

Transformation towards circular systems

WASTE FEW ULL workshop

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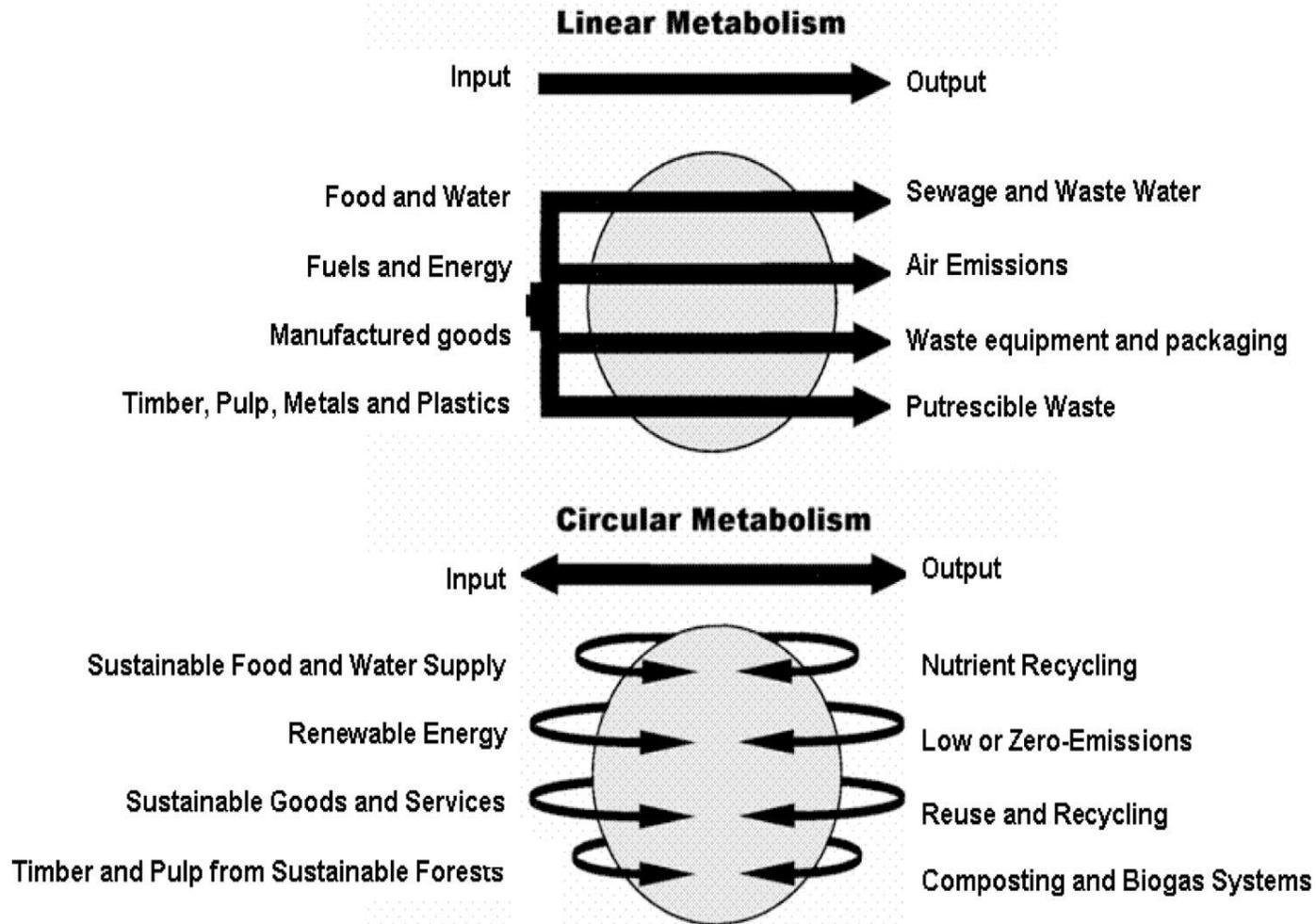
Unprecedented global challenges today

- All relevant biophysical indicators are turning negative, fast, steeply, dangerously
- The emerging context is beyond human experience
- Costs of mitigation, adaptation, remediation are rising sharply

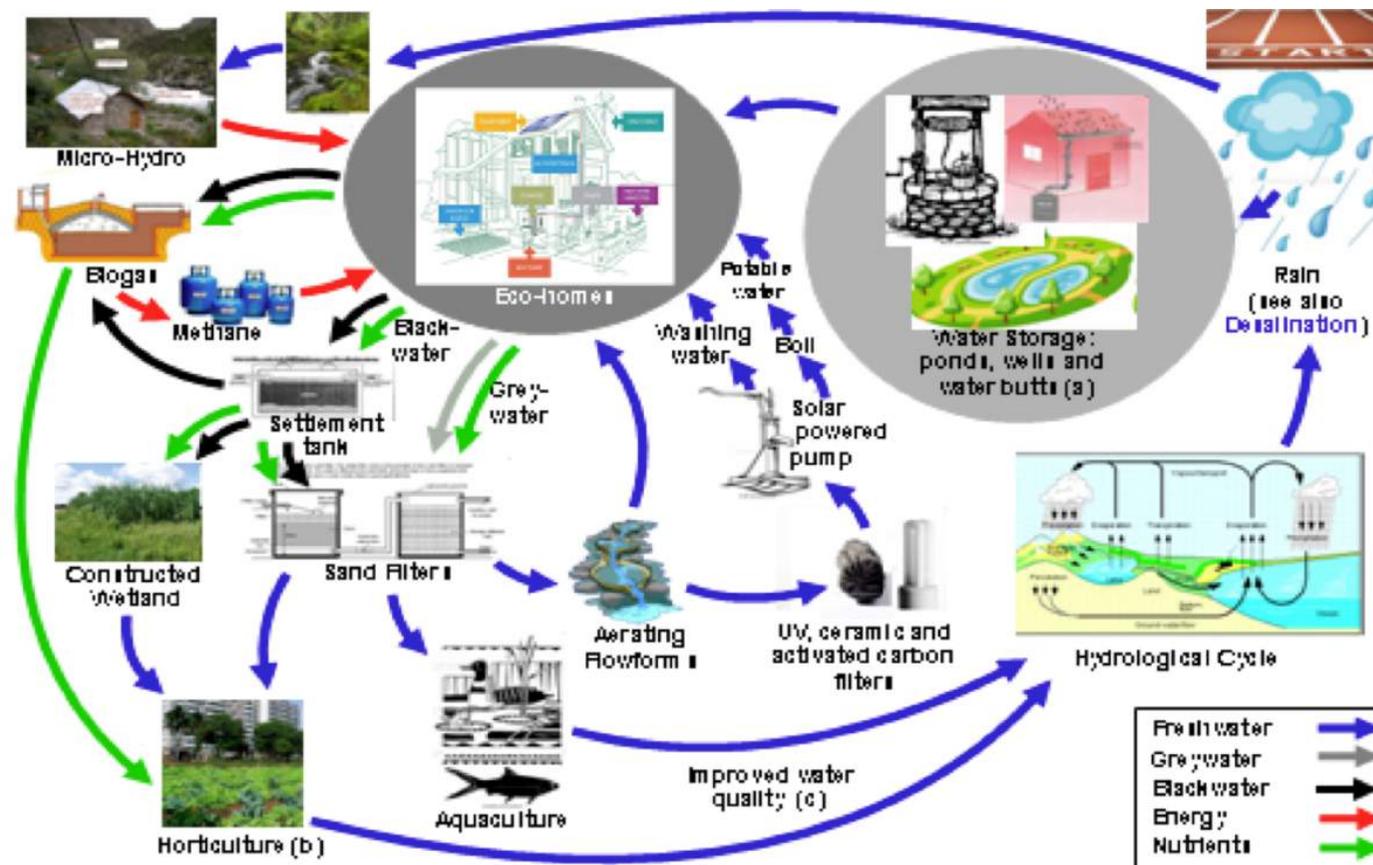
Recent UN-backed international reports:

- IPCC
- IPBES
- IAASTD
- FAO
- WHO

A shift from linear to circular metabolism



Integrating food and energy production with water and waste management in circular systems



(a) Ponds: Water also can function as food domain
 (b) Drip irrigation systems used in market gardens. Water use is minimized due to water retention in soil through high % organic matter. The substrate used is mulch (straw, wood chips and cardboard) and gravel and other permaculture techniques

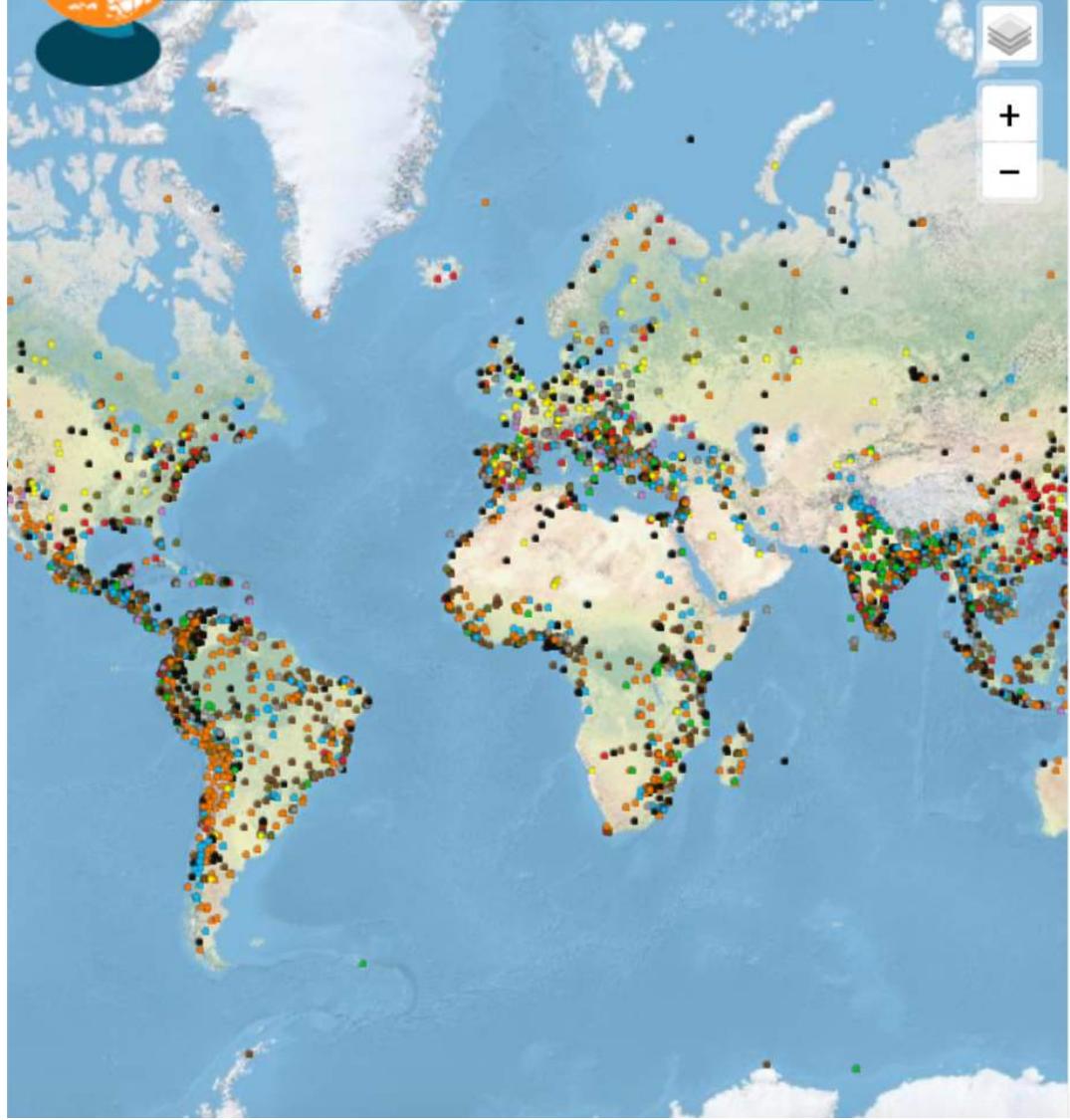
The circular economy: reality or rhetoric?

- Estimates for the EU-27 economy are that **only 12% of the material input was recycled in 2019**
- The industrial economy is not circular - it produces polluting waste, and it requires new supplies of energy and materials extracted from **old and new “commodity frontiers”**
- The world input of inorganic and organic materials to the economy are still going up
- Even a **non-growing industrial economy requires continuous new inputs of energy and materials** from the **commodity extraction frontiers** because energy is not recycled, and **materials are recycled only to a small extent.**



Environmental Justice Atlas

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Commodities

3621 cases have been reported so far

- AR
- CN
- EN
- ES
- FR
- IT
- TR

▸ Legend

▾ by Commodity

Sort alphabetically

Land	1183	Palm oil	101
Water	773	Iron ore	98
Electricity	655	Lead	78
Crude oil	334	Live Animals	72
Coal	314	Zinc	71
Gold	314	Fruits and Vegetables	70
Domestic municipal waste	237	Carbon offsets	70
Tourism services	235	Recycled Metals	68
Industrial waste	223	Cement	66
Natural Gas	211	Sugar	64
Copper	205	Manufactured Products	58
Chemical products	186	Cellulose	57
Timber	159	Rare metals	54
Silver	146	Eucalyptus	52
Biological resources	142	Aluminum/Bauxite	46
Uranium	137	Meat	44
Fish	127	Pesticides	44
Sand, gravel	111	Steel	42
Ecosystem Services	103	Corn/Maize	39

What *kind* of circular food-energy-water systems?

Dominant model

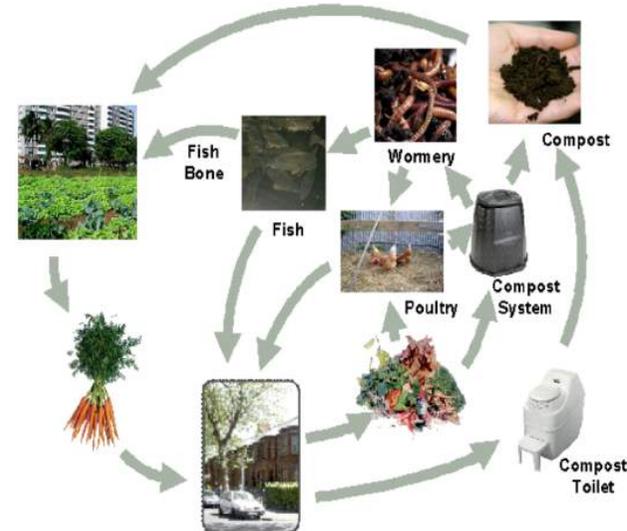
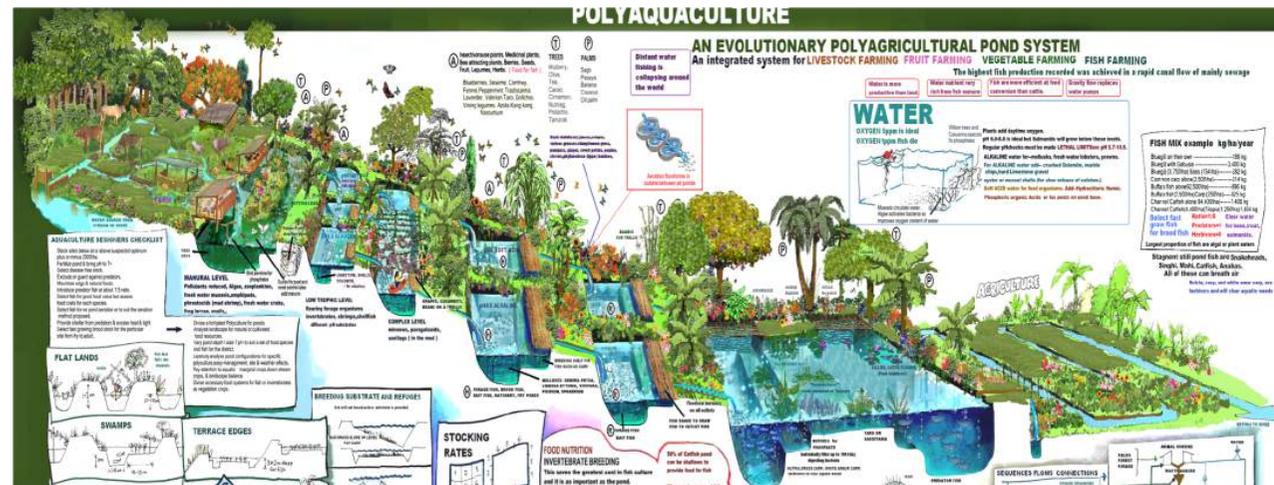
- Circular systems as part of Sustainable Intensification, digital technology & robots, and global supply chains
- Emphasis on science
- ***Conforms*** to productivist, growth oriented model and 'business as usual' based on accumulation through dispossession

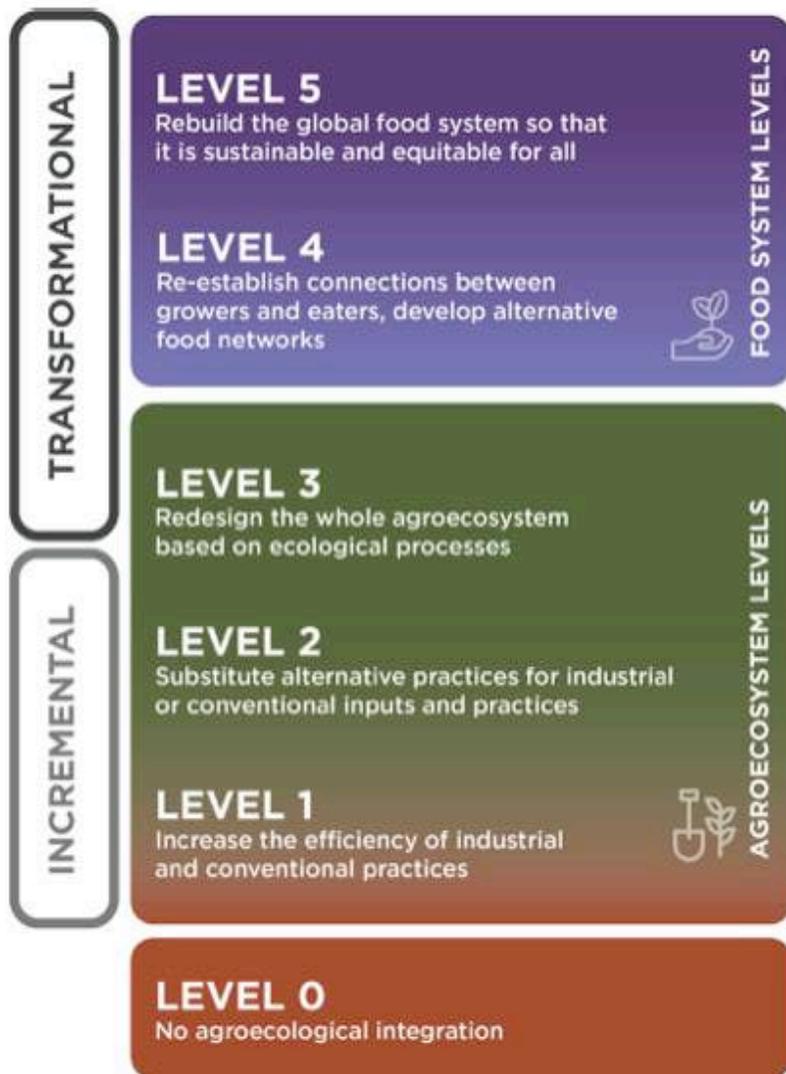
Food, water, energy sovereignty and other possible worlds

- Circular systems as a science, practice and social movement
- Emphasis on citizen knowledge(s) in co-production & validation of socio-technical innovations
- ***Transforms*** dominant regime

Circular Systems: from Uniformity to Diversity

- Agro-ecology – mimicking natural ecosystems
- Eco-literacy and eco-design/permaculture/bio-mimicry
- Circular systems that combine food and energy production with water and waste management along rural-urban continuum.

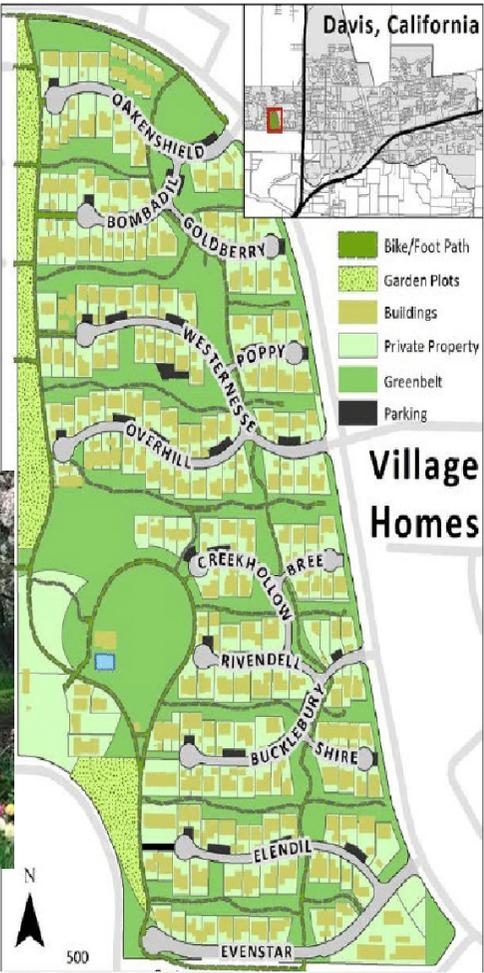
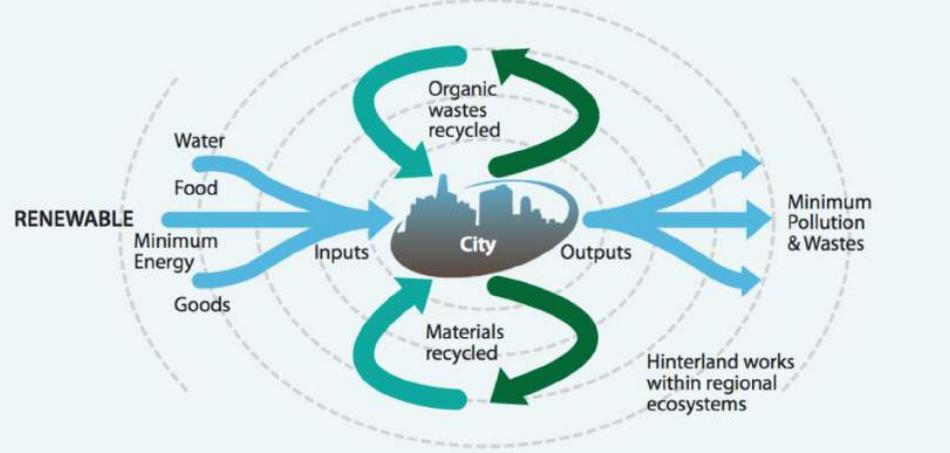




Infographic by Biovision based on Gliessman and FAO

Integrating Food - Energy - Water - Housing in circular systems

CIRCULAR METABOLISM CITIES REDUCE CONSUMPTION AND POLLUTION, RECYCLE AND MAXIMIZE RENEWABLES



Visions of transformation

- a transformative approach restructures and **re-territorializes** food and energy production, water management as well as distribution and consumption within **decentralized circular systems that mimic natural ecosystems at different scales**—from individual farm plots to entire cities.
- This vision echoes the proposals of the Russian anarchist geographer Peter Kropotkin ([1898](#)) for an agrarian-industrial mutualism, in which most economic **activities are re-localized in villages mixing agricultural and industrial elements, and where production is controlled by those directly engaged in it.**

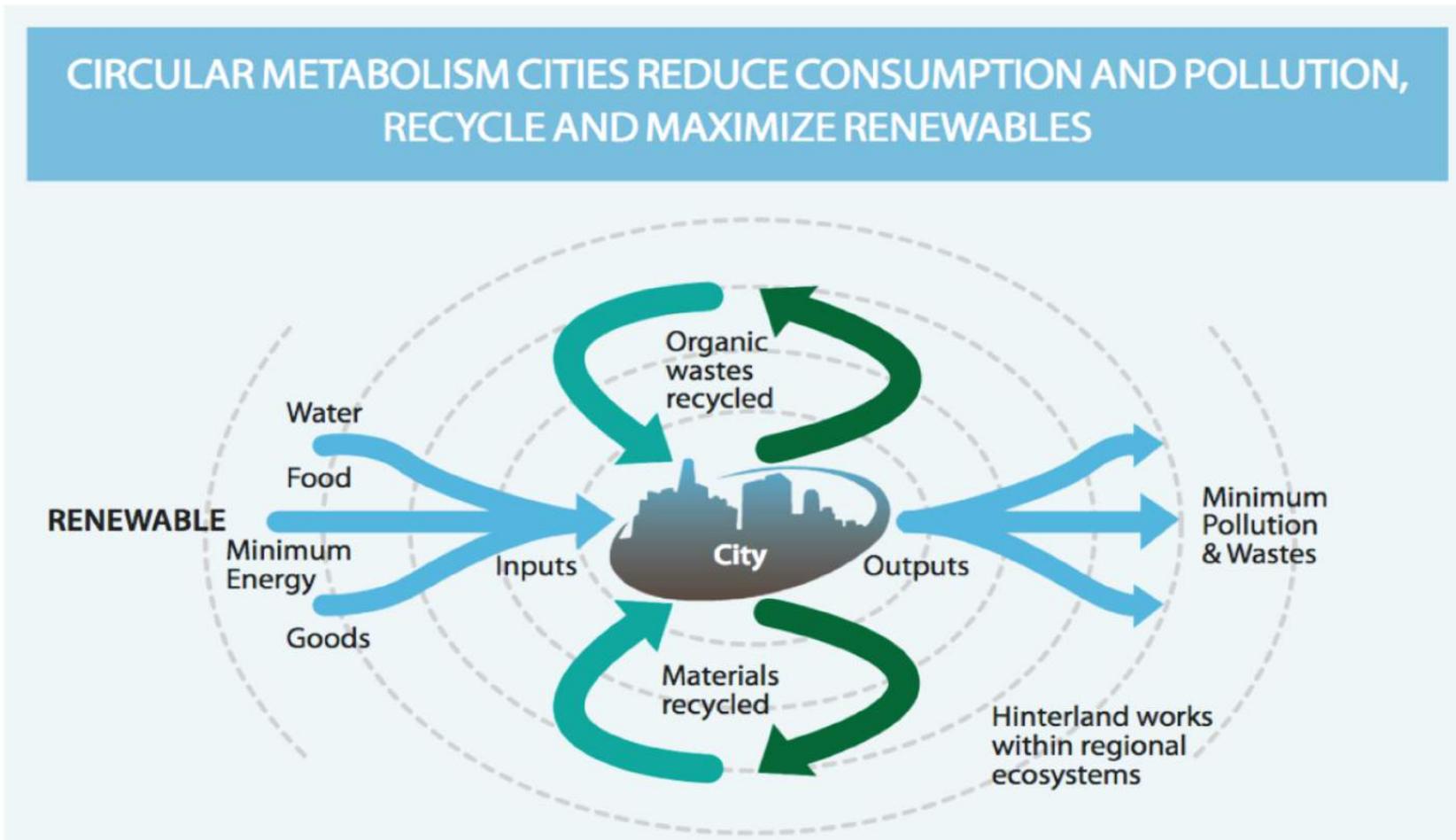
Circular systems based on agrarian-industrial mutualism

The building blocks include:

- enhancing functional biodiversity
- ecological clustering of industries (water, food, energy, waste...)
- the eight “Rs”: re-evaluate, re-conceptualize, re-structure, redistribute, re-localize, reduce, reuse, and recycle
- local production and consumption in rural and urban territories



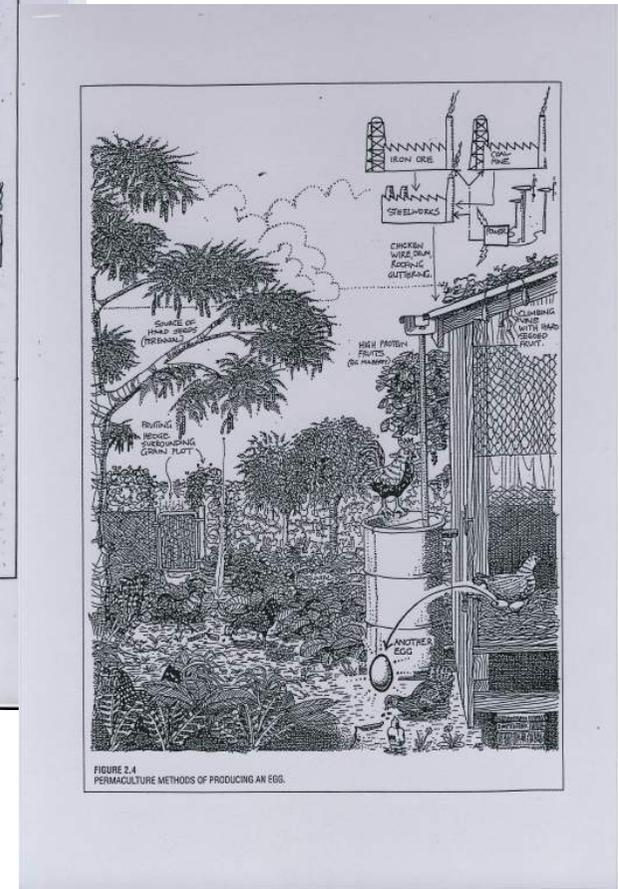
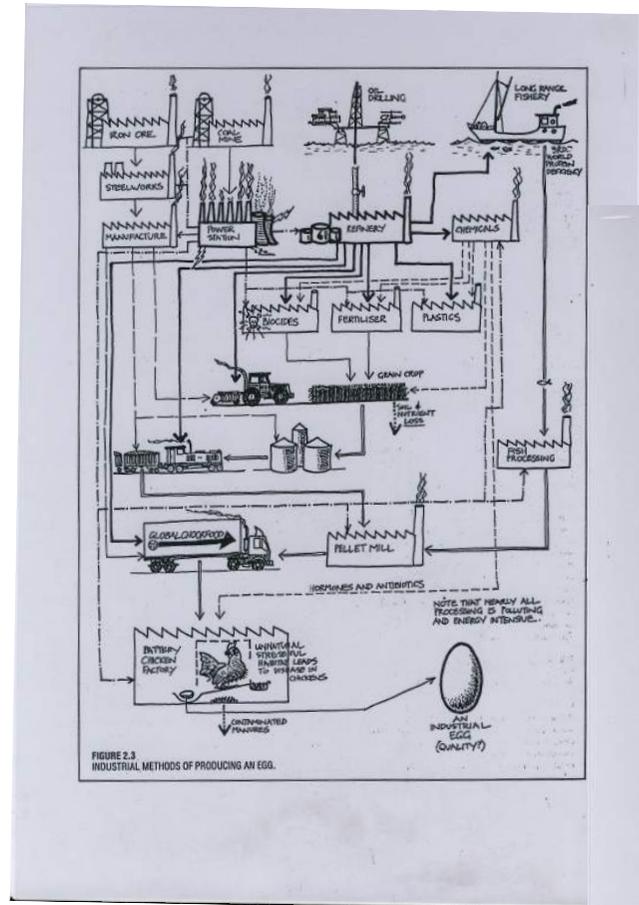
Transformation for circular systems: making it happen



National policies for de-growth in production & consumption

A radical shift from globalised linear systems to re-localized circular models that link food and energy production with water and waste management— as part of a controlled process of **de-growth in production and consumption that reduces GHG emissions, biodiversity loss, and poverty within and between territories**

- “achievable design changes” could reduce global energy consumption by 73 percent



Financial commitments for circular systems

The UN's Secretary General António Guterres has warned that promises to reduce greenhouse gas emissions are pointless while governments around the world persist with investment in fossil fuels.

"Promises ring hollow when the fossil fuels industry still receives trillions in subsidies," Guterres says.

Similarly, I argue here that promises to reduce biodiversity loss and GHG emissions through circular systems are pointless if Europe (and rest of the world) persists with investments in petrochemical based systems

Financing transformative circular systems is key for climate change adaptation and mitigation, and much more....

Increase public funding for R&D: case of agroecology

Agroecology receives **very little or no funding** – **this can be reversed:**

- USA and UK - projects with an emphasis of agroecology based on agroecosystem diversification represent only 0.6 to 1.5% of the entire agricultural research budget
- 0% of the European Union funds channelled through FAO, IFAD and the WFP between 2016 and 2018 supported transformative agroecology while only 2.7% had a focus on substituting harmful inputs and practices with less degrading ones.
- UK, France, and Germany overseas aid – less than 3 to 5% of agriculture aid budget funds agroecology R&D



Promoting cognitive justice and participatory research for circular food-energy-water systems by transforming research

- **democratizing science and technology research**, with increased funding for public research and transdisciplinary approaches that include people in co-creation of knowledge
- **de-institutionalizing research for autonomous learning and action**, with an emphasis on strengthening horizontal networks of grassroots innovation and decentralized self-managed research as well as citizen oversight over the production of knowledge.

Promoting equitable access to resources

In the face of the widespread acquisition and privatisation of land and water rights, alternative policies are needed to ensure equitable access, use and control over natural resources:

- Secure tenure rights play a vital role in spreading circular systems
- Decision makers must abandon investment policies that favour land acquisitions and instead focus on strengthening customary & collective tenure systems as well as removing discrimination against women and BAME

Transforming markets for circular system products

Circular system approaches build alternative networks through **forms of economic exchange that reinforce connections between producers and consumers within territories**, – re-localising production & consumption of food, energy & water

- **Public procurement of locally produced & processed agroecological/organic foods** promotes access to more dietary diversity in schools, hospitals and public canteens in Italy, Austria, Denmark....



Disinvest in major GHG emitters & drivers of biodiversity loss

- Production and use of **synthetic Nitrogen fertiliser** accounts for roughly **21.5% of the annual direct emissions from agriculture in 2018**. Worldwide use of synthetic N fertilisers expected to **increase by over 50% by 2050** (Menegat, Ledo and Tirado, 2021).
- The spread of agroecological alternatives to synthetic N use partly depends on **financial institutions disinvesting in agribusiness corporations** with a vested interest in the high use of synthetic N fertilisers (e.g. N fertiliser companies like Yara and CF Industries)
- Financial institutions **dis-investing in fossil fuel intensive food, water and energy systems** is key for global reduction of **GHG emissions & biodiversity loss**
- **UK Financial Institutions** - estimated carbon emissions associated with Financial investments analysed in 2021 (all sectors) amounted to 805 million tonnes CO₂. **If the FIs were a country, they would have the 9th largest emissions in the world – larger than Germany**

Free time and material security - pre-requisites for widespread transformation to circular food-energy-water systems

- Deep financial and policy changes to give **more material security** to citizens
- Wo/men need **free time** for democratic deliberations, co-creation of circular systems, and for practicing the **art of participatory democracy needed for local adaptive management & governance of circular systems**

Re-directing finance and policies for society-wide transformation for equity, resilience, and sustainability

- a guaranteed and unconditional minimum income for all
- a significant drop in time spent in wage-work and a fairer sharing of jobs between men and women
- the re-localisation of plural economies that combine both market oriented activities with non-monetary forms of economic exchange based on barter, reciprocity, gift relations, and solidarity within and between territories

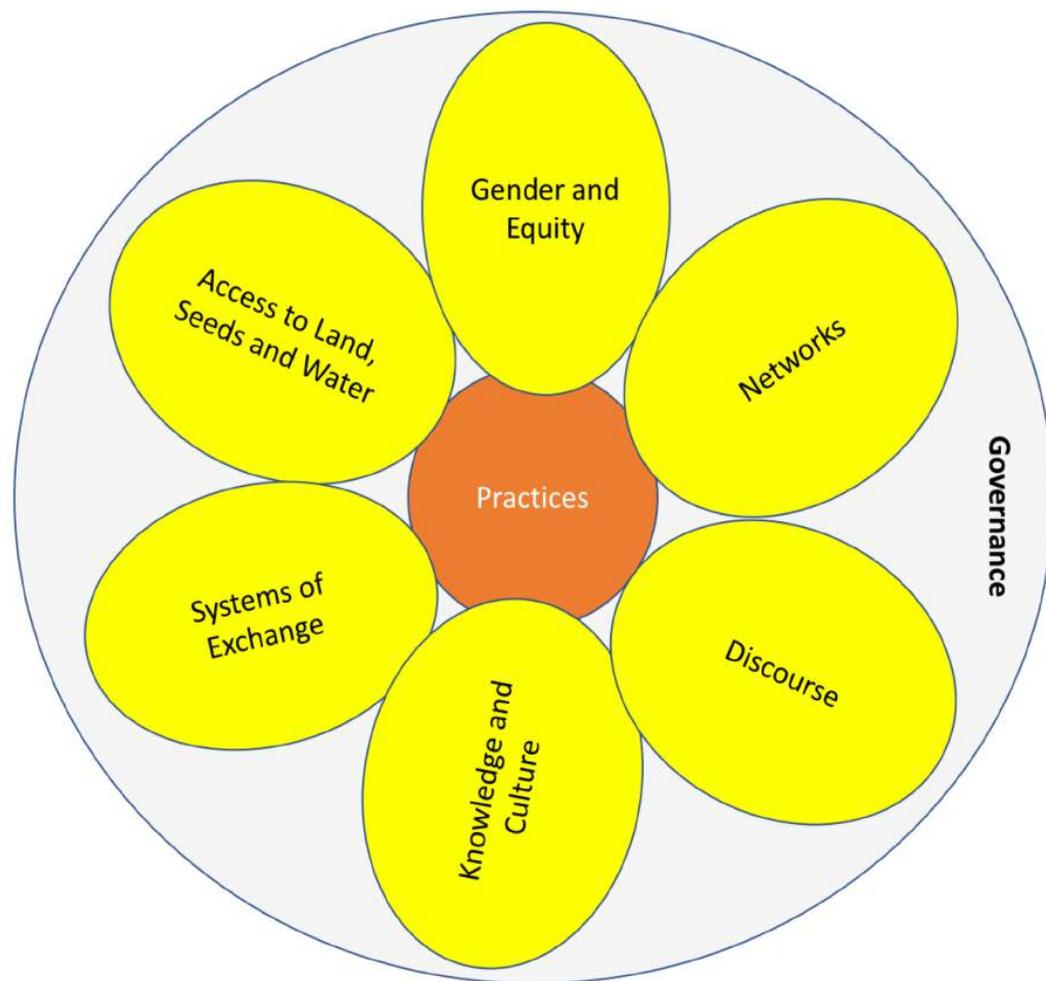
Redistribution for equity, resilience and sustainability

- Reversing the growing gap between the rich and poor
 - *the hyper-rich (less than 100 people) own and control more wealth than 50% of the world's population*
 - *wealthiest 1% of the world's population emit more than twice as much carbon dioxide as the poorer half of the world*
- Reversing processes of accumulation through dispossession – nationally and globally

Redistribution of wealth, - including through taxes on the hyper-rich, financial speculations, and closing fiscal paradises

Transfer of surplus wealth from hyper-rich to fund regeneration of diverse circular systems and local economies in Europe and overseas

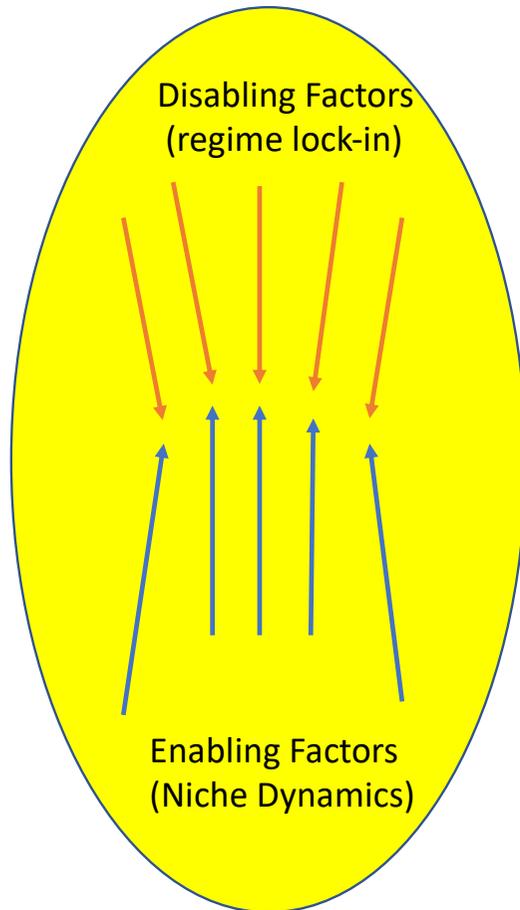
Circular systems for equity, sustainability and resilience – a major challenge



Transformation needs to **focus on the wider social, political and economic context** that shapes circular systems

Systemic rather than sectorial approach to change,
- with **simultaneous and mutually reinforcing actions** in all 6 domains of transformation

Domains 1-6 (e.g. knowledge and culture)



The six domains of transformation are:

- (1) Access to Natural Ecosystems
- (2) Knowledge and Culture
- (3) Systems of Exchange & Finance
- (4) Networks
- (5) Equity & Gender inclusion
- (6) Discourse

Within each domain, there are factors, dynamics, structures and processes that constrain shift to diverse circular systems (**orange arrows**), and those that enable it (**blue arrows**).

Spread and scaling out of circular systems depend on

- Transformative process that seeks to recreate **the democratic political realm and regenerate a diversity of autonomous local circular food-energy-water systems in territories** - based on social justice and ecological sustainability
- Emphasis on **power-reversals** based on the self-organizing capacities of **people** and their collective power to reclaim spaces controlled by **disabling governments and corporations**



Gracias
Merci
Thank you