OVERSHOOT

System Design & Practice in Aid of Urban Crises

Master Project

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International Master of Architecture
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KU LEUVEN
faculty of
architecture

Overshoot is a systemic issue.

Over the past century-and-a-half, enormous amounts of cheap energy from fossil fuels enabled the rapid growth of resource extraction, manufacturing, and consumption; and these in turn led to population increase, pollution, and loss of natural habitat and hence biodiversity.

The human system expanded dramatically overshooting Earth's long-term carrying capacity for humans while upsetting the ecological systems we depend on for our survival.
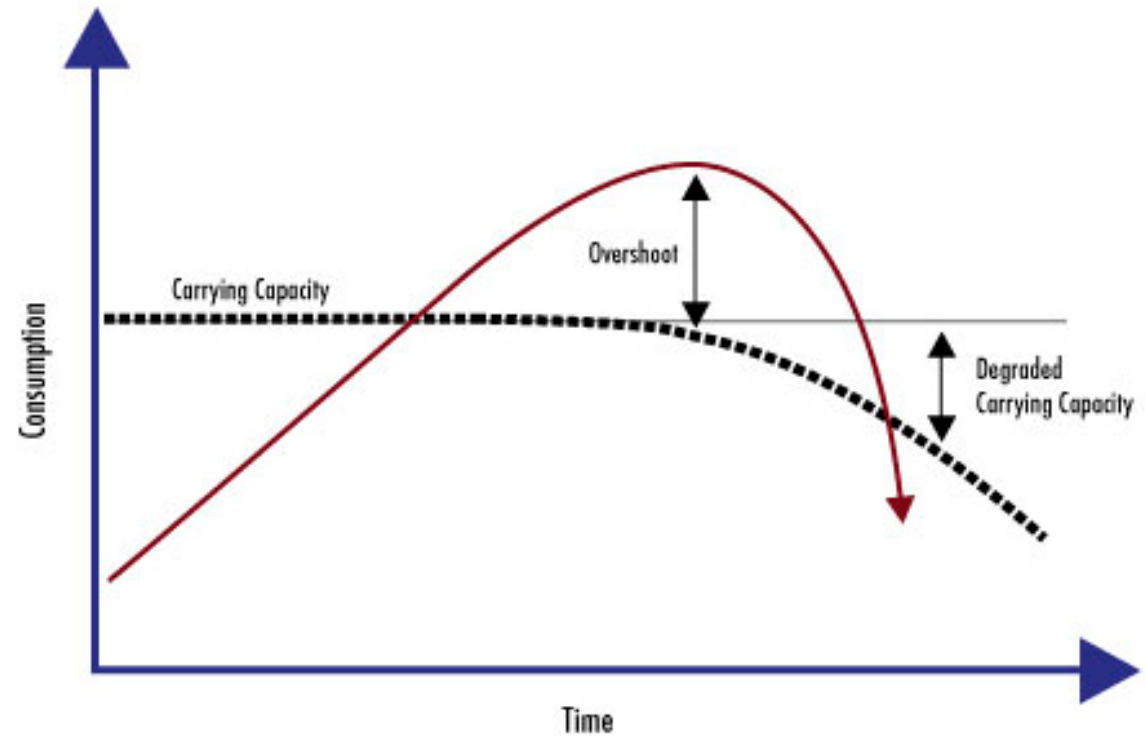
R.Heinberg, August 17, 2017

Eco-systems under threat
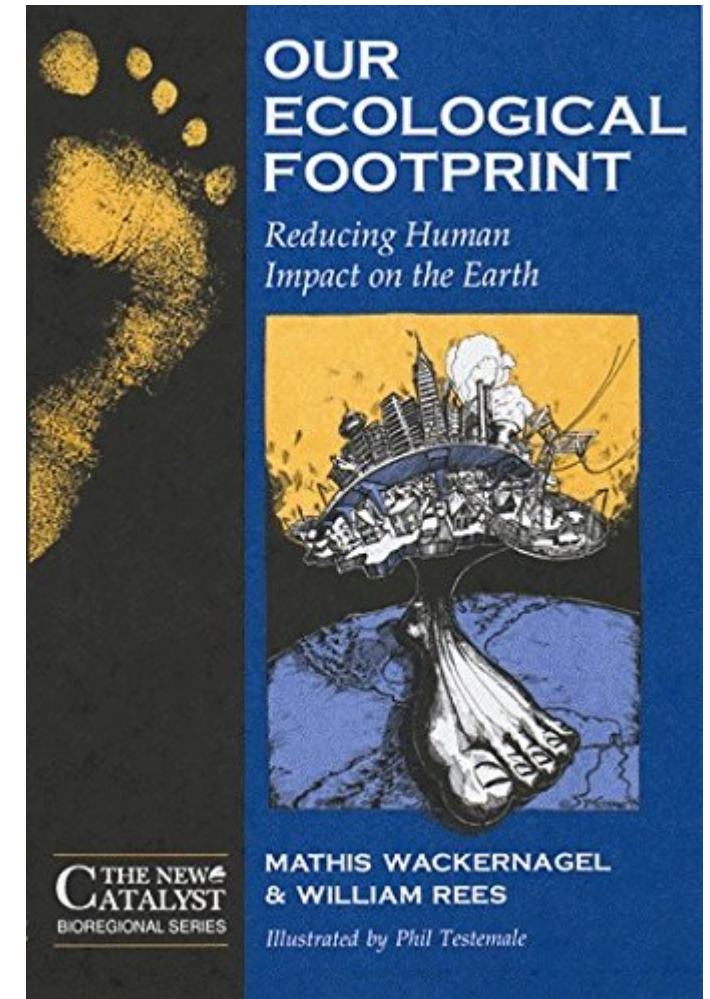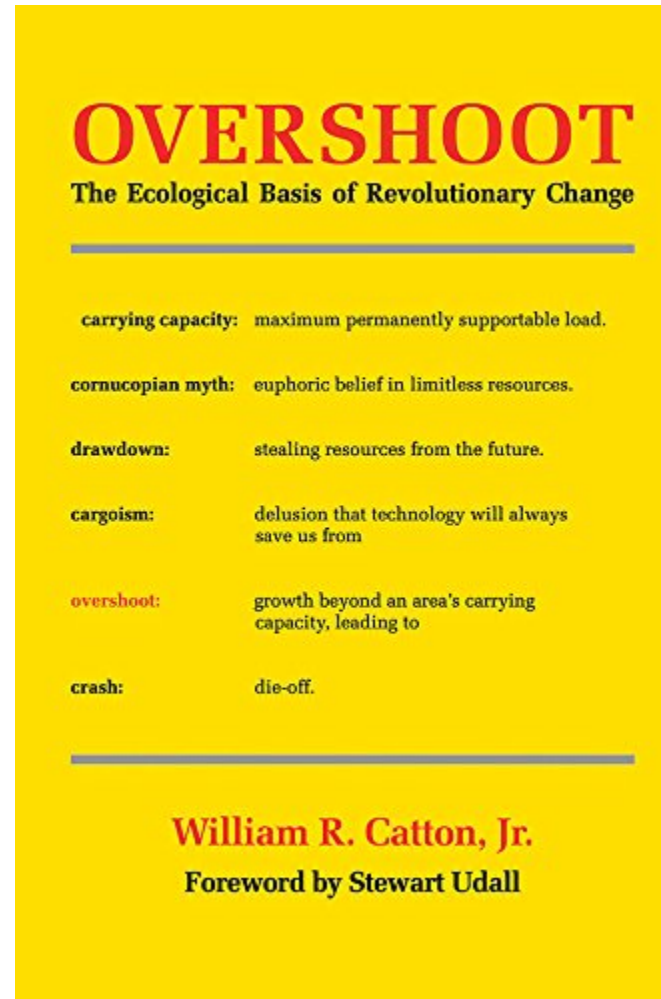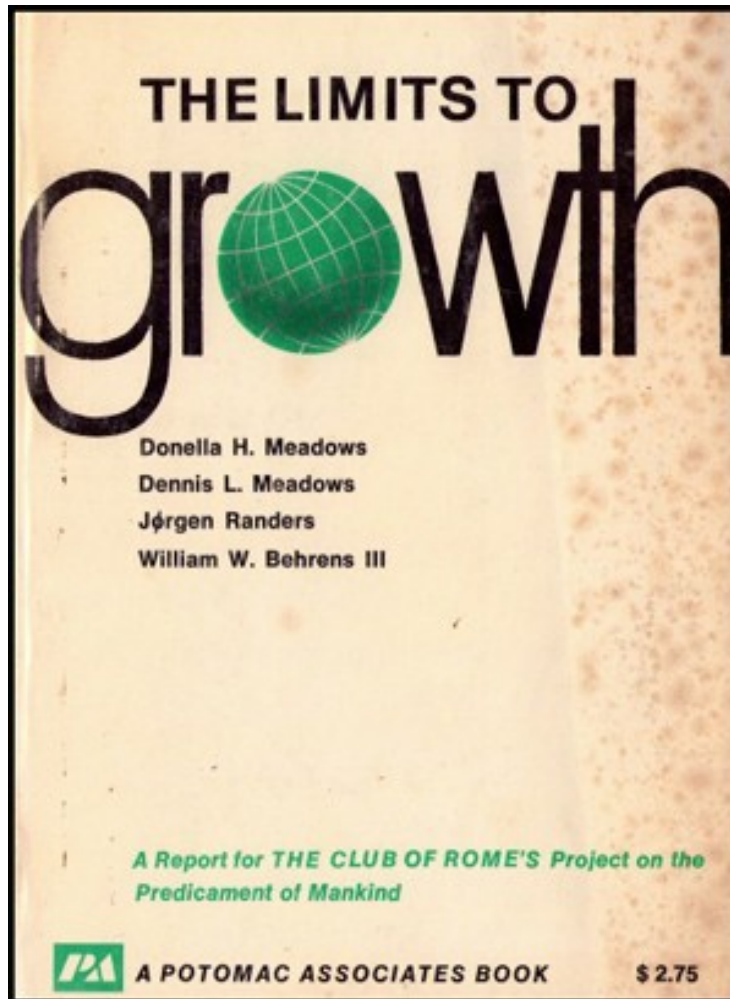
Overshoot

In ecology, "overshoot" occurs when a species exceeds the sustainable carrying capacity of its eco-system, as illustrated in this graphic

Source: W. Rees & M. Wackernagel (1996) *Our Ecological Footprint: Reducing Human Impact on the Earth, Gabriola Island,* BC: New Society Publishers

Urban Crises

By analogy with other **eco-systems**, all the systems of an urban habitat can be understood as **dynamically-complex adaptive systems:**

- They're made of many parts
- That interact with each other, with the system and beyond it
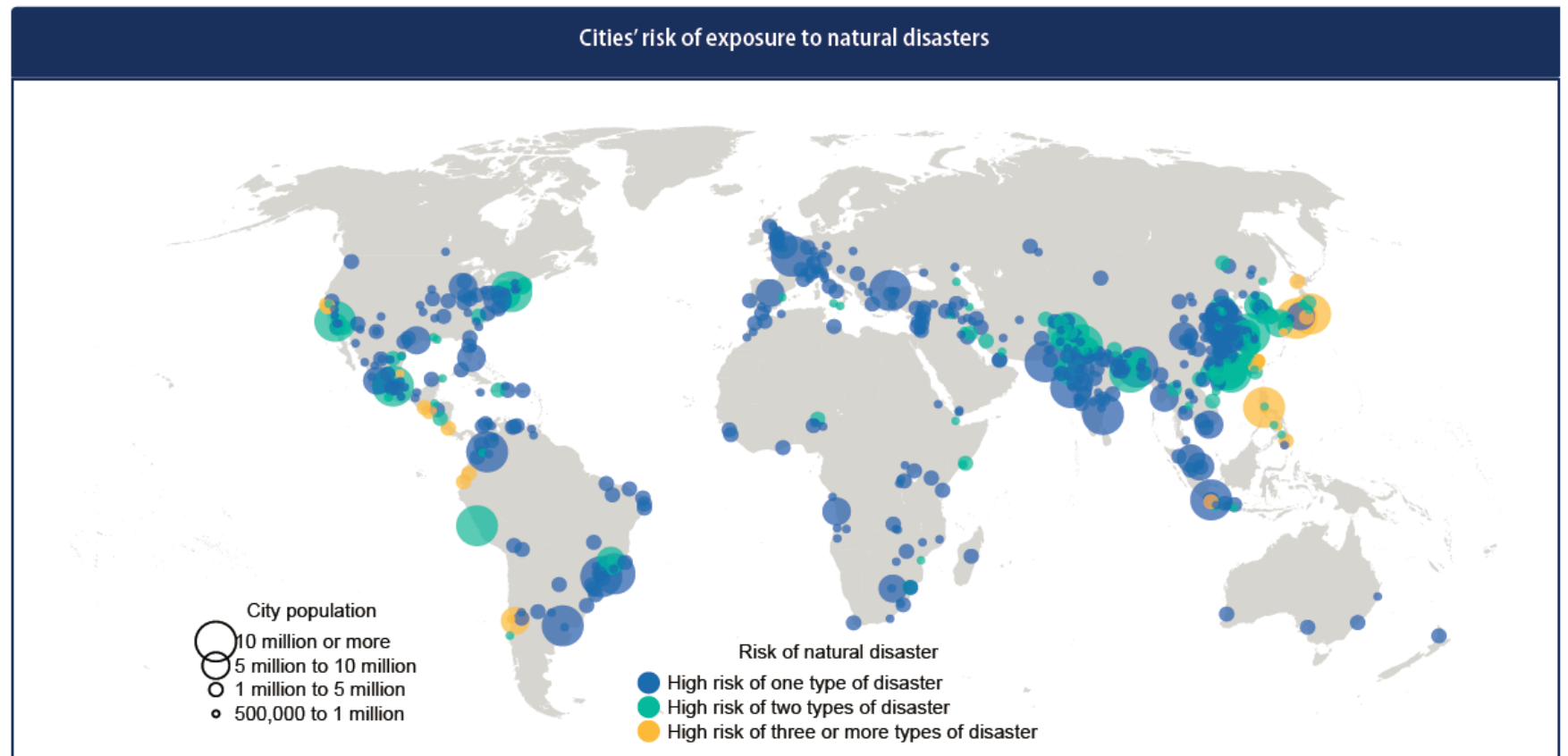- In ways that are conditioned by current and previous interactions

The behaviour of a dynamically-complex adaptive system emerges from the interactions among the parts, between the parts and the system as well as between the parts, the system and other systems beyond it.

Since these systems are highly connected and interdependent, **systems thinking** offers a way to understand urban crises and formulate **systemic responses & collaborative approaches** that help to mitigate or even prevent such crises.

Why Cities?

Many cities are vulnerable to at least one type of **natural disaster,** but most cities face **many other challenges**.

Cities' risk of exposure to natural disasters

City population
- 10 million or more
- 5 million to 10 million
- 1 million to 5 million
- 500,000 to 1 million

Risk of natural disaster
- High risk of one type of disaster
- High risk of two types of disaster
- High risk of three or more types of disaster
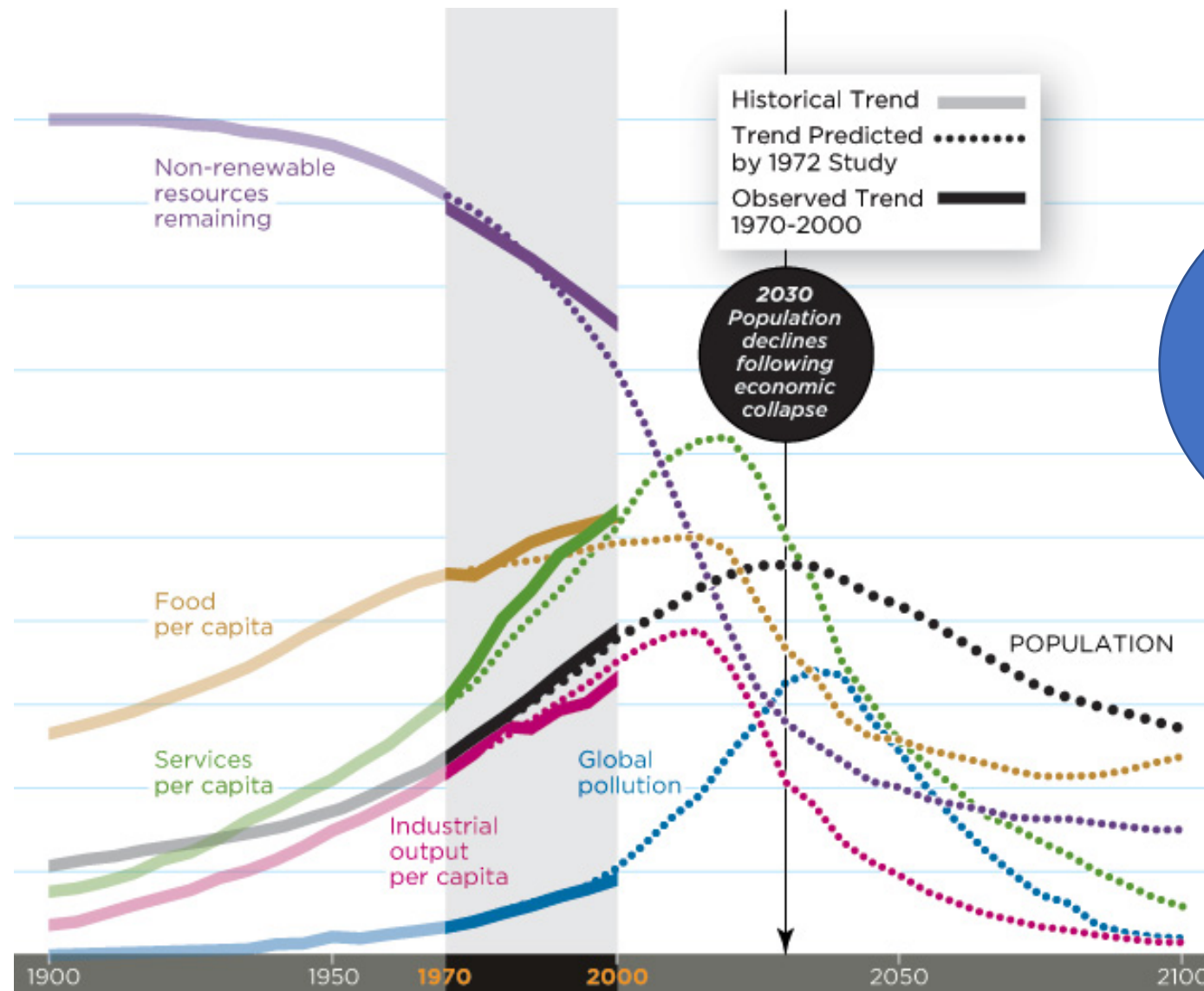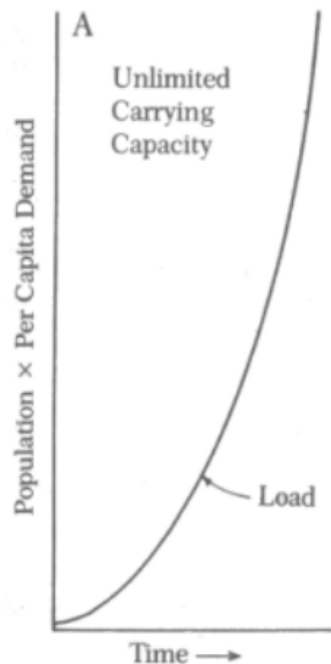
FOREST DESTRUCTION

The limits to growth revisited after 40+ years

COVID-19 enhanced threat of population decline & economic collapse

Reactions to the current situation

DENIAL
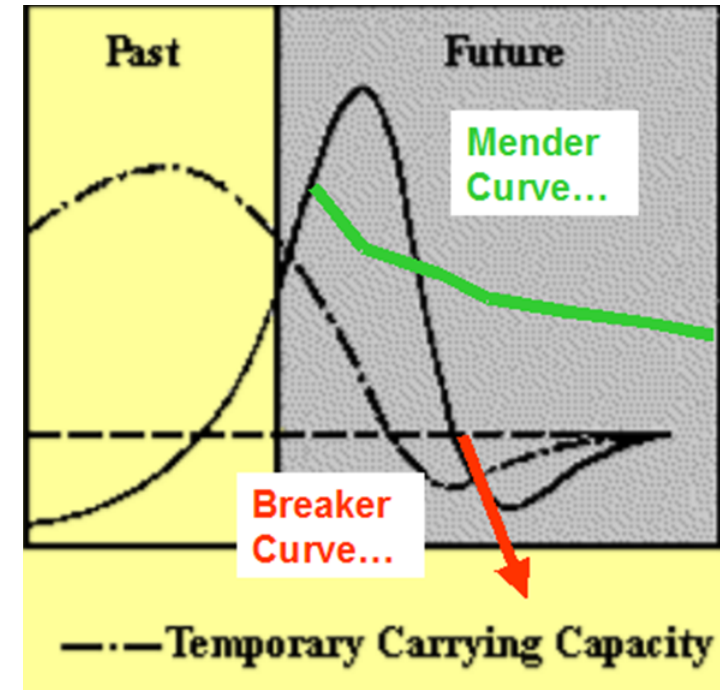The earth has the capacity to carry an ever expanding population.
We can grow forever!
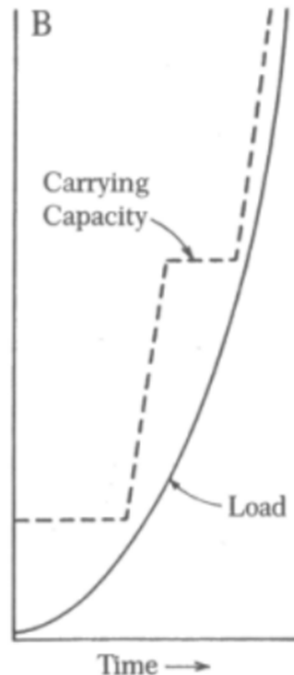
TECHNO-FIX
We will continue to expand "carrying capicity" through technology, thereby supporting an ever-expanding growth.
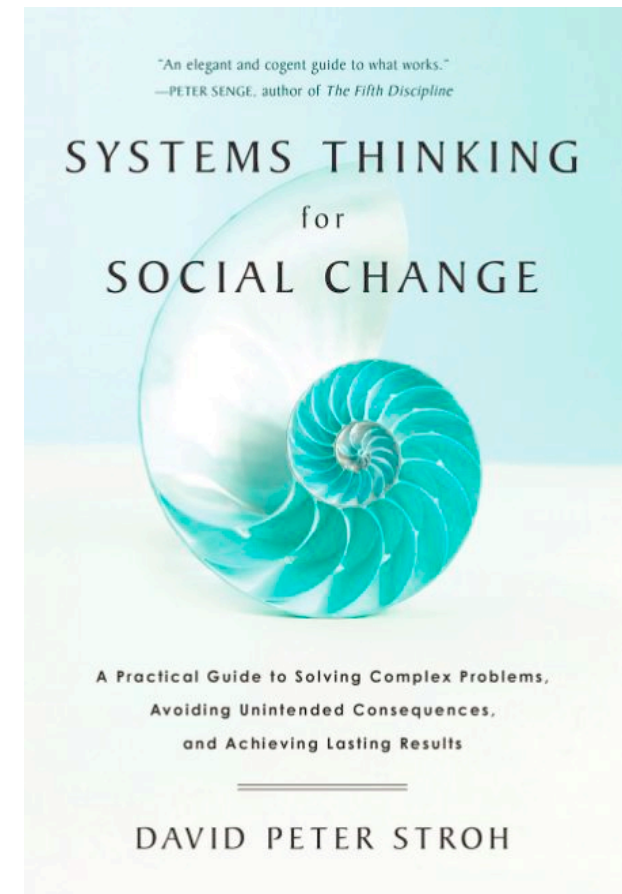**We can grow forever!**

MENDERS' APPROACH
We do not wait for the overshoot to happen but voluntarily scale back our life-styles.
We link up with eco-systems, building renewable carrying capacity!

DOUGHNUT ECONOMICS

THE *SUNDAY TIMES* BESTSELLER

DOUGHNUT ECONOMICS
Seven Ways to Think Like a 21st-Century Economist

KATE RAWORTH

'The John Maynard Keynes of the 21st century'
George Monbiot, *Guardian*

Thinking in Systems

A Primer

Donella H. Meadows

Edited by Diana Wright,
Sustainability Institute

"An elegant and cogent guide to what works."
—PETER SENGE, author of *The Fifth Discipline*

SYSTEMS THINKING
for
SOCIAL CHANGE

A Practical Guide to Solving Complex Problems,
Avoiding Unintended Consequences,
and Achieving Lasting Results

DAVID PETER STROH

Systems thinking

Systems thinking involves an understanding of a system by **examining the linkages and interactions between the components** that comprise the entirety of that system, as well as perceives that same **system as an interactive component of something bigger than itself**.
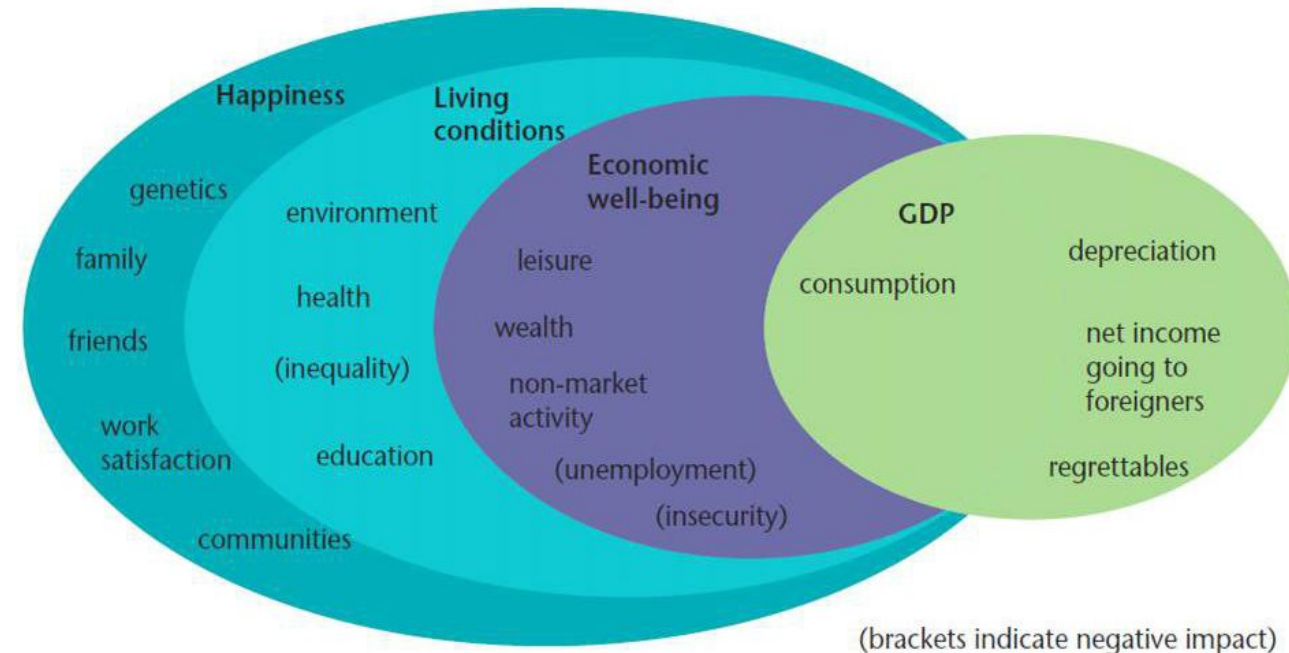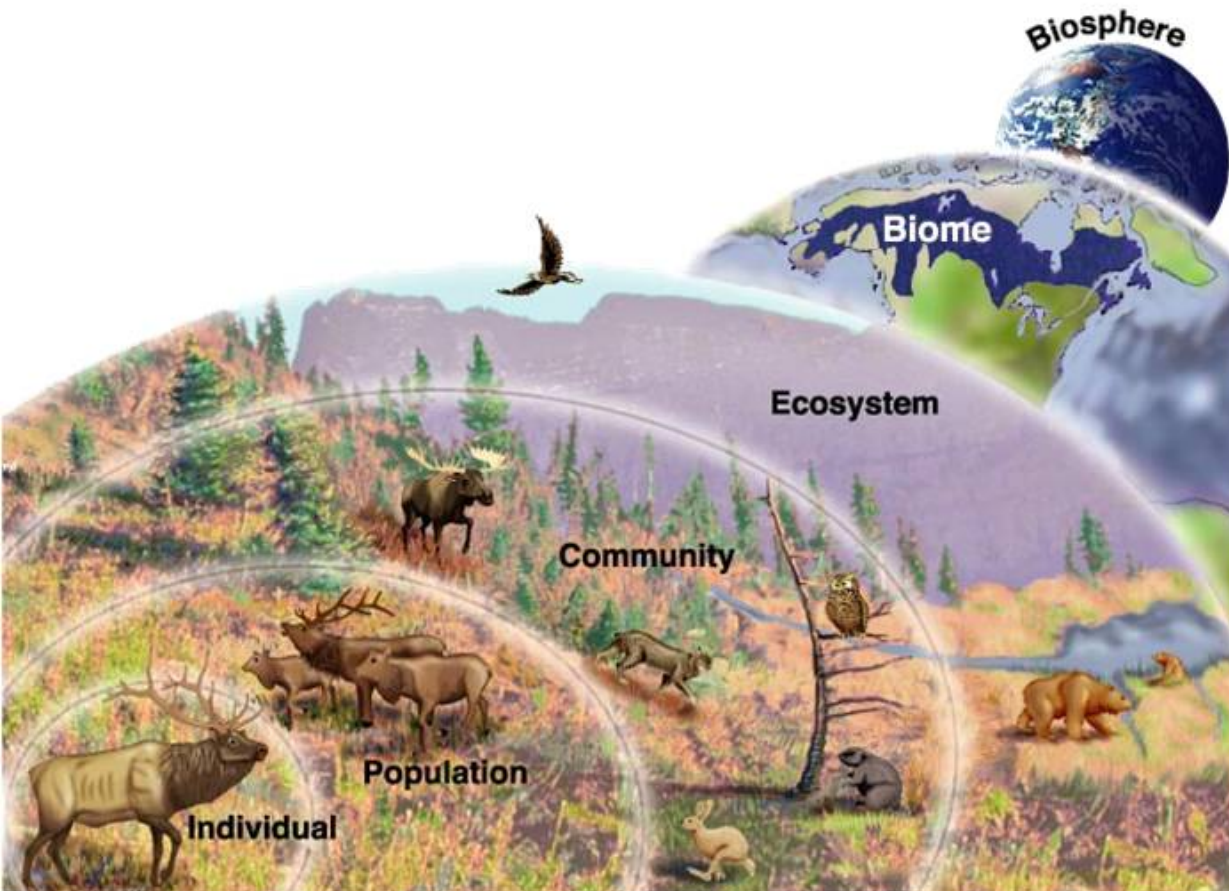
Systems thinking for urban crises

The menders' approach values the importance of systems thinking. It **seeks systemic responses and collaborative approaches** that help systems to transform simultaneously without losing sight of the user experience.

Cities are ideal grounds for pitching menders' approaches !
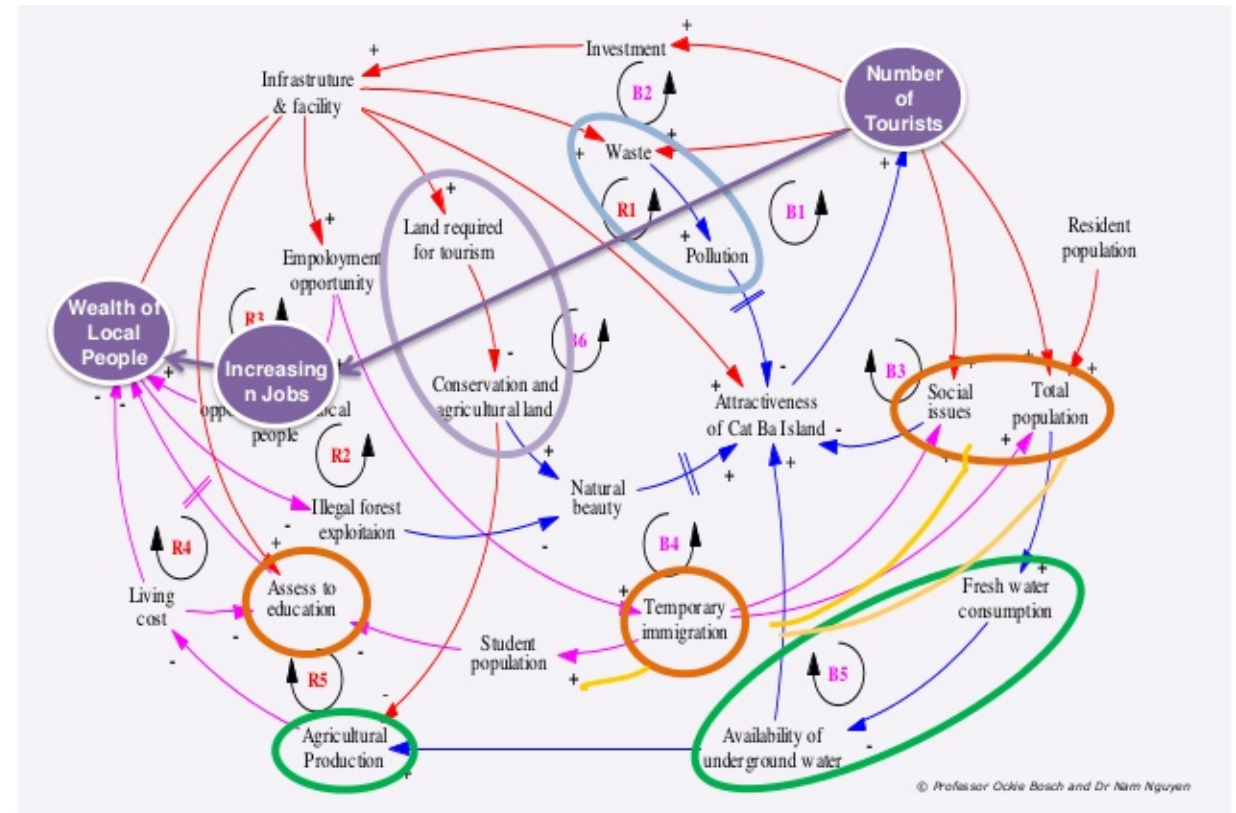
Source: Richard L. Daft(2008) The Leadership Experience. p. 141.
Source: https://www.slideshare.net/Think2Impact/module-1-introduction-to-systems-thinking

Systemic approaches

Reverse negative connotations associated with cities by making the most of following approaches.

Innovative Cities

Eco-cities

GLOBAL CITIES

Resilient Cities

INCLUSIVE CITIES

Canvas Cities

Smart Cities

Circular Cities

Healthy Cities

Solar Cities

World Cities

START-UP CITIES

Systemic approaches

Enhancing Urban Resilience
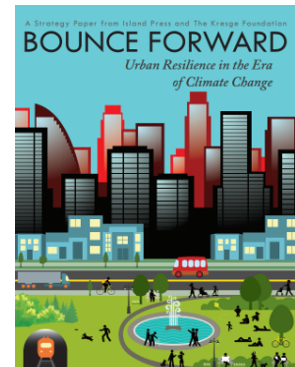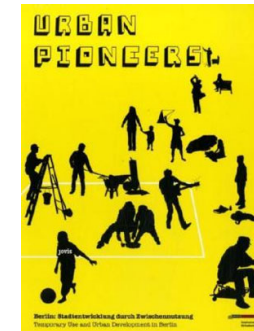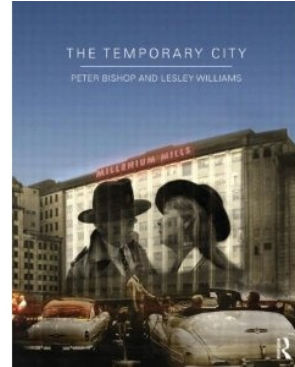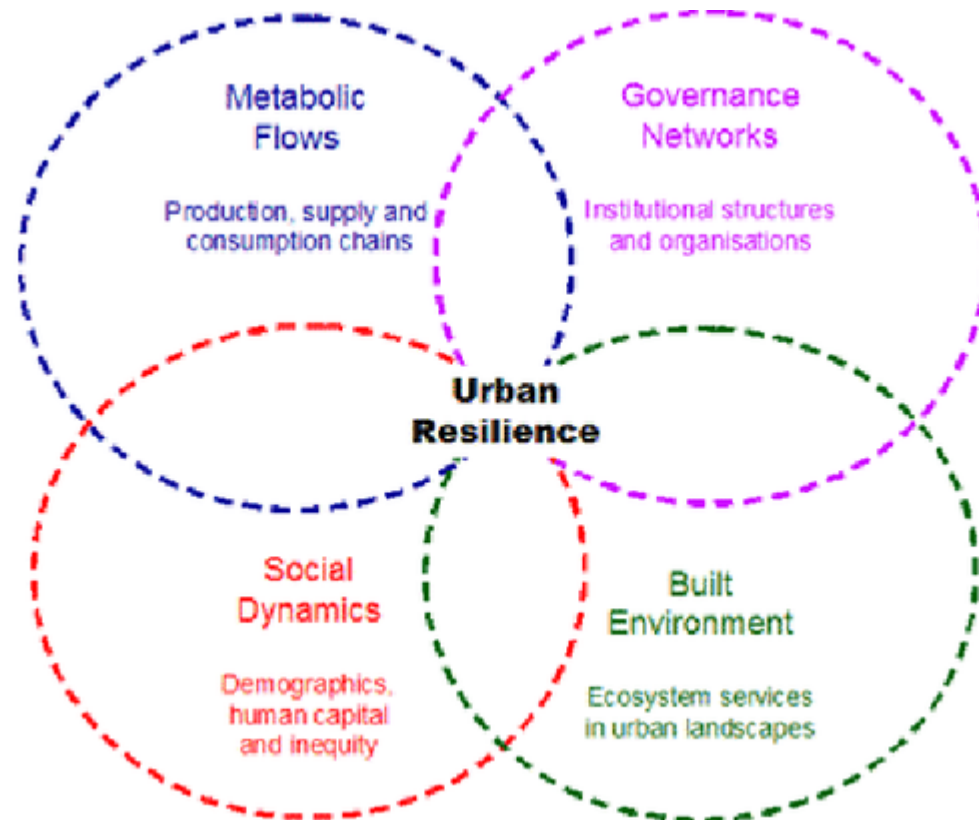
Systemic approaches: the city as a system

Mending **metabolic flows**
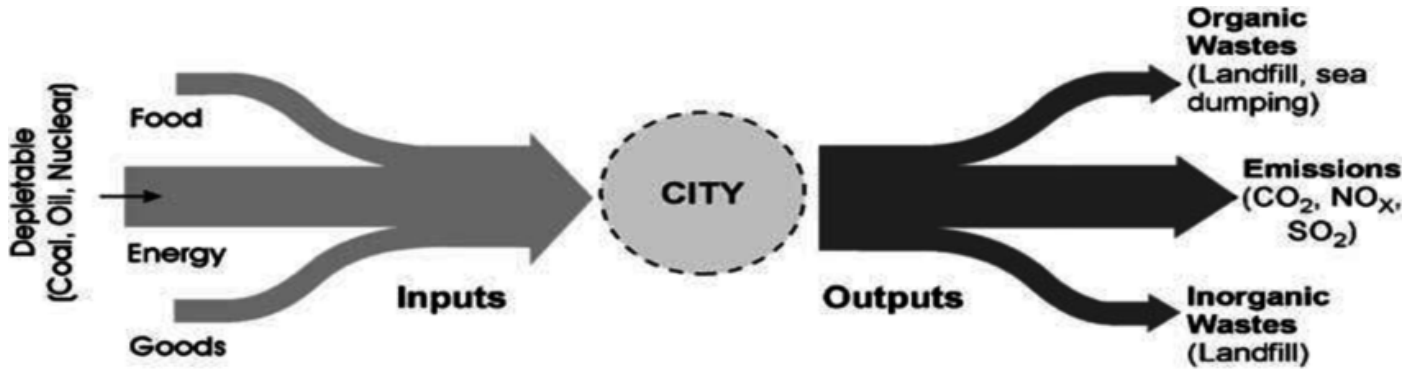
(a) 'Linear metabolism' cities (consume and pollute at a high rate)
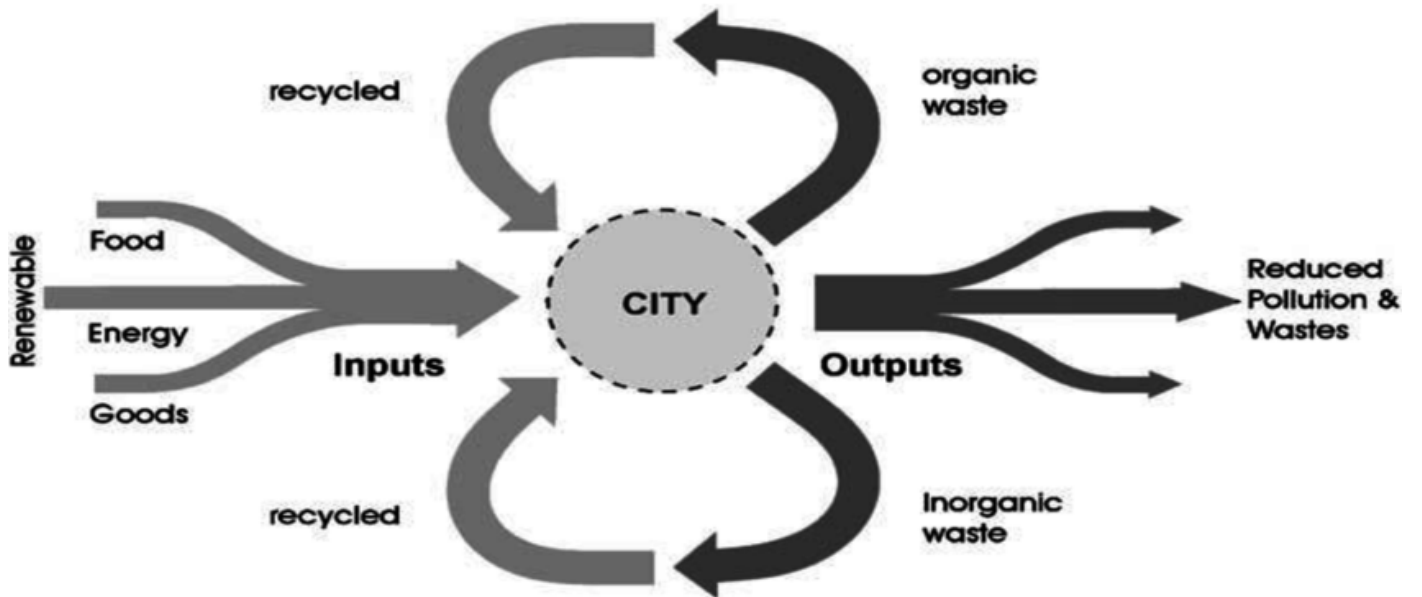
(b) 'Circular metabolism' cities (minimise new inputs and maximise recycling)

Systemic approaches

Promoting policies and initiatives in support of **circular economy**

Systemic approaches

Reducing vulnerabilities and enhancing social resilience by encouraging **mutual support systems**
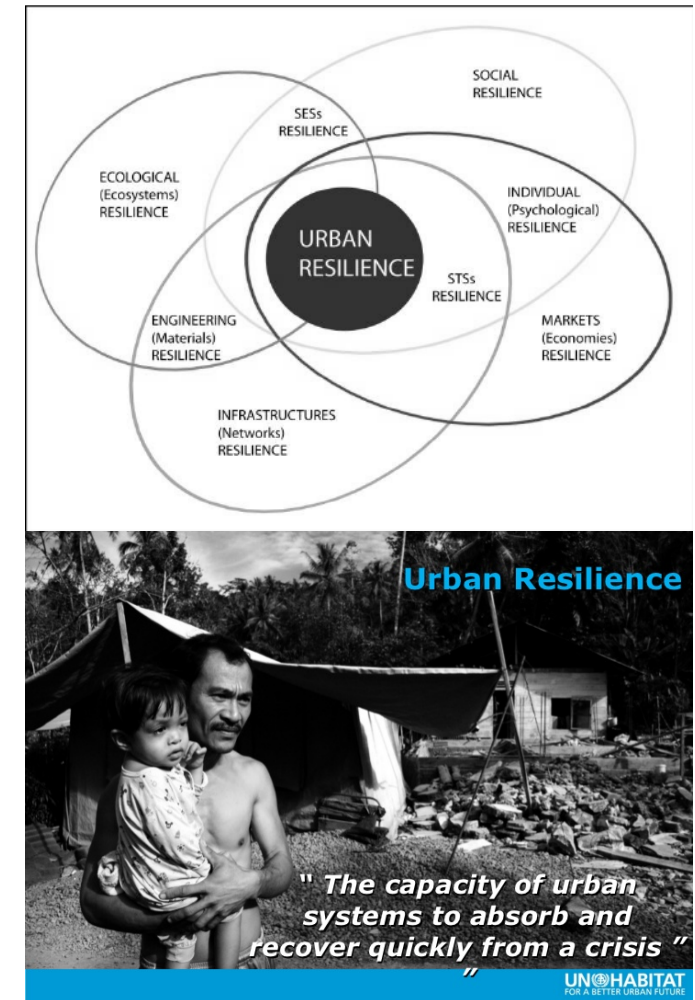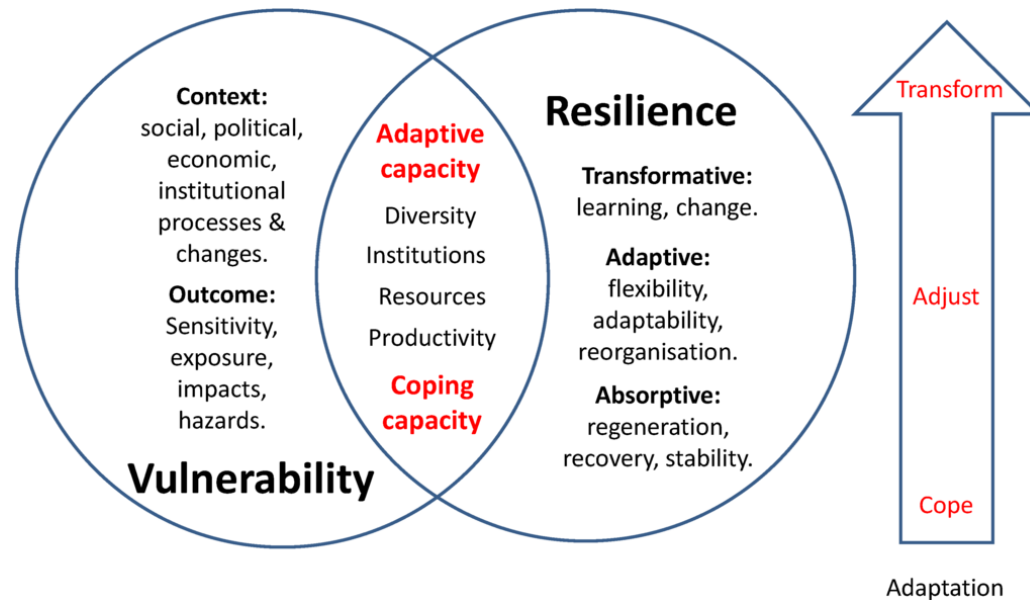
Systemic approaches

Encouraging **environmental concern and a humanitarian dimension** in architecture, urban planning and urban design.
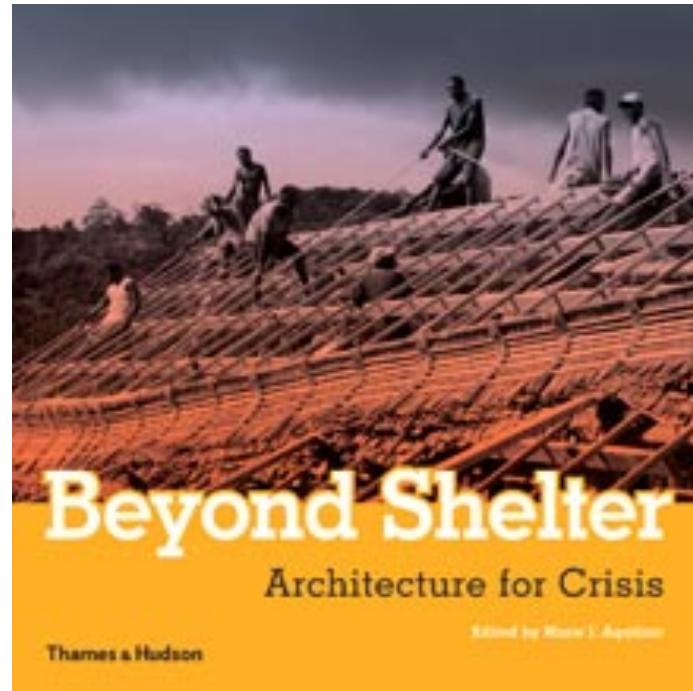
Beyond Shelter
Architecture for Crisis
Edited by Marie J. Aquilino

Beyond Shelter features 25 generously illustrated reports from all over the world. Written by the founders of some of the world's most provocative architecture and engineering firms, non-profit companies and research centres and leaders of such prominent organizations as the Red Cross, UN-Habitat and the World Wildlife Fund, they demonstrate that

evolving risk requires new ways of thinking, and that architects have a leading role to play.

N.B.: "Architecture" in this context refers to a range of professionals specialised in spatial practices. Noteworthy is that a new generation of architects, planners, designers etc. is opting for humanitarian work

Modalities of the master dissertation

ELIGIBILITY

Candidates for this master projects need to be familiar with ecological thinking launched in the 1970s and have previous interest and/or experience in sustainable architecture and design and/or initiatives that promote circular economy and/or inclusiveness. They should have a keen interest to delve into recent literature on system thinking, system design and system practice and produce an output that takes systems thinking as a thematic entry point.

PROJECT CONTEXT, SCOPE & OUTPUT

Selected participants need to familiarize themselves with systems thinking, design and practice before they set the context and focus of their project.

- The **context** of their project should link up with the Faculty's on-going international projects / collaborations or proposed by the promotor in conjunction with the Faculty members / overseas counterparts engaged in that particular project (e.g. VLIR-UOS, int'l dev't organisations, etc.).

- The **scope** of the project should identify a well-delineated urban area or thematic matter where carrying capacity is endangered, analyze the situation as well as design remedial interventions through systems thinking, design and practice.

- The **expected output** will consist of a written thesis that complies with academic standards enhanced by drawings, diagrams, images, etc.

COLLABORATIONS

The master project is conducted in close collaboration with the Bualuang Research Fellowship "Design and Development for Urban Crises" at the **Thammasat Design School** in Bangkok (TH). Upon successful completion of the project, one student may be invited either for a short-term internship or a research assistantship in one of the organisations involved with this Fellowship.

Depending on the focus of their thesis, students may also have an opportunity to prepare and participate one of the **workshops/ summer schools** that are scheduled as part of the Fellowship or other collaborative engagements in the summer of 2021.

Tentative phasing of the master dissertation (See also: next slide).

Participants will work **in team with the academic promotor**, meeting ± every 2 weeks throughout the dissertation.

Throughout **semester 1**, participants will **work in a loose team formation** to familiarize themselves with systems thinking, design and practice. A write-up at the beginning and end of that exercise will coincide with the practical weeks so as to encourage interchange with that semester's studio practice. The semester's final write-up will serve as literature review for their dissertation.

Starting **from January 2021**, students will be encouraged to refine research questions and choose an **individual trajectory**, such as:

- register for a free 11 week online team course in system practice where they will elaborate a commonly held research interest with other adepts of systems practice from around the world.

- tie in as observers with any of the electives, courses, design studios, summer schools, or workshops of the Faculty and integrate that observation to their research interest

- link up with external NGOs, think tanks as they deem beneficial for their research interest (e.g.: collaborations in previous slide).

During **semester 2**, participants will **set out and pursue their individual trajectory** through 3 well-defined phases: (1) exploration of research & design goals; (2) elaboration of research & design goals; (3) wrap-up & outline of results and outputs. The totality of the trajectory will be submitted as a draft for revision at least two weeks before final submission.

The **expected output** will consist of a written thesis that links the literature study to the research interest pursued in the second semester. This end result needs to comply with academic standards enhanced by drawings, diagrams, images, etc.

KU LEUVEN CALENDAR - ACADEMIC YEAR 2020-2021 CAMPUS SINT-LUCAS GHENT / BRUSSELS

1st semester

	14/9-18/9	21/9-25/9	28/9-2/10	5/10-9/10	12/10-16/10	19/10-23/10	26/10-30/10	2/11-6/11	9/11-13/11	16/11-20/11	23/11-27/11	30/11-4/12	7/12-11/12	14/12-18/12	21/12-25/12	28/12-1/1	4/1-8/1	11/1-15/1	18/1-22/1	25/1-29/1	1/2-5/2
Calendar week	W 38	W 39	W 40	W 41	W 42	W 43	W 44	W 45	W 46	W 47	W 48	W 49	W 50	W 51	W 52	W 53	W 1	W 2	W 3	W 4	W 5
Semester week	W 0	W 1	W 2	W 3	W 4	W 5	W 6	W 7	W 8	W 9	W 10	W 11	W 12	W 13	Christmas break		W 14	W 15	W 16	W 17	W 18

Autumn Vacation Secundary School · Armistice · Christmas break Secundary School · Patronsaint's Day

Rows (programs): Ba AR & Ba IA: 1st fase; Ba AR & Ba IA: 2nd fase; Ba AR: 3rd fase; Ba IA: 3rd fase; Ma AR & Ma AR (int) & Ma SRP: 1st fase; Ma IA: 1st fase; Ma AR & Ma AR (int): 2nd fase; Ma SRP: 2nd fase

Activities 1st semester:
- Kick-start
- 1st exploration in literature / field & profess. experience
- 1st research design
- Literature review / field & profess. experience (repeated)
- Write-up Literature review / field & profess. experience
- Revision research design & dissertation outline
- Start-up
- Review Secundary Sources
- Fine-tuning research questions

2nd semester

	8/2-12/2	15/2-19/2	22/2-26/2	1/3-5/3	8/3-12/3	15/3-19/3	22/3-26/3	29/3-2/4	5/4-9/4	12/4-16/4	19/4-23/4	26/4-30/4	3/5-7/5	10/5-14/5	17/5-21/5	24/5-28/5	31/5-4/6	7/6-11/6	14/6-18/6	21/6-25/6
Calendar week	W 6	W 7	W 8	W 9	W 10	W 11	W 12	W 13	W 14	W 15	W 16	W 17	W 18	W 19	W 20	W 21	W 22	W 23	W 24	W 25
Semester week	W 1	W 2	W 3	W 4	W 5	W 6	W 7	W 8	Easter Break		W 9	W 10	W 11	W 12	W 13	W 14	W 15	W 16	W 17	W 18

Spring break Secundary School · Easter Monday · Easter Break Secundary School · Feast of the Ascension · Whit Monday · deliberation and proclamation week

Activities 2nd semester:
- revisid research design
- Exploration & try-out of research & design goals (repeated)
- final research design
- Elaboration research & design goals (repeated)
- Wrap-up & outline results & outputs (repeated)
- draft master disseratation
- Finalization master dissertation
- final disseratation
- Exploration
- Elaboration
- Wrap-up
- Finalization

subject to change

Caption

Normal schoolweek	Practical week (= week reserved for activities connected to lab-O or/and atelier OPO's)
Infosession Bachelors 1st fase / infosession ISP	Vacation
	Cramweek
Exams	Blanco week (= class-free week)
Jury B = Brussels, G = Ghent	Deliberations
Report	Feedback and proclamation