

20th ISDE International Lecture, Climate Change Risk and Regenerative Economics

The Measure of What Matters

Digital Earth Framework 6 and the Future of Planetary Value

By

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From Climate Risk to Accountable Value

Framework 6 addresses the evidence infrastructure between them.

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- Climate risk is becoming non-linear, systemic and spatially uneven
 - Economic responses need trusted evidence, not only ambition
 - Digital Earth provides the setting in which risk, value, rights and verification can be connected
 - Framework 6 concerns the pathway from evidence to legitimate value

The bridge between climate risk and regenerative economics is trusted planetary evidence.



Digital Earth is a Pluralistic Vision

- A cyber-physical infrastructure for Earth systems intelligence
- Built from observations, models, simulations and digital twins/threads
- It connects science, infrastructure, governance, ethics, culture and decision-making.
- Framework 6 is a lens into an enabling layer, linking evidence, value and trust.

Digital Earth turns data into shared intelligence for planetary stewardship.



12 Thematic Frameworks of Digital Earth



Tier 1, Foundational Systems

1. Dynamic Complex Adaptive System
2. Cyber-Physical Continuum
3. Supersense and Perception
4. Sustainable Computational Substrate
5. Trust and Compliance Infrastructure

Tier 2, Enabling Infrastructures

6. Value Exchange Infrastructure
7. Ethical Governance System
8. Knowledge Federation
9. Meta-Design Space for Planetary Futures

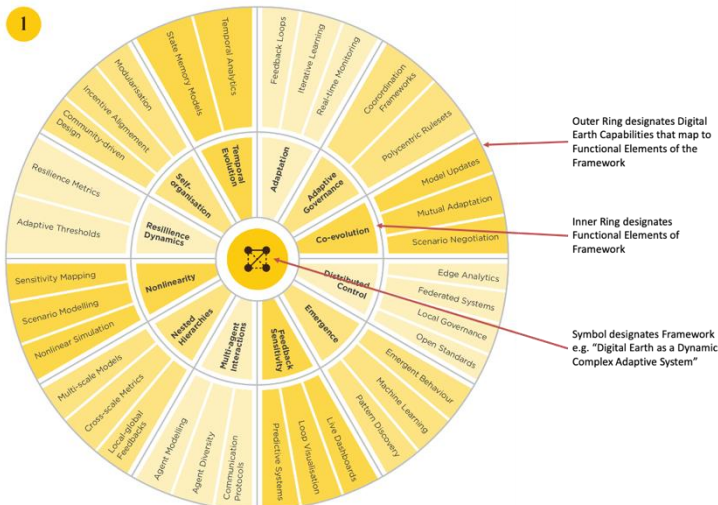
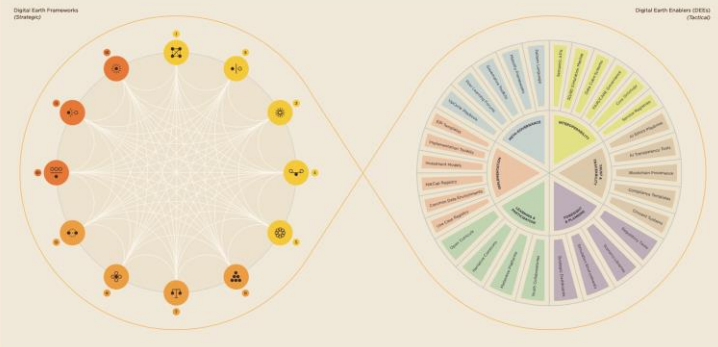
Tier 3, Human-Centric Applications

10. Learning and Empowerment Platform
11. Cultural Memory and Storytelling Hub
12. Strategic Intelligence and Decision Theatre

The frameworks are lenses into one system of systems

The International Society of Digital Earth

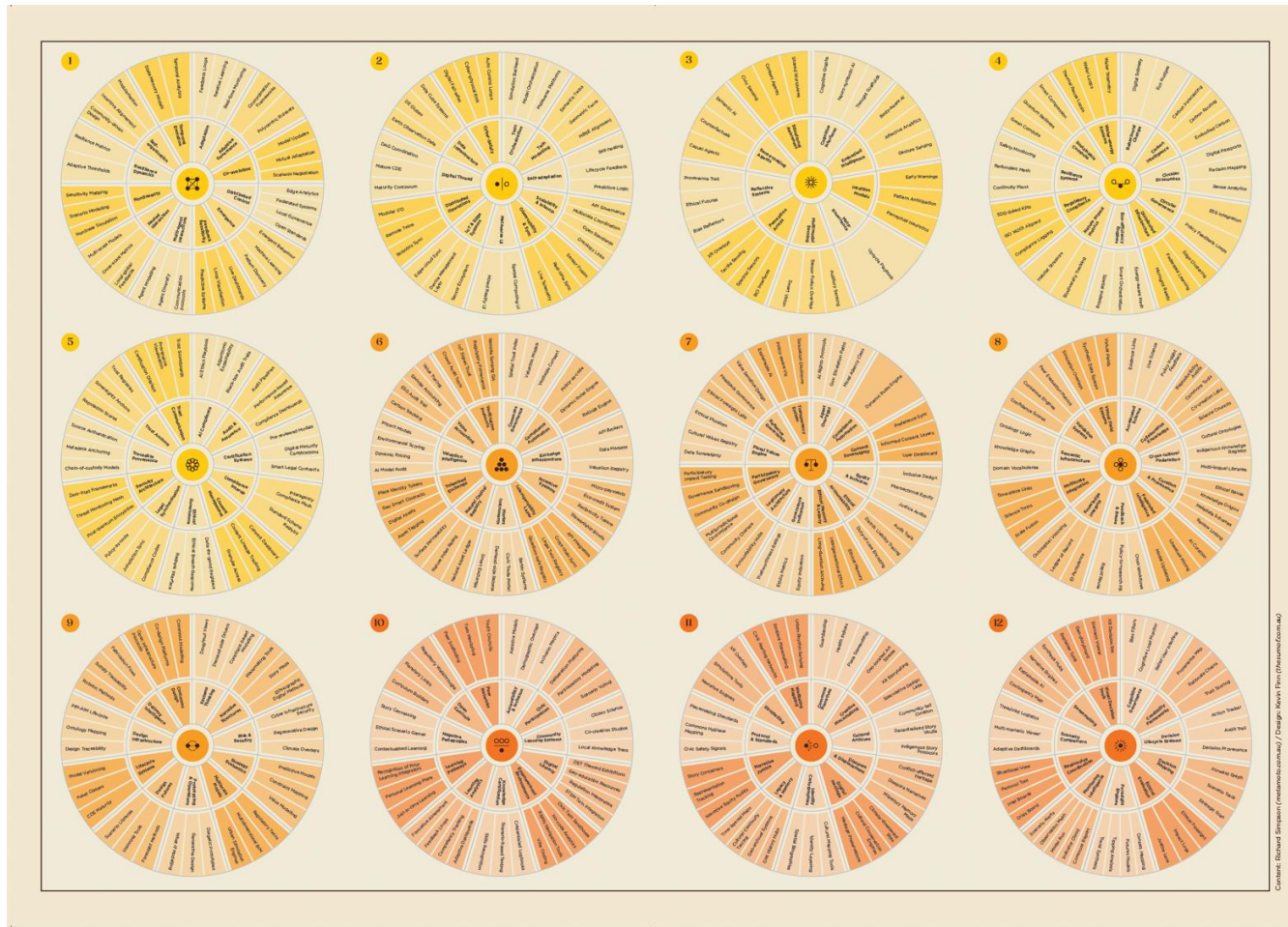
Tier 1 Foundational Systems These define the system architecture and establish Foundations of Digital Earth.	Tier 2 Enabling Infrastructures These frameworks build on Tier 1 to enable trusted value creation, data integration, and governance.	Tier 3 Human-Centric Applications These frameworks reflect how Digital Earth supports societal learning, participation, identity, and global sustainability.
<ul style="list-style-type: none"> ☉ Digital Earth as a Dynamic Complex Adaptive System ☉ Digital Earth as a Cyber-Physical Continuum ☉ Digital Earth as a Sensemaking and Perception ☉ Digital Earth as a Sustainable Computational Substrate ☉ Digital Earth as a Trust and Compliance Infrastructure 	<ul style="list-style-type: none"> Ⓜ Digital Earth as a Value Exchange Infrastructure Ⓜ Digital Earth as an Ethical Governance System Ⓜ Digital Earth as a Knowledge Federation Ⓜ Digital Earth as a Meta-Design Space for Planetary Futures 	<ul style="list-style-type: none"> 👤 Digital Earth as a Learning & Empowerment Platform 👤 Digital Earth as a Cultural Memory and Storytelling Hub 👤 Digital Earth as a Strategic Intelligence & Decision Theatre



Outer Ring designates Digital Earth Capabilities that map to Functional Elements of the Framework

Inner Ring designates Functional Elements of Framework

Symbol designates Framework e.g. "Digital Earth as a Dynamic Complex Adaptive System"



The Question at the Heart of Framework 6

Making value visible without reducing everything to money.

- Some value is priced
- Some value is rewarded
- Some value is disclosed
- Some values should never be exchanged.

Framework 6 frames the conditions under which evidence becomes legitimate value.



The Evidence-to-Value Gap

Seeing is not the same as recognising value.

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- Satellites, sensors, twins and AI models expand perception
 - Evidence becomes useful only when trusted, governed and decision-ready
 - Institutions often fail to recognise ecological, cultural or preventive value
 - Framework 6 defines the pathway from evidence to legitimate value

The pathway from evidence to value is now a critical infrastructure.



What We Do Not Value ..Still Has Consequences

Every valuation system creates blind spots.

- Regulations, accounts and procurement rules often miss cultural value, local knowledge, ecological function, public data quality and avoided harm.
- Those omissions shift costs to communities, public budgets, insurers and future generations.
- Framework 6 makes blind spots explicit so value can be priced, rewarded, protected or deliberately kept outside exchange.

The danger is not only mispricing. It is organised invisibility.



Geo-Veracity

The measurable trustworthiness of spatial digital truth.

- Accuracy, currency, provenance and uncertainty have economic value.
- Trusted spatial data reduces risk, dispute and transaction cost.
- A geo-veracity dividend rewards quality, reuse, validation and correction.
- The digital world must keep faith with the real one.

No value claim is stronger than the evidence on which it rests.



From Tokens to Twins

A token can carry a claim.
A twin can hold context.

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- A token cannot make the underlying claim true
 - A Digital Earth twin can reveal state, change, risk and relationships
 - A digital thread preserves evidence, provenance, rights, uncertainty and decisions
 - Value exchange must move from isolated transactions to governed evidence.

A ledger records movement. A Digital Earth thread explains meaning.

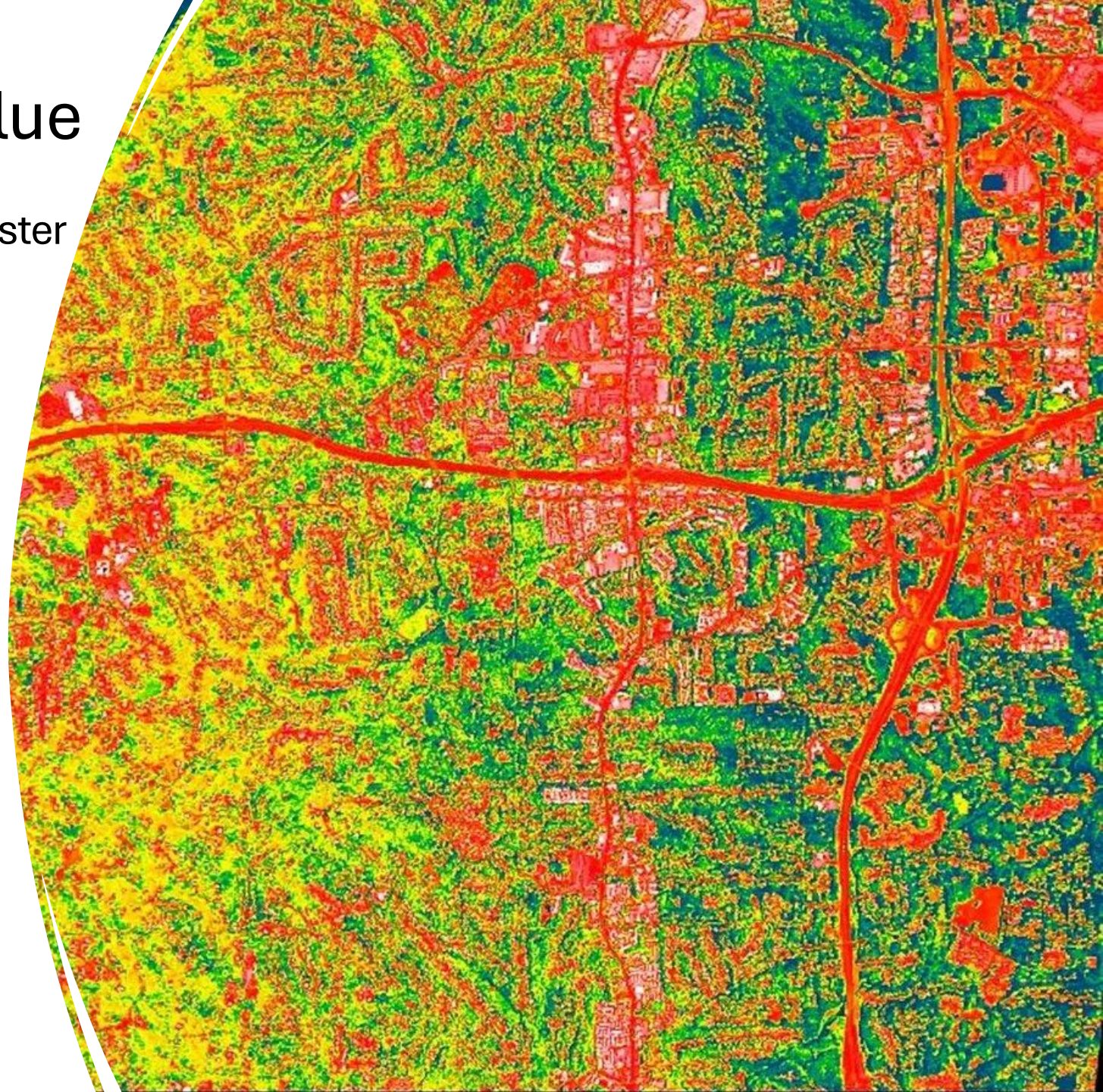


Avoided Harm is Real Value

Sometimes the greatest value is the disaster that does not occur.

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- Peak demand avoided can reduce cost, emissions and infrastructure strain.
 - A spill contained, a blackout prevented, a bridge closed in time all create value.
 - Framework 6 makes absence legible through trusted baselines.

Prevention must become visible enough to be rewarded.



Testing Value in Practice

Local innovation becomes valuable when it can be trusted and repeated.

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- Low-carbon materials, regenerative works and circular design require planning, procurement, site skills and verification, not only new products.
 - Digital Earth can record baselines, specifications, performance, recyclability, lessons learned and repeatability.
 - Shared evidence spaces allow councils, communities and infrastructure owners to test, reward and scale eco-centric changes without starting from zero each time.

Innovation becomes value when others can test it, trust it and repeat it.



Digital Earth & Financial Integrity

A planetary reference layer for value, risk and stewardship.

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- Digital Earth is not money, and it should not be presented as a substitute for monetary authority.
 - Financial systems often lack reliable, spatially explicit evidence about the ecological systems that underpin economic activity.
 - Digital Earth can strengthen climate-risk, nature-risk, infrastructure-risk and stewardship evidence for governments, regulators, insurers and investors.
 - Framework 6 links trusted environmental and spatial evidence to reporting, risk assessment, procurement, investment and public accountability.

Financial systems need better evidence about the Earth systems on which long-term value depends.





Foresight Changes Value

What can be anticipated can be governed differently.

- Example: Lagrange 5 space-weather observation can improve early warning.
- Early warning changes the economics of preparedness, insurance and resilience.
- Better modelling makes avoided loss more visible before disaster occurs.
- Digital Earth turns foresight into a practical basis for investment, assurance and accountability.

What becomes knowable becomes part of our responsibility.

The Economy Answerable to Earth

Framework 6 is a value-governance lens for a living planet.

- The values that sustain long-term prosperity are often ecological, social, spatial and intergenerational before they are financial.
- Digital Earth can help recognise and govern stewardship, resilience, trusted information, avoided harm and shared public value.
- Framework 6 points towards a future in which better knowledge of the Earth supports wiser investment, stronger accountability and more regenerative development.

Digital Earth helps ensure that what matters most is visible enough to be valued, protected and acted upon.



Thank you

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