



MICRO-CREDENTIAL

CIRCULAR ECONOMY FOR LAND AND WASTE MANAGEMENT

3.- Land as a Circular Resource

*Land degradation and loss of
ecosystem services*

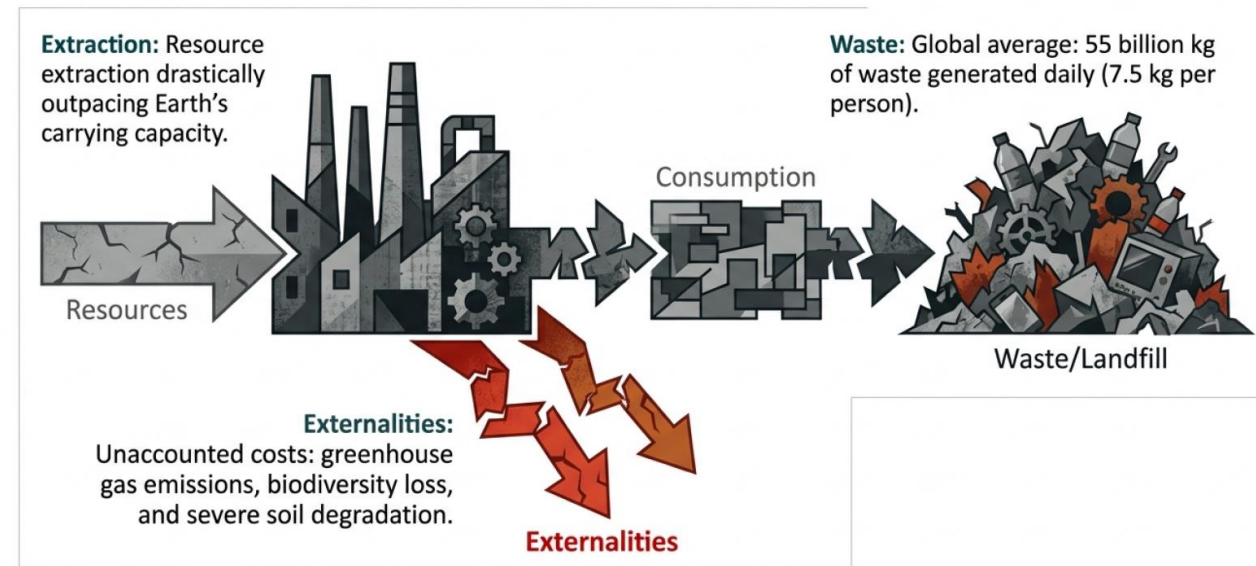
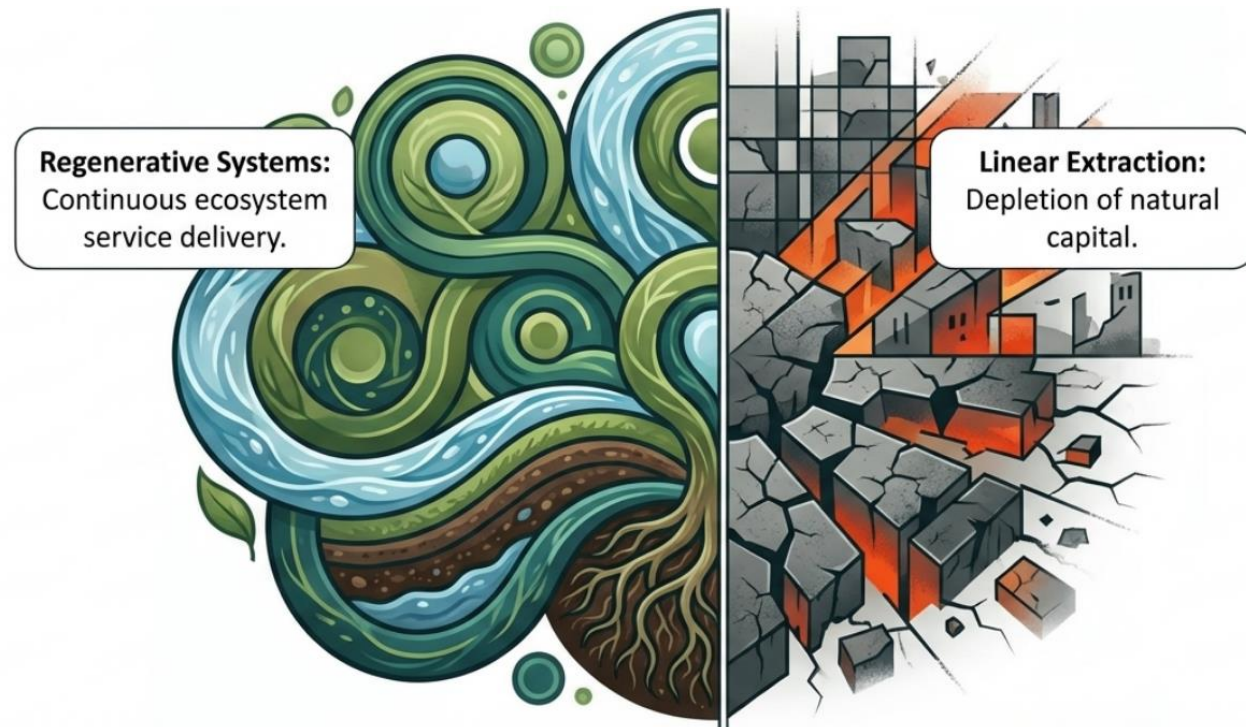
CELWS-W03-V02



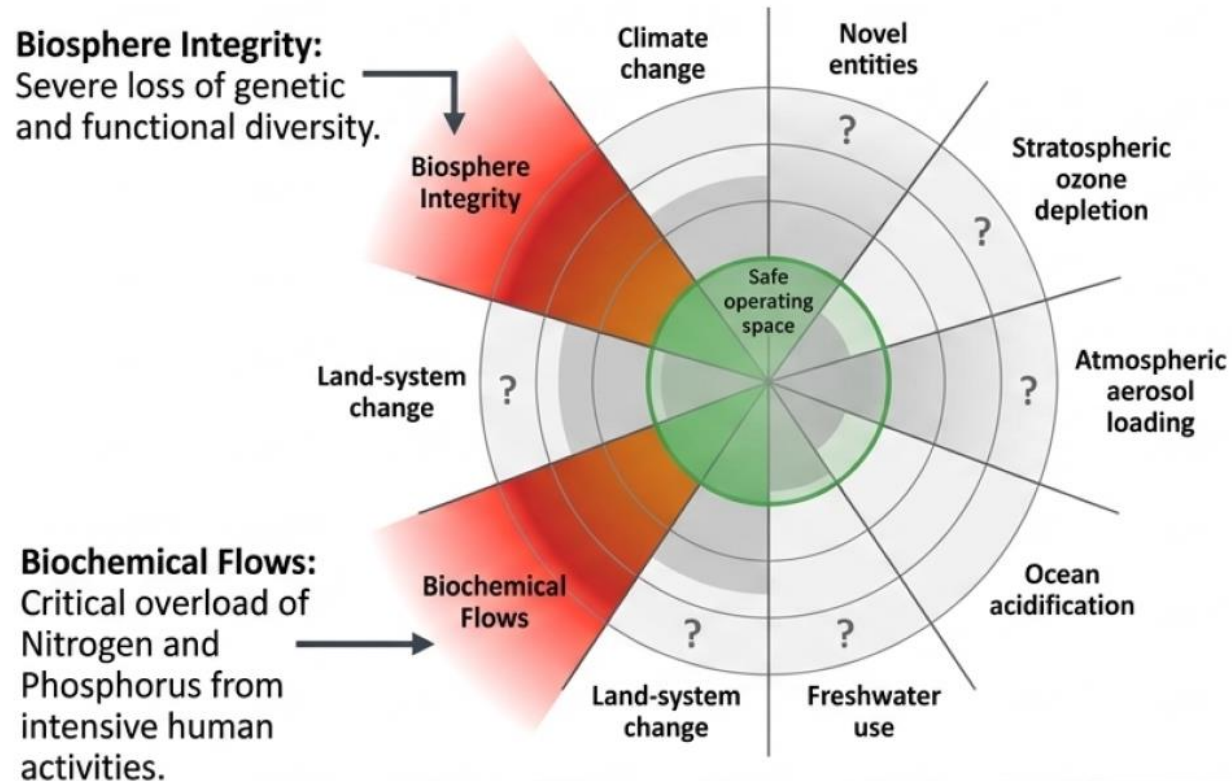
Co-funded by
the European Union



The Linear Economy: A Systemic Crisis for Land



What is Land Degradation?



The Result: Systemic breakdown of the land's fundamental ability to sustain biological life.

Healthy System Soil Texture



Degraded System Erosion & Salinization



The Imbalance: Extraction > Generation

The Reality: Under natural conditions, 1 inch of topsoil takes thousands of years to form. Under linear, hyper-optimized agricultural practices, it is lost in seasons.



Phase 1: Toxicity.
Xenobiotics (synthetic chemicals) exceed nature's carrying capacity.



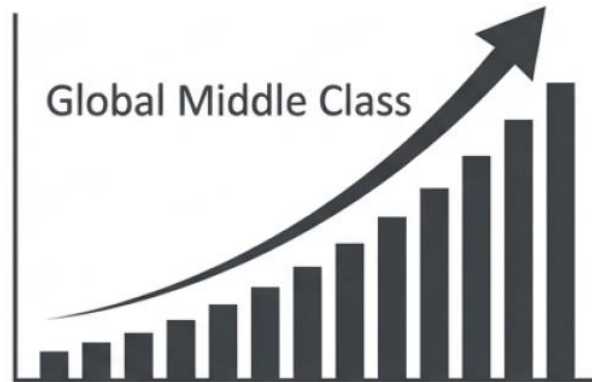
Phase 2: Biological Death.
Soil microbiomes collapse; organic matter decomposition halts.



Phase 3: Desertification.
Land loses moisture retention, triggering total ecological collapse.

Drivers of Degradation: The IPAT Equation

$$I = P \times A \times T$$



I (Impact on Environment) =

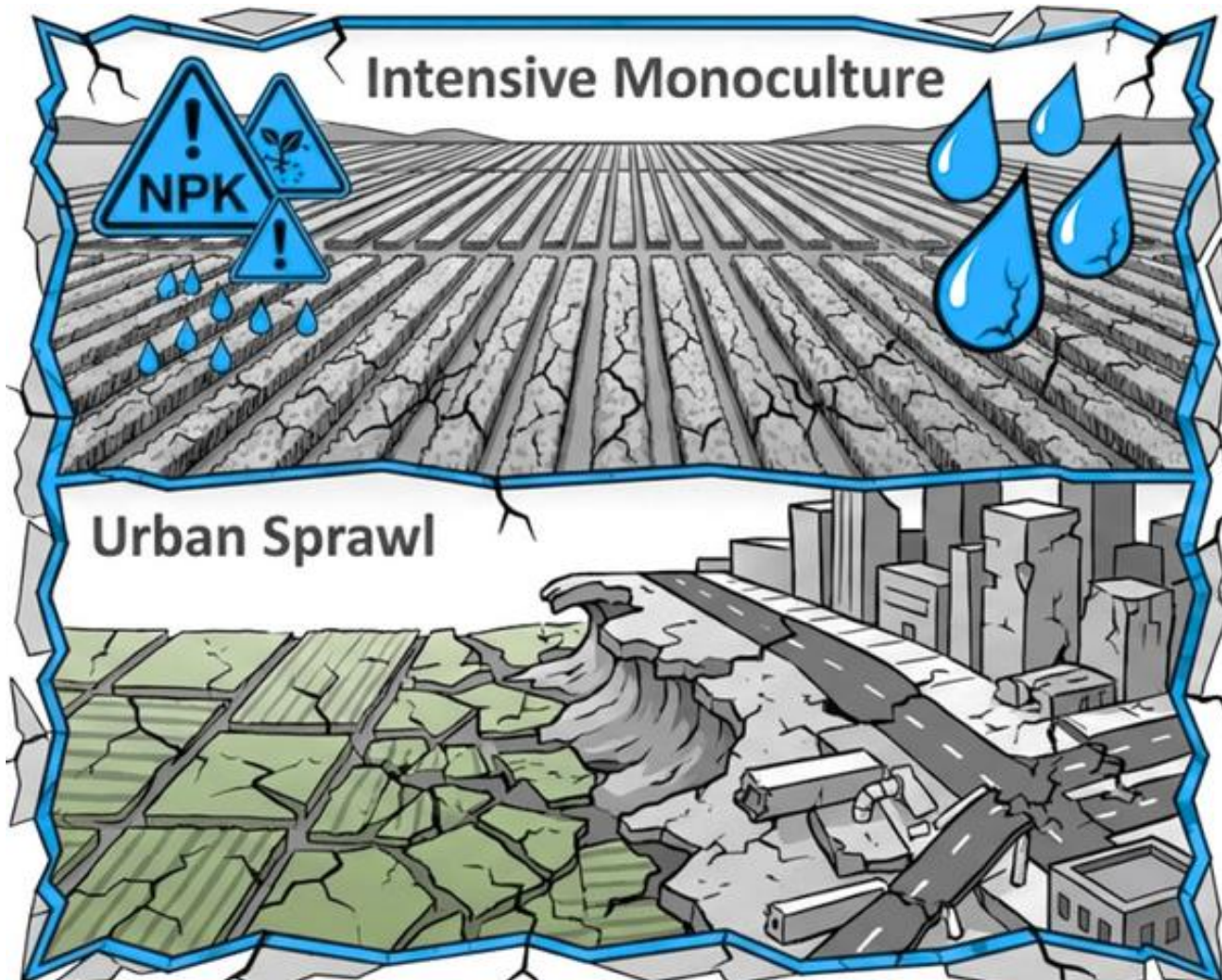
P (Population): Heading toward **8.5–10 billion** by 2050.

A (Affluence): Global middle class projected to reach **5.3 billion** by 2030.

T (Technology): Resource-intensive, **linear** “take-make-waste” production.

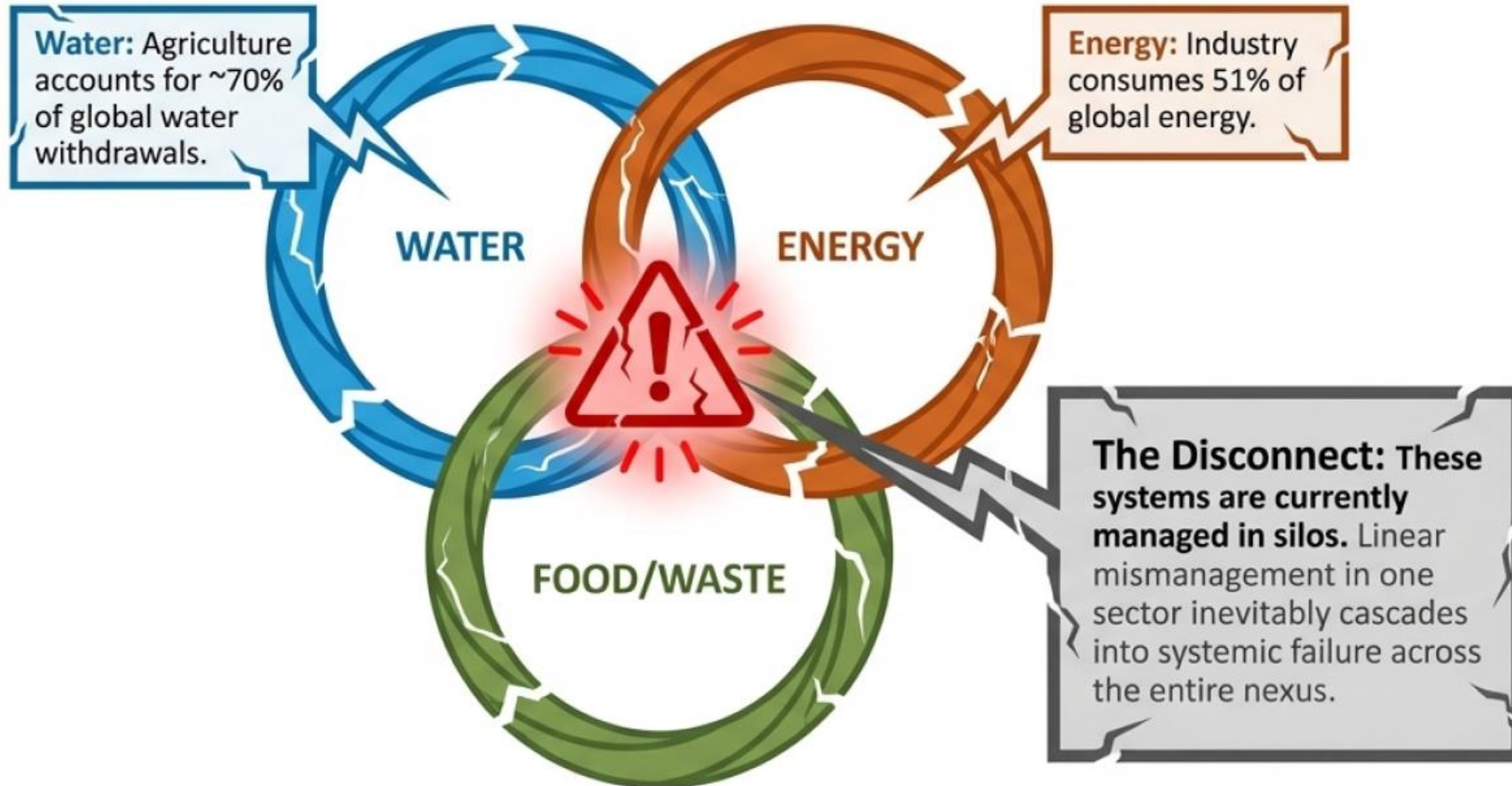
Takeaway: Without fundamentally altering ‘T’ (transitioning to **Circular, regenerative systems**), our Impact will irreparably breach planetary boundaries.

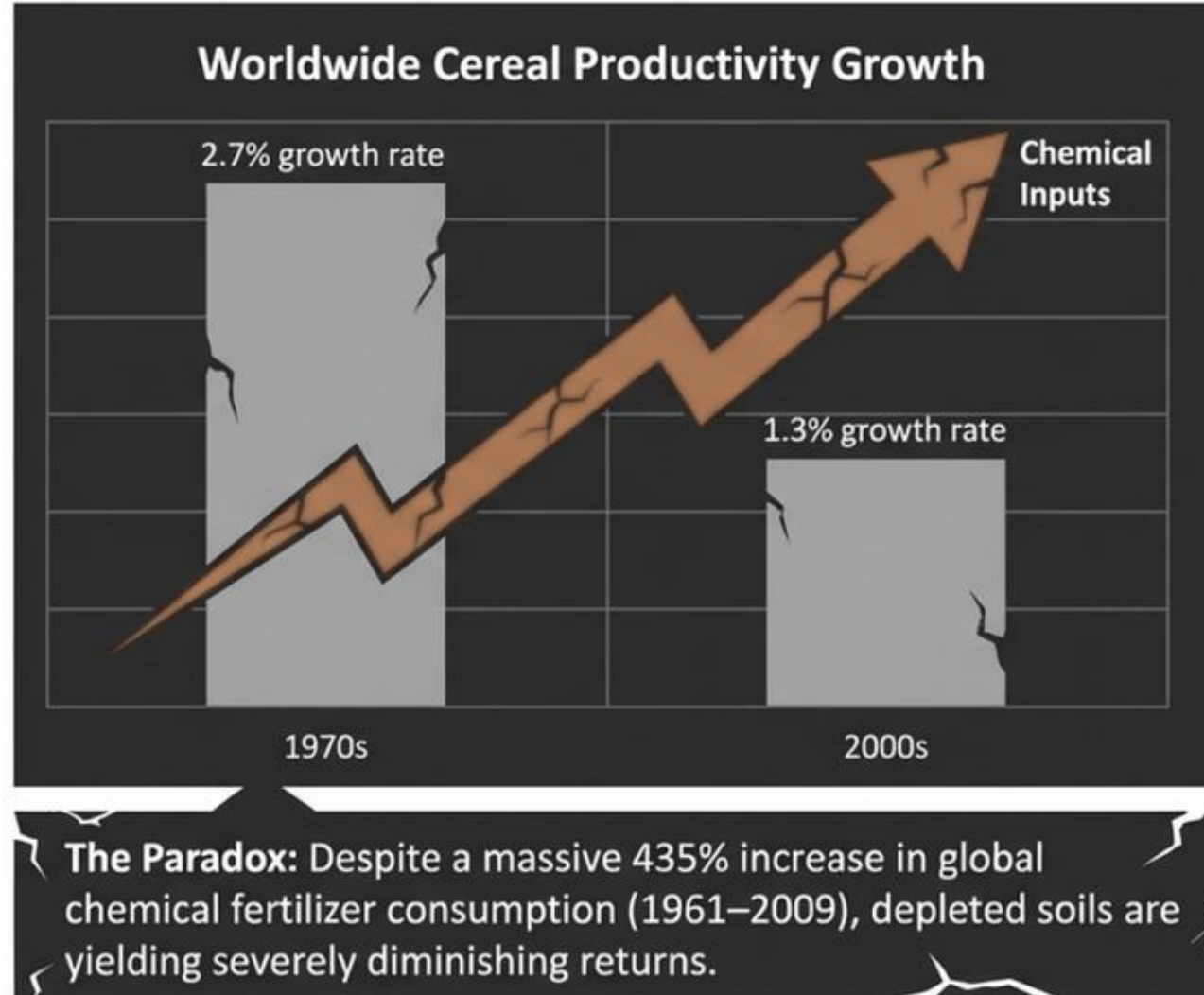
Driver: Intensive Agriculture and Urbanization



Agriculture: Negative nutrient balance; synthetic inputs erode natural soil fertility while masking underlying degradation.

Urbanization: Irreversible sealing of productive land; immense concentration of construction and municipal waste generation.







Carbon Sequestration

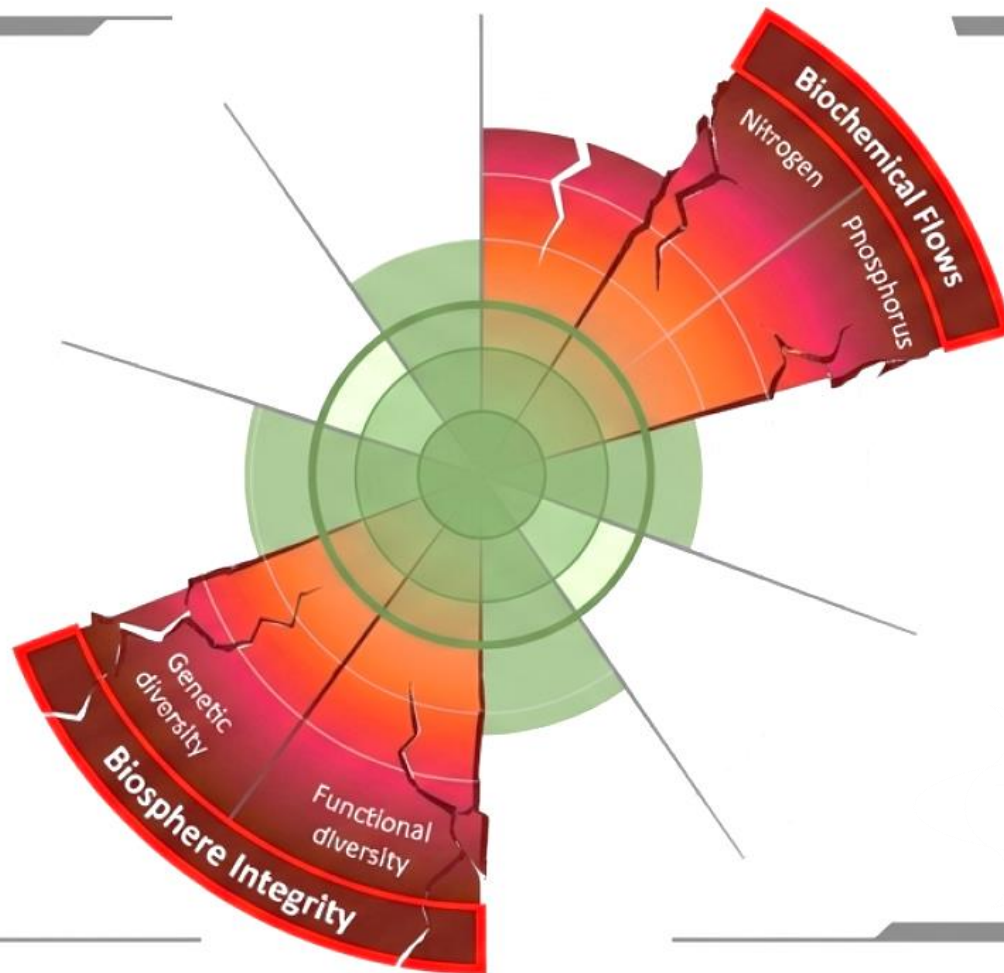
Lost Carbon Sinks: Degraded soils release ancient, stored carbon and fundamentally lose their biological capacity to capture new emissions.



Flood Risk

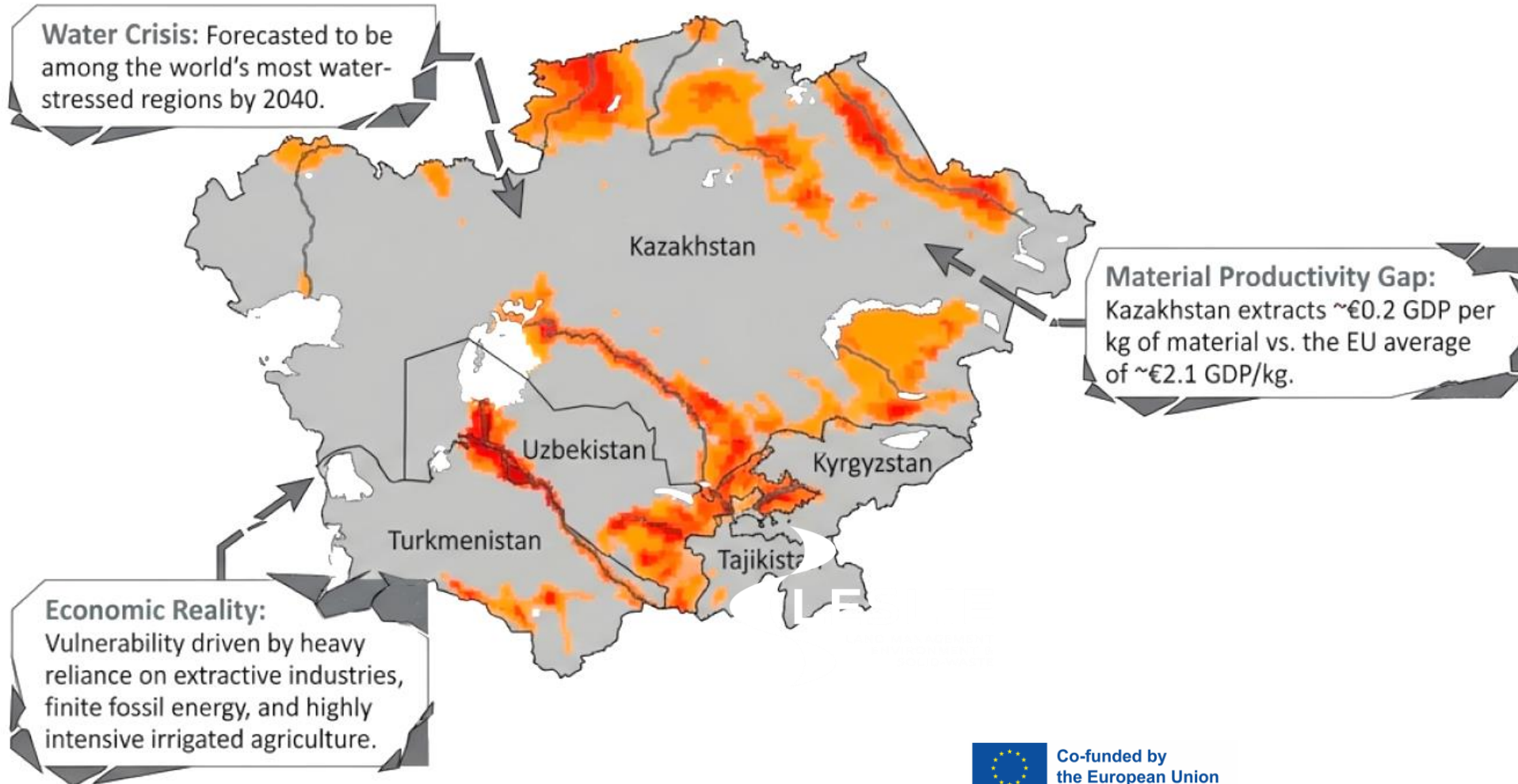
Lost Water Regulation: Compacted, artificially sealed lands cannot absorb rainfall, exponentially increasing catastrophic downstream flood risks.

Ecosystem Services Loss: Supporting



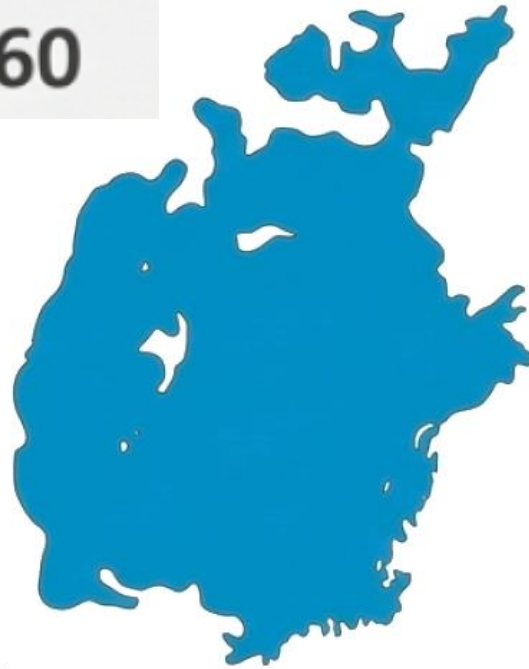
Supporting services are the invisible, biological foundation of all other ecosystems.

The **linear model's** absolute reliance on synthetic inputs and extractive yields has fundamentally ruptured the Earth's natural nutrient recycling capabilities.

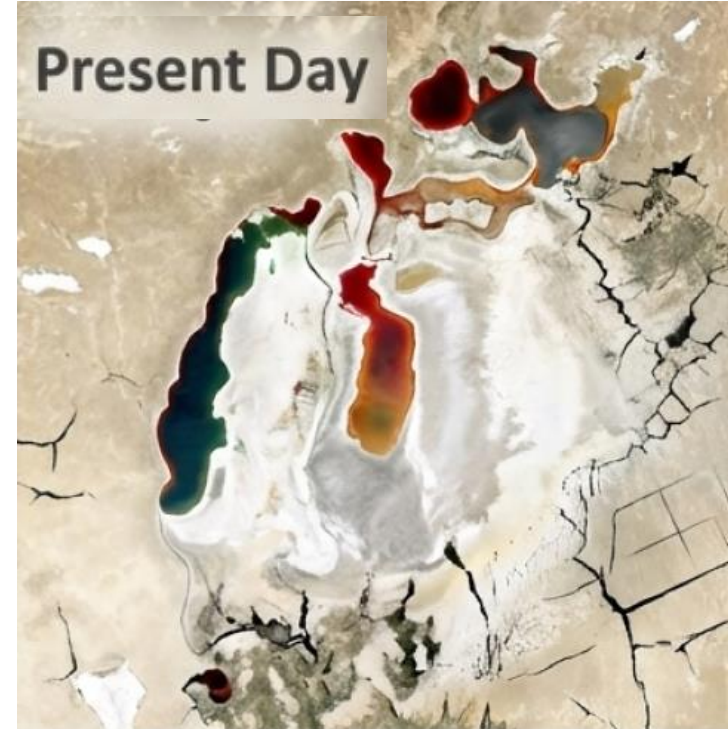


The Aral Sea Example

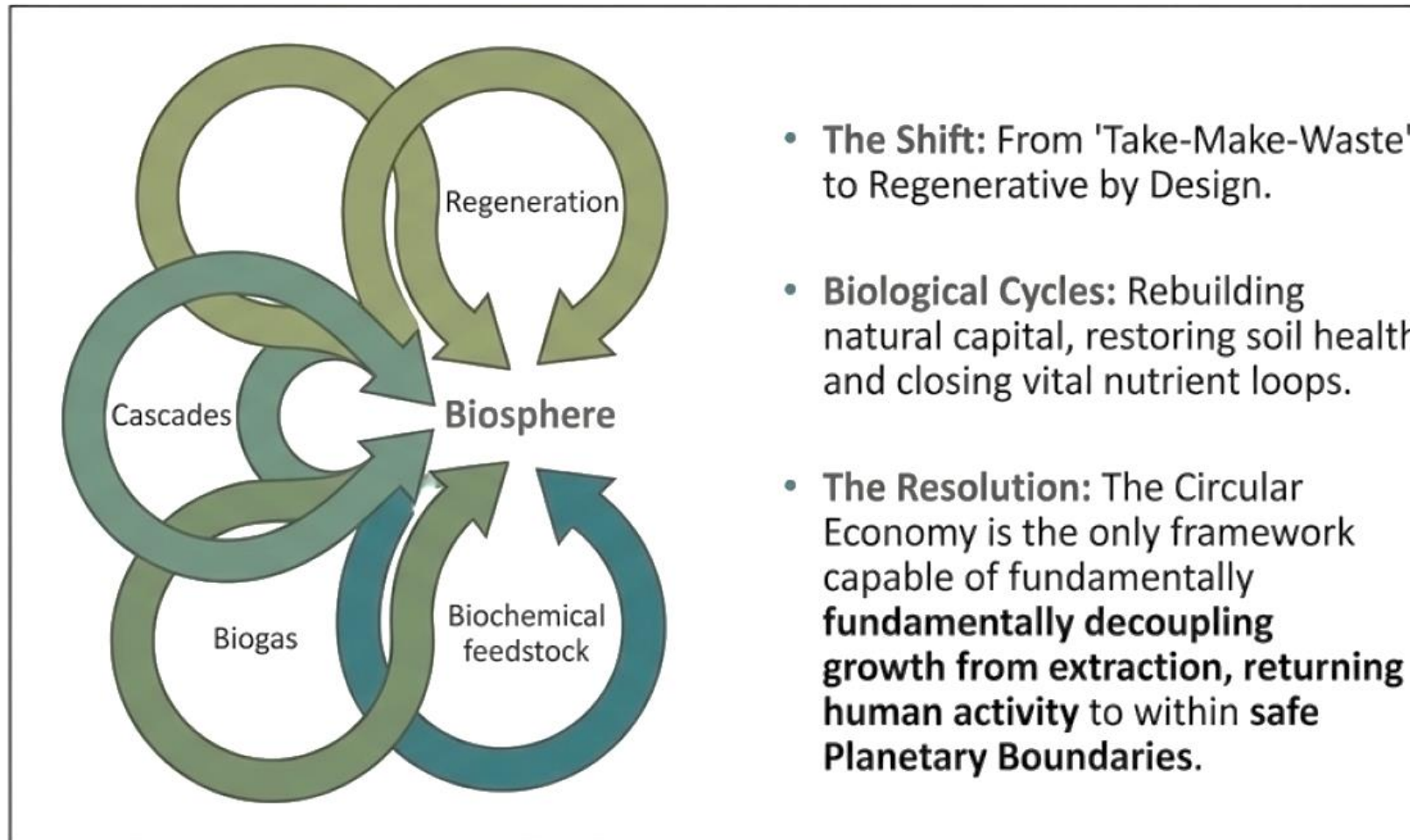
1960



Present Day



The ultimate consequence of linear water and land mismanagement. Decades of intensive agricultural diversion transformed a vibrant, regulating ecosystem into a hyper-saline desert, devastating local microclimates, health, and economies.



- **The Shift:** From 'Take-Make-Waste' to Regenerative by Design.
- **Biological Cycles:** Rebuilding natural capital, restoring soil health, and closing vital nutrient loops.
- **The Resolution:** The Circular Economy is the only framework capable of fundamentally **decoupling growth from extraction, returning human activity to within safe Planetary Boundaries.**



MICRO-CREDENTIAL

CIRCULAR ECONOMY FOR LAND AND WASTE MANAGEMENT

3.- Land as a Circular Resource

*Land degradation and loss of
ecosystem services*

CELWS-W03-V02



Co-funded by
the European Union

