

A CHEER Platform for Realizing Agenda 2030

'Collaborative-Human-Ecological-Economics-Resources'

4th April 2019

Prof Peter Head CBE FEng FRSA

Chairman and Founder Resilience Brokers Ltd

@PeterHeadCBE

#Geo4SDGs

#GWF 2019

Introduction to Resilience Brokers and the Trust

- UK group to speed up and scale up transformative urban/rural development;
- Operates in space between private, public, knowledge and civil society sectors;
- Leading experts and tools for **integrated-systems** and **collaborative approach**. **Resilience.io**
In 2018 set up the Resilience Brokers Programme:
- Support financeable performance based PPP projects
- 40% reduction in infrastructure cost to deliver Agenda 2030
- Multi-hazard risk analysis
- Marketplace for solutions to support resilience

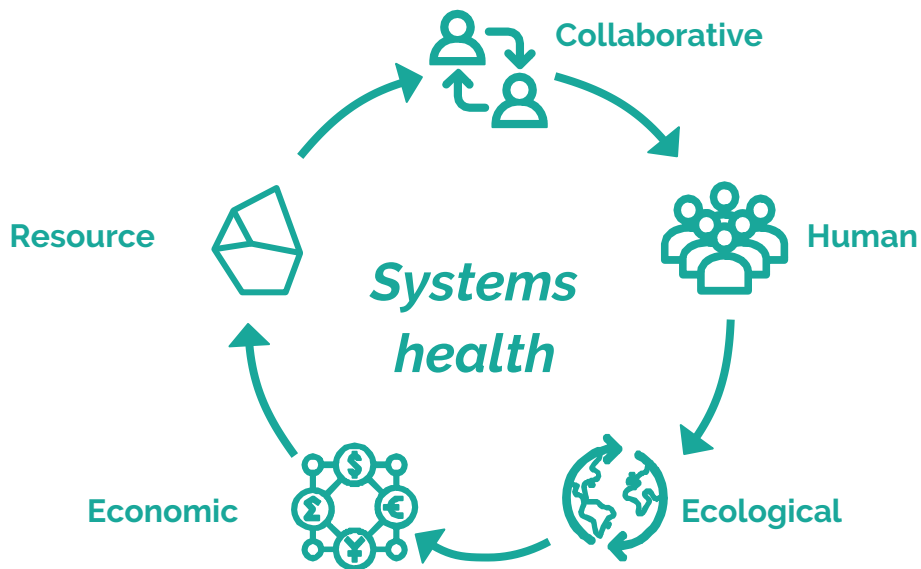


The CHEER systems-health approach

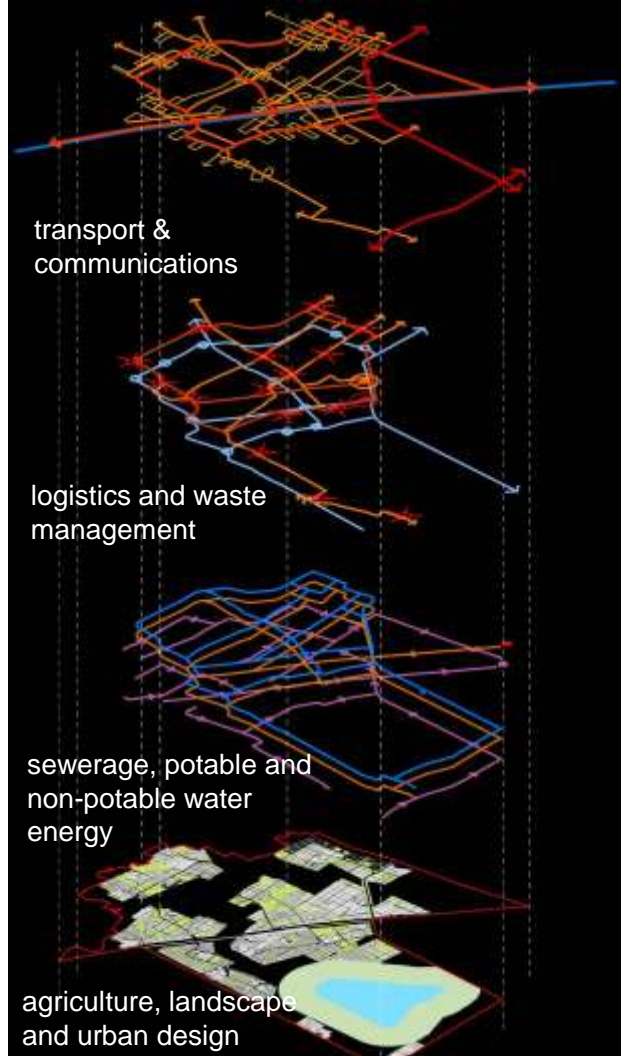
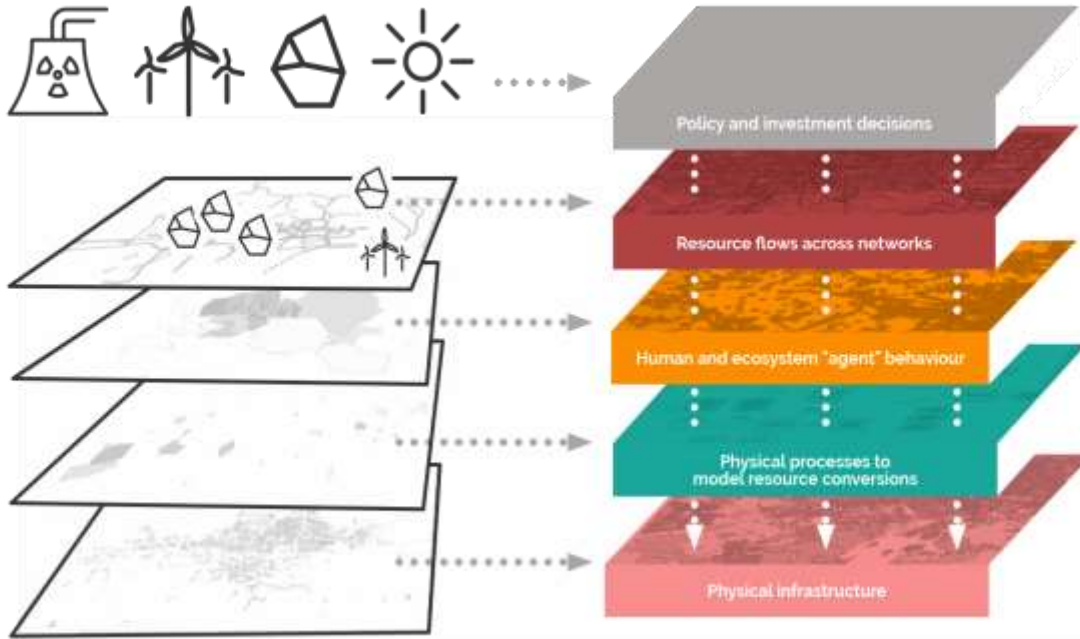
An approach that harnesses big data and scientific evidence to support local decision making by integrated modelling of:

- Social and natural systems and their interlinkages,
- Economics related to human wellbeing,
- The health of ecological systems.

The CHEER approach supports scalable solutions and the global deployment of leading technologies and innovative business models.



Integrated Infrastructures



Data brokering approach - a change in paradigm

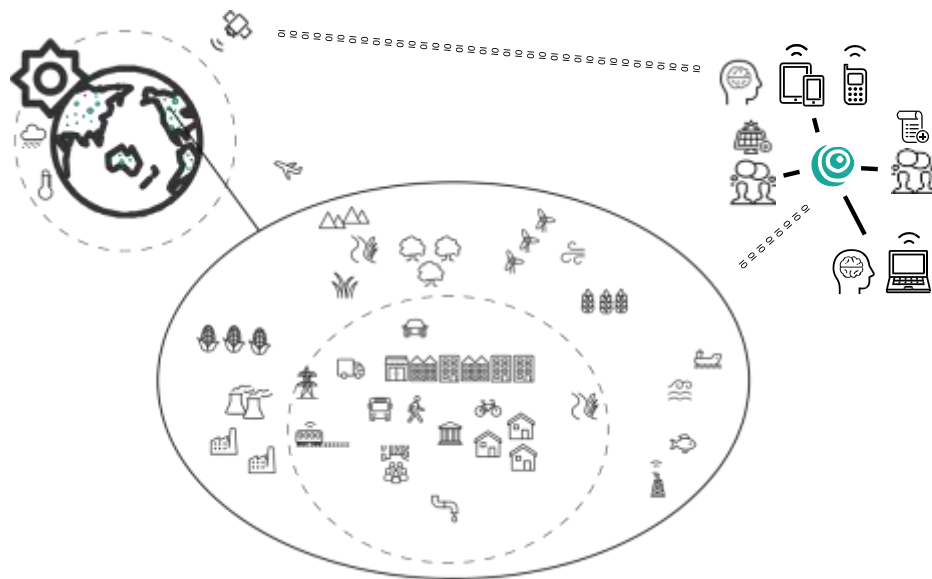
Interoperability through mediation

System of systems integration, linking complex and heterogeneous systems by building bridges between existing network platforms and systems infrastructures.

Geo-locate flows, infrastructure

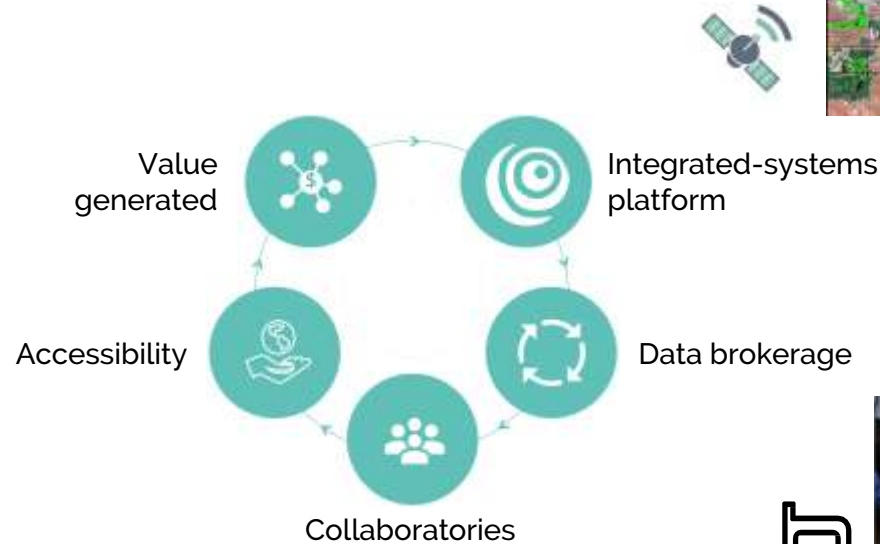
Data-brokering infrastructure enables access to and interoperability with a wide variety of data sources:

- geo-locational data and from Earth observations;
- open datasets across scales (e.g., local, regional);
- proprietary data sets;
- ground-based sensors;
- crowdsourced data.



Fostering collective intelligence

Co-creating a data brokerage system



Data Brokerage System



4. User interfaces



3. Systems-modelling services



2. Data cataloguing and processing



1. Data access

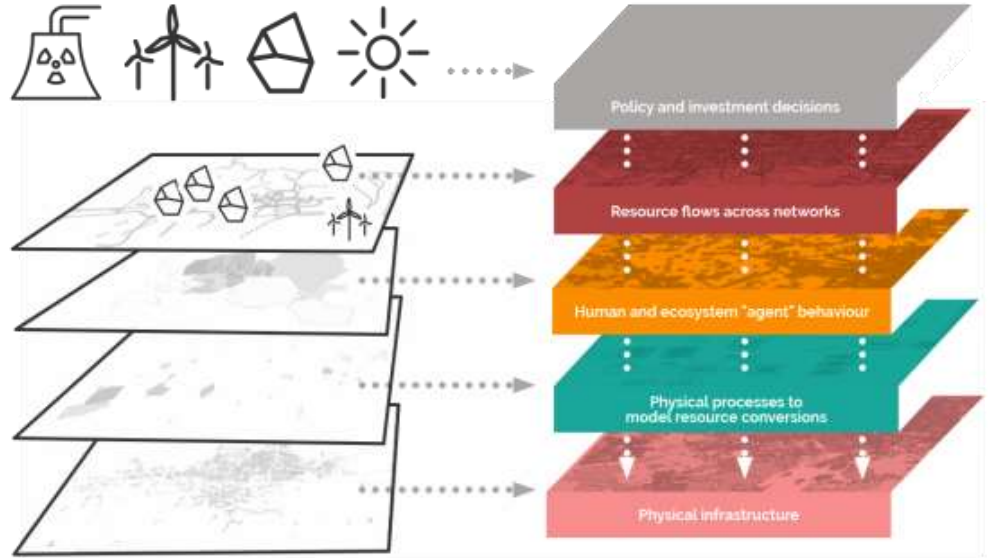


Social Science

An **Agent Based Model** (ABM) simulates the population of the entire city region, their choices, consumption patterns and behaviours.

Natural Science

A growing library of input-output **Digital Twins** (process optimization blocks) that describe all of the energy and materials flows of a city-region system and their business models. These processes are geolocated to build up an integrated systems network based on actual city function.



Decisions

Investment in infrastructure

- Energy, Water, Transport, Housing, ...
- Local, foreign, government, private, ...

Market Policies and planning

- Taxation, tariffs, quota, subsidies, ...
- Land use plans, regulations, ...

Indicator outcome range

(5-20 years)

- Sector resource and energy flows
- Effects on imports & exports
- Wastes & Emissions (CO₂, CH₄,...)
- Employment, income, in(equality)
- Human wellbeing indicators
- Ecological health indicators
- Sector economic activity
- Access to service / %



Supporting city regions to tackle practical problems



resilience.io platform use cases

Greater Accra, Ghana	<i>Water supply, sanitation and accessibility</i>	
Hunter Valley, Australia	<i>Water infrastructure, energy transition, institutional resilience</i>	
Union Canal, Scotland, UK	<i>Water supply, sanitation and accessibility</i>	
Anninghe, Sichuan, China	<i>Integrated multi-hazard modelling</i>	
Queen Elizabeth Olympic Park, London, UK	<i>Digital and social inclusion, green space accessibility</i>	
Medellín, Colombia	<i>Air quality, public health, transport, green space</i>	

emerging Resilience Brokers projects

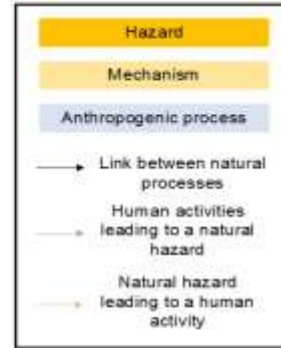
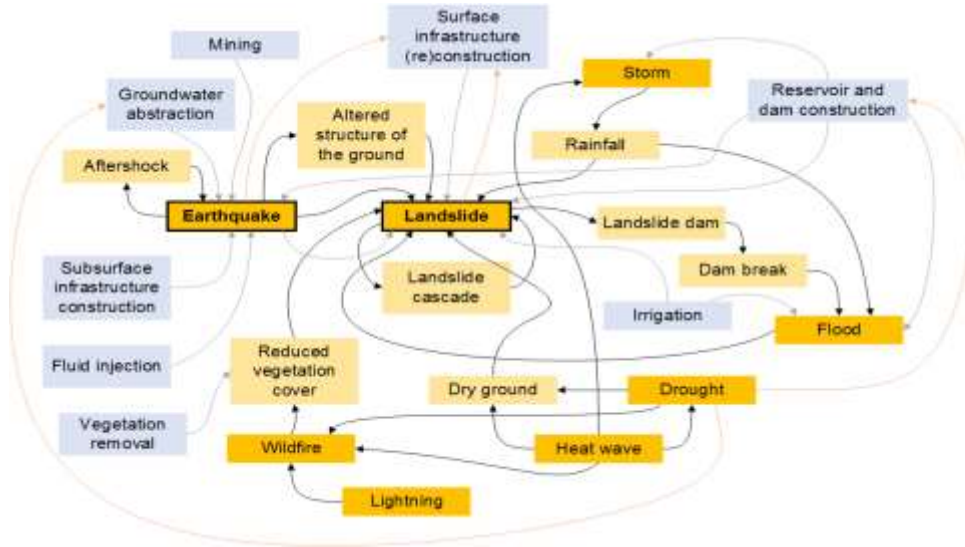
Beirut, Lebanon	<i>Green space, urban health, pedestrian and cycling routes</i>	
Western Cape, South Africa	<i>Water supply, energy transition</i>	
Amsterdam Metropolitan Area, Netherlands	<i>Integrated smart mobility and housing; regional data cooperation</i>	

Multi-Hazards **Dujiangyan, Sichuan Province**

Resilient Economy and Society
by Integrated SysTems modelling
(‘RESIST’)



Multi-Hazards



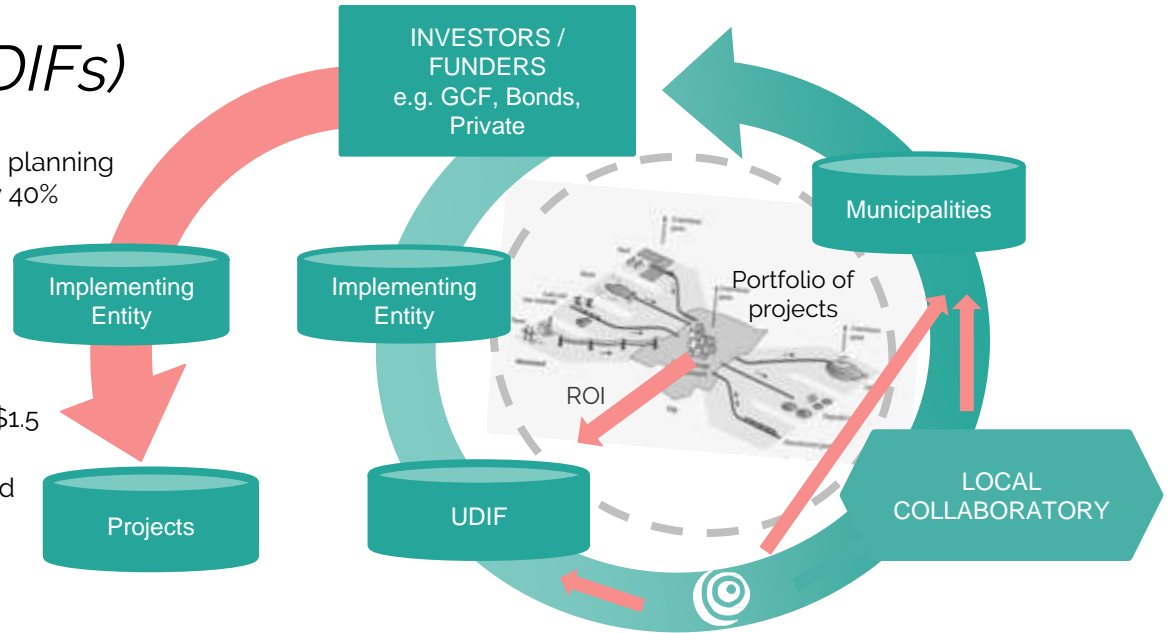
Urban Development Investment Funds (UDIFs)

Smart selection of projects and improved design, planning and maintenance can reduce finance demand by 40%

Sustainable infrastructure cost through integrated planning is \$3 trillion/yr (2014 prices): this is 4.8% of GDP

Current private sector spend on infrastructure is \$1.5 trillion/yr.
\$1 trillion/yr could come from Bonds into blended UDIF.

43% energy
29% transport
21% water, flood and waste
7% communications/data



Networked organisation

Drawing strength from a global network of delivery and knowledge partners

UN HABITAT
FOR A BETTER URBAN FUTURE

UN
environment
United Nations
Environment Programme

UCCRN
URBAN CLIMATE CHANGE
RESEARCH NETWORK

Imperial College
London

Climate
Resilience
Consulting

FE Future Earth

UTS:ISF

RESURGENCE

ICAI
International Council
for Integrated Assessment

UN
DP

SDSN

University of
BRISTOL

ecological
sequestration
trust

Tynos
Consulting

SDGacademy

Rezatec

ICLEI
Local
Governments
for Sustainability

TVGROH

SDSN
YOUTH

GO GROUP ON
EARTH OBSERVATIONS

ARC

IIER
International
Integrated
Earth Research

learning
emergence

Burning? Learn?

Geodan

EHAB

ODI
OPEN
DATA
INSTITUTE

International
Science Council

ICES
INTEGRATION

IHS
Making cities work
Leading

energyfuturelab

KnowlEdge

中国科学院
CHINESE ACADEMY OF SCIENCES

et Climate-KIC

COLNIFA

GO FAIR