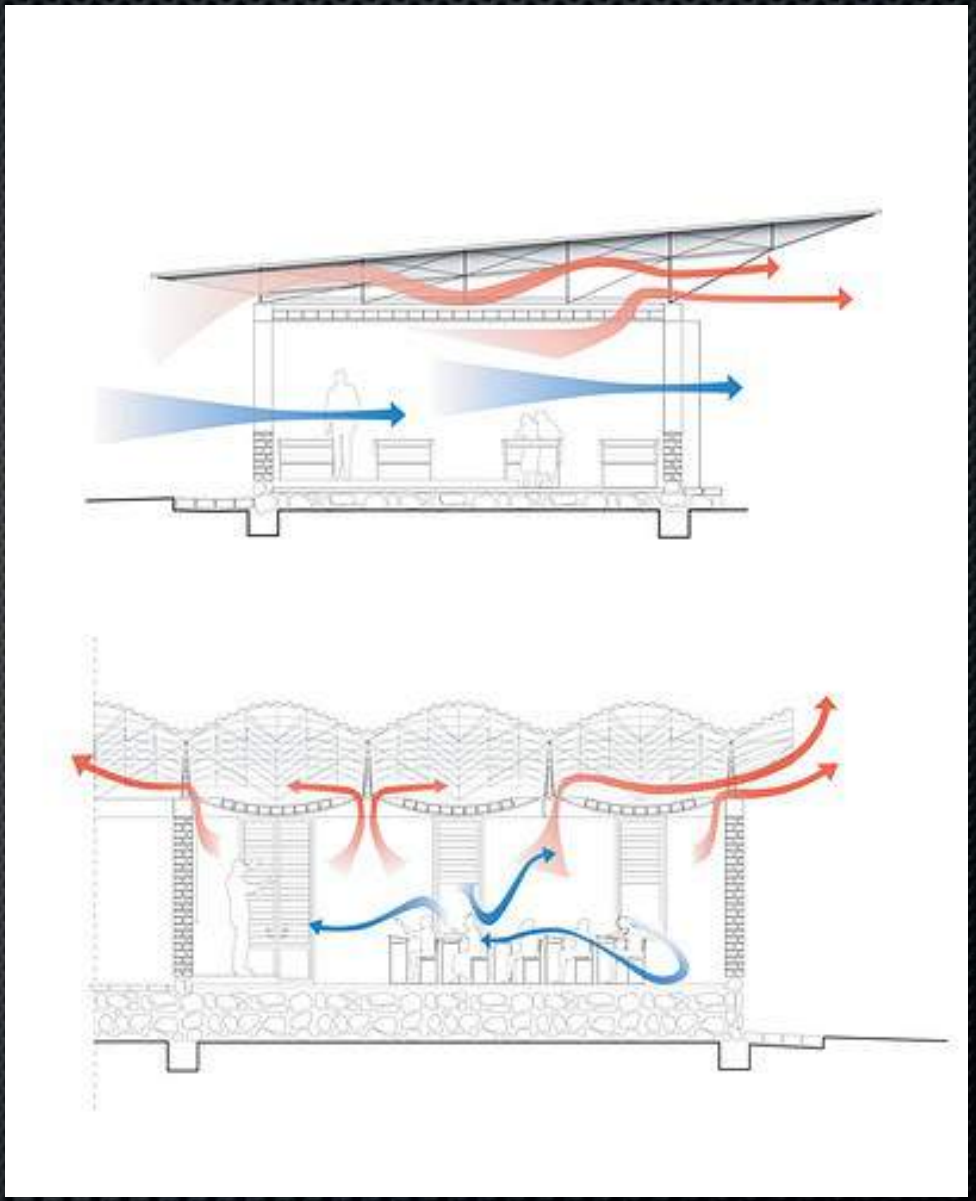

HARMONY

Diabédo Francis KÉRÉ
Gando school Burkina Fasso

HARMONY

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HARMONY

Anna HERINGER, Eike ROSWAG
School, Rudrapur, Bangladesh

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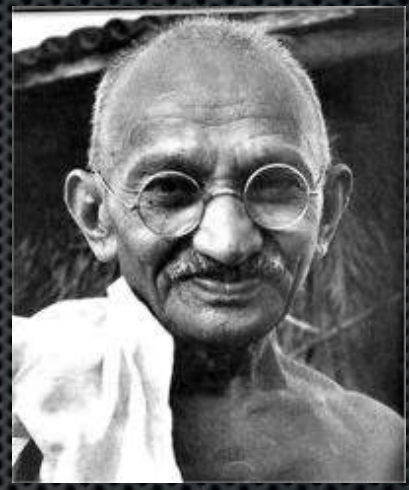

Quote for today:

“The Earth provides enough to satisfy every man’s needs, but not every man’s greed.”

Mahatma GANDHI