



MICRO-CREDENTIAL

CIRCULAR ECONOMY FOR LAND AND WASTE MANAGEMENT

3.- Land as a Circular Resource

Soil as a finite resource

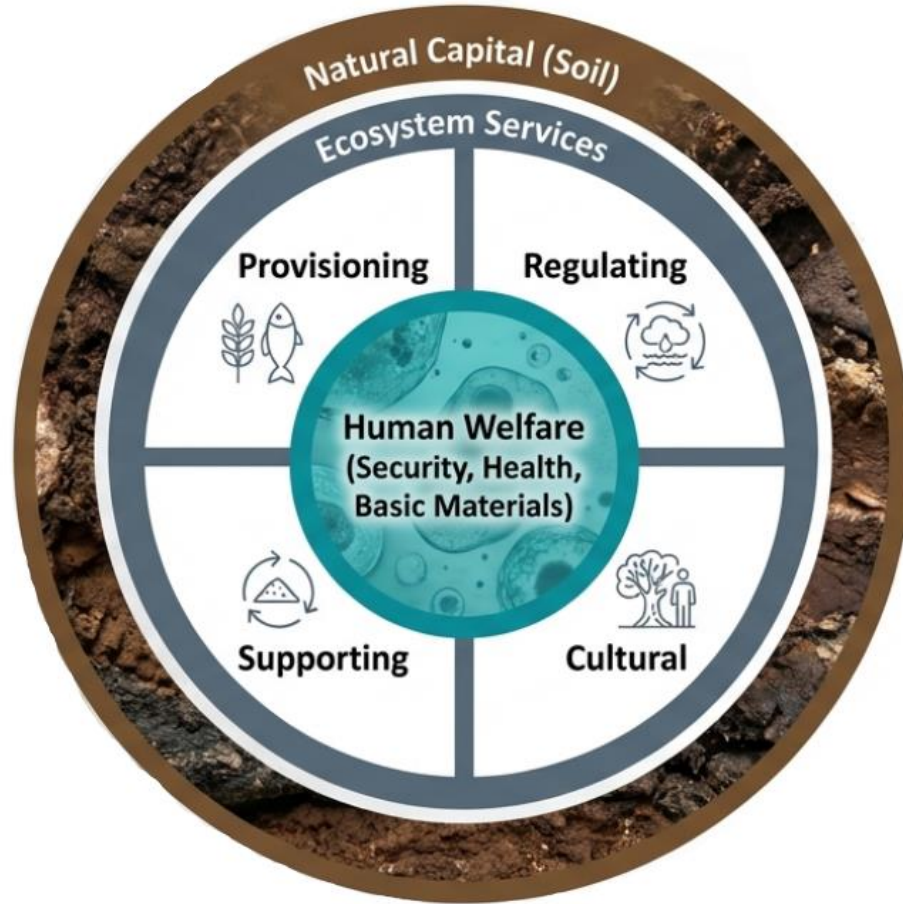
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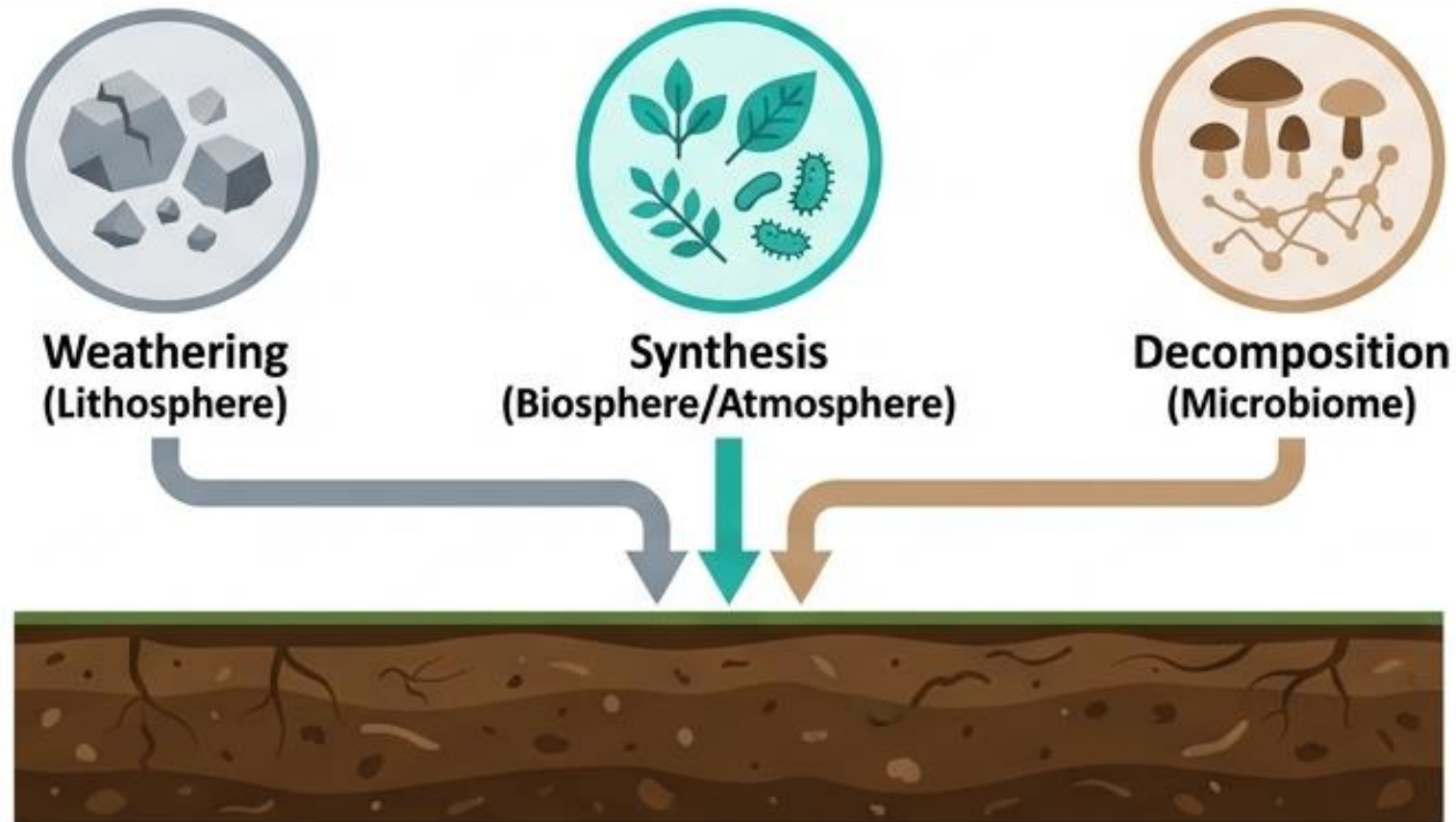


Soil: The Finite Foundation of Circular Systems



- 90% of land- and water-related impacts driven by resource extraction
- Soil as the primary source for biomass (food, fiber, fuel)
- Interdependency: Natural capital → Ecosystem services → Human welfare
- The "Spaceman Economy" perspective

DATA POINT: Under natural conditions, one inch of topsoil takes thousands of years to form.



Result: Rich, Bioactive Soil Matrix

GEOLOGICAL TIME



1,000 Years = 1 Inch of Topsoil

HUMAN TIME

1 Year



1 Year = 1 Inch Extracted

The IPAT Equation ($\text{Impact} = \text{Population} \times \text{Affluence} \times \text{Technology}$).
High-yield agricultural practices act as a multiplier on extraction speed.

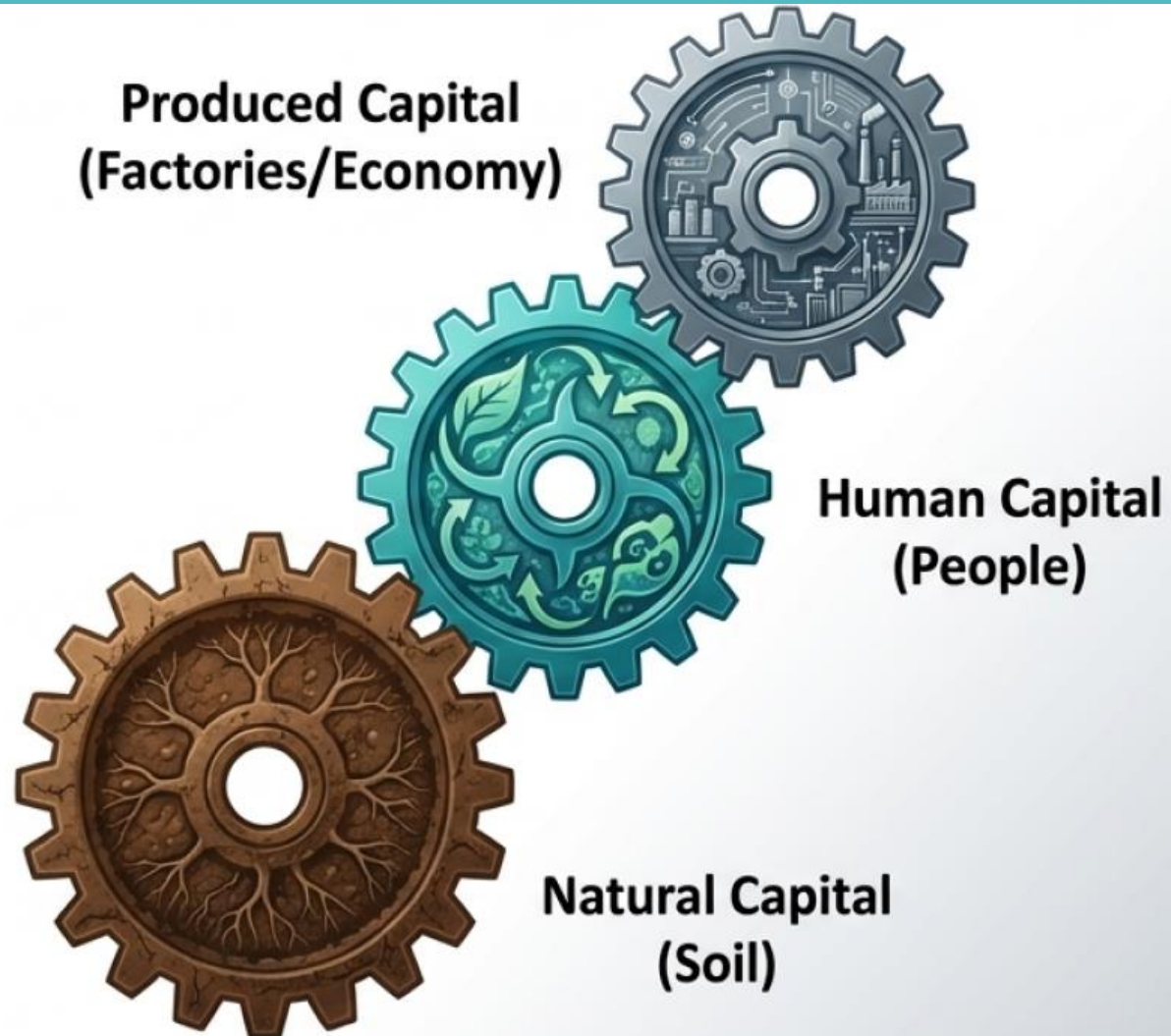


\$40 Billion

The estimated annual global cost of declining soil fertility.



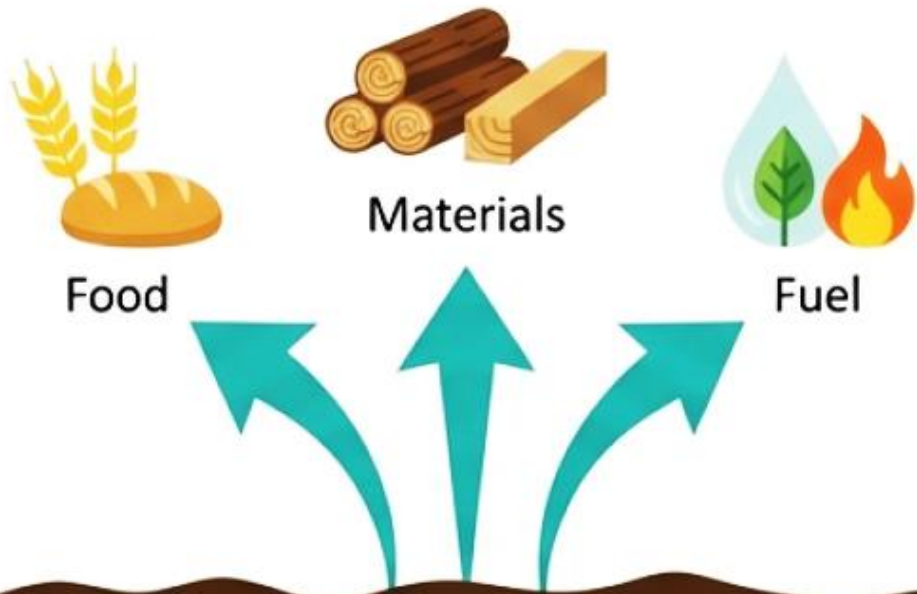
25–35% of the global 1.5 billion hectares of cultivated land is currently degraded.



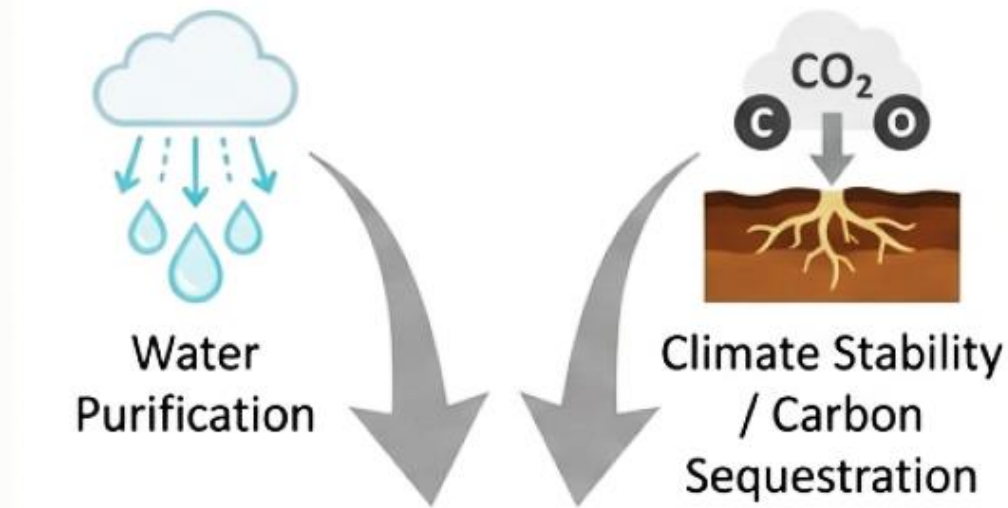
The global economy is currently **liquidating the Earth's natural capital** to drive **produced capital**.

If the foundational gear shrinks, the **entire socio-economic machine grinds to a halt**.

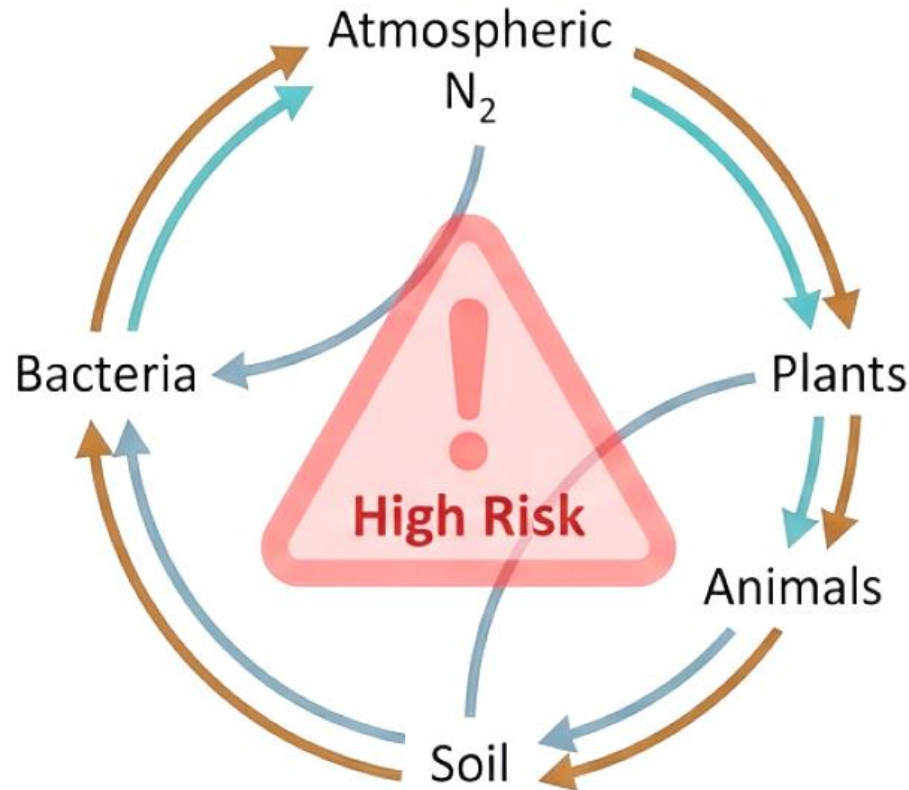
Provisioning Functions



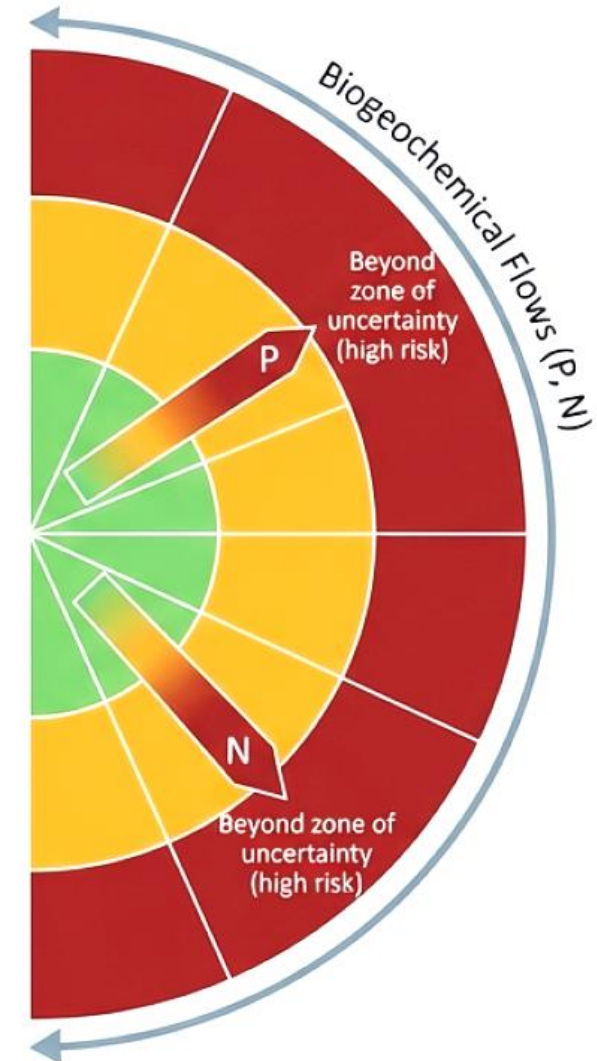
Regulating Functions



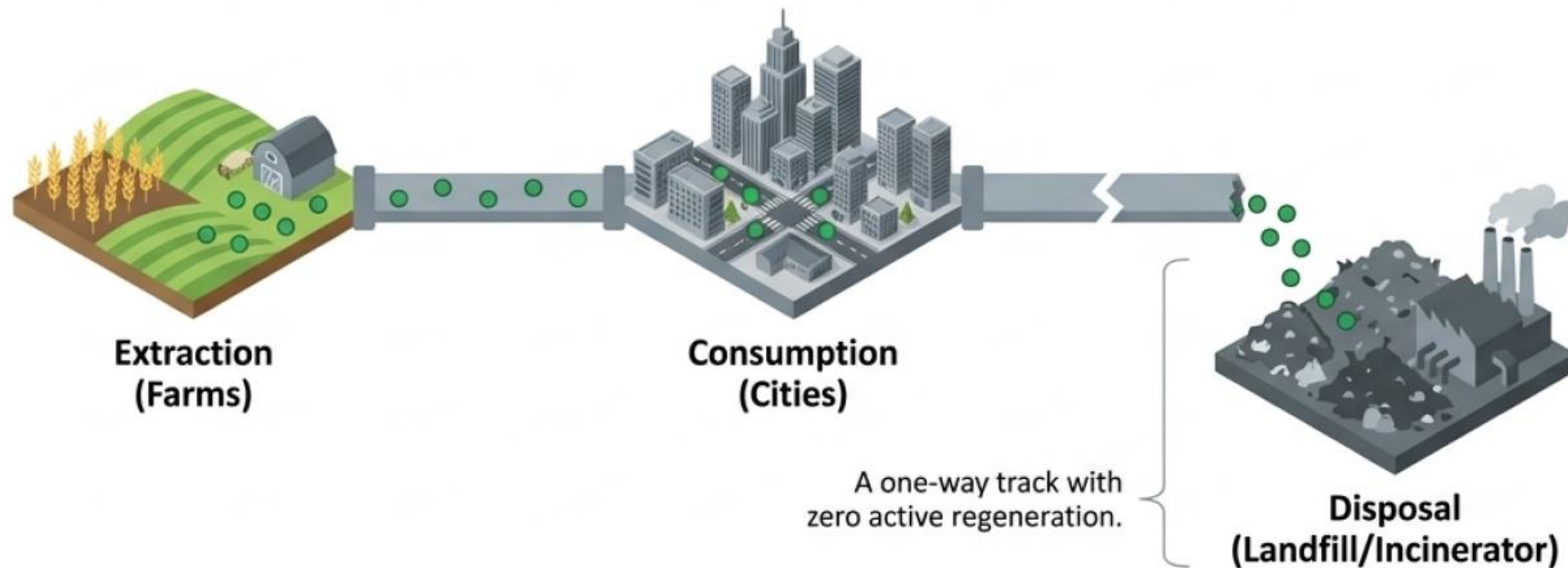
Soil Functions: Regulating & Supporting

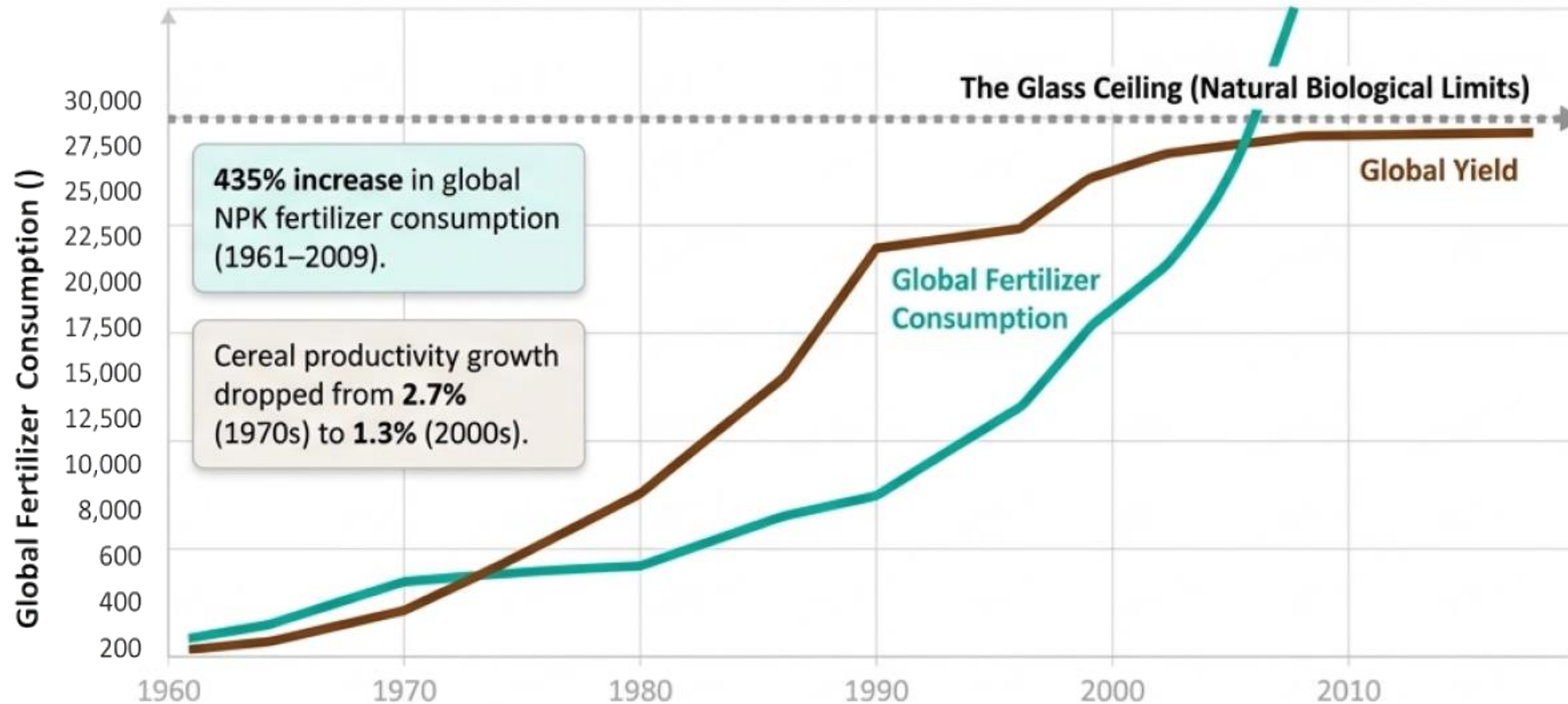


Industrial extraction has pushed global nitrogen and phosphorus cycles far beyond the safe operating space, destabilizing the biosphere's fundamental supporting services.



20 Gigatonnes. The global processing and end-of-life waste generated annually by the 'Take-Make-Throw' model.



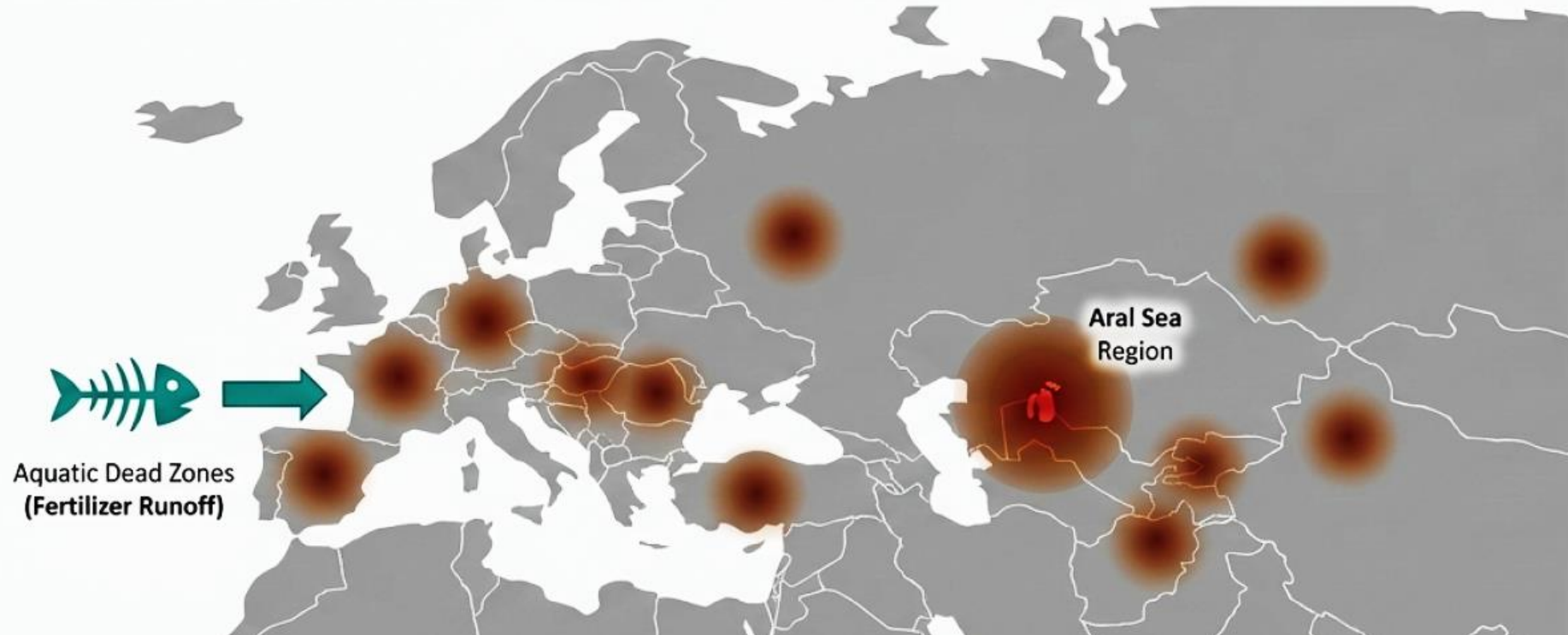


Global Deficit

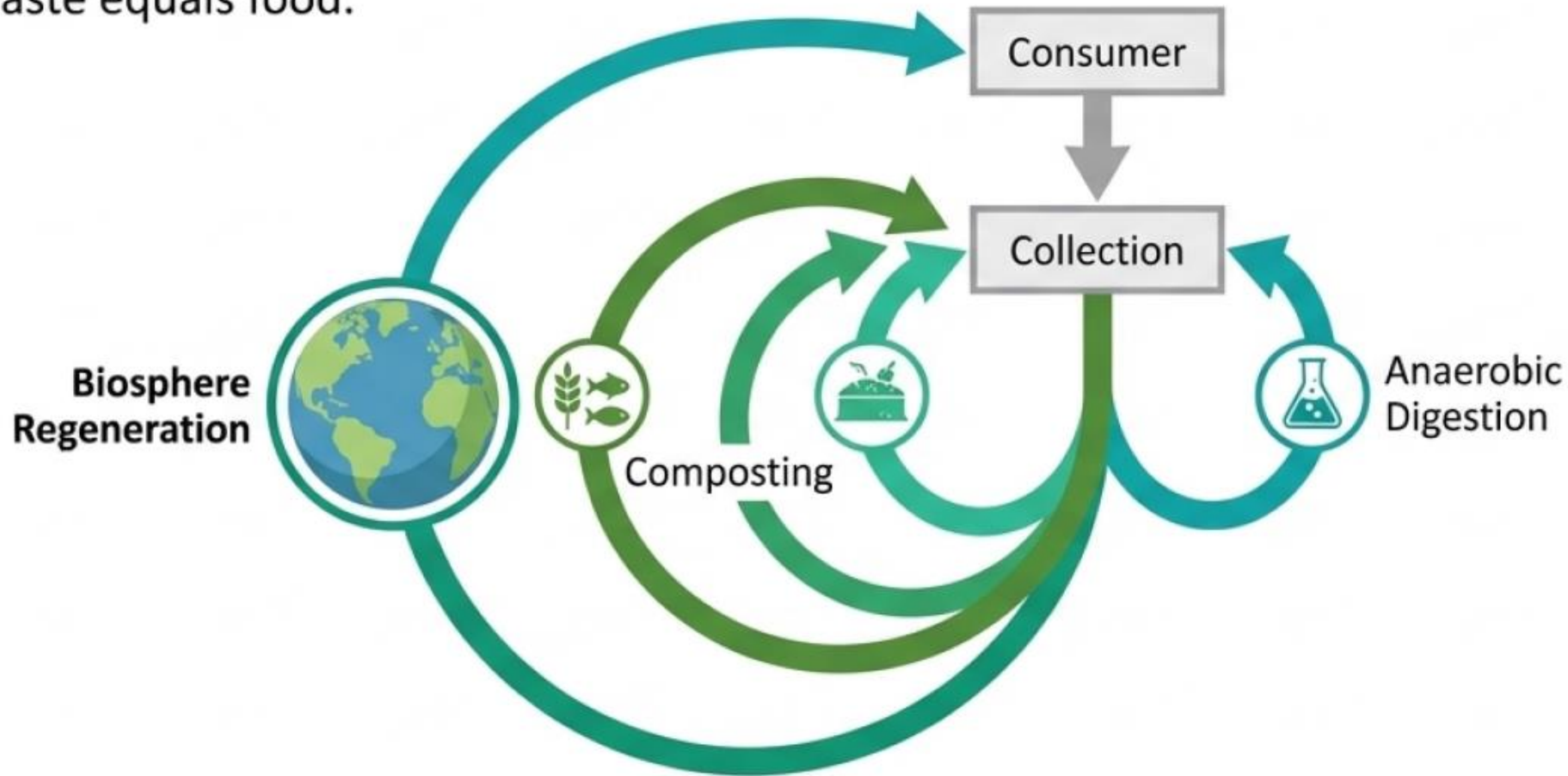
Annual global nutrient deficit of 5.5M tonnes Nitrogen, 2.3M tonnes Phosphorus, 12.2M tonnes Potassium.

Regional Context

In Europe, 45% of soils have low/very low organic matter. High vulnerability in Central Asian zones.



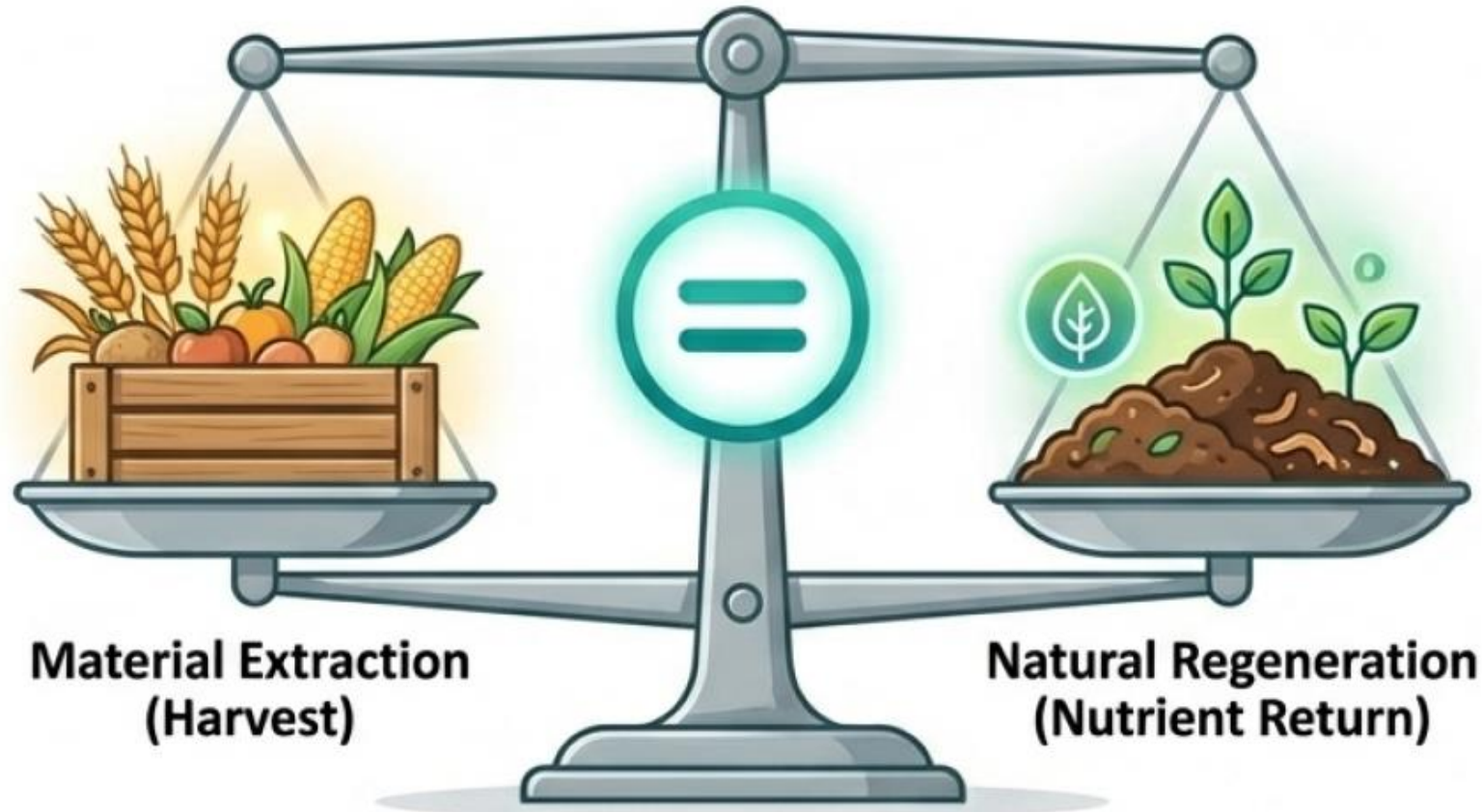
Waste equals food.



Closing the Loop: Regeneration through Nutrient Return



Decoupling economic growth from raw material extraction.





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