

Moving from interconnected crisis to systemic solutions

Resource efficiency, nature-based solutions, and systemic transformation as responses to the complexity of the triple planetary crisis

Key facts of the triple crisis at a glance

The triple planetary crisis is a systemic challenge, not three separate issues: **climate change, biodiversity loss, and pollution** reinforce one another through shared drivers and feedback, threatening planetary and human well-being (see Knoblauch et al., 2025). It is driven by fossil fuel dependence, unsustainable production and consumption, overexploitation of land and resources, and structural inequalities. Seven of nine planetary boundaries have already been crossed, pushing ecosystems toward tipping points, while sectoral amplifiers - energy with its major GHG emissions, land degradation and pollution; agriculture with plastic and nutrient pollution, biodiversity loss and climate links; and construction with high land, material, and energy demand causing emissions and habitat loss - intensify pressures. The **impacts are distributed unequally**, with Indigenous Peoples, low-income groups and countries, women and youth facing the greatest burdens while holding the least decision-making power and resources to adapt.

"Integrated action on resource efficiency, climate and energy, food and land achieve significantly larger positive effects than any one of these policy areas for action would in isolation." (UNEP, 2024)

Three Pathways for Systemic Solutions

The triple planetary crisis demands responses that move beyond single-issue solutions. Three interdependent pathways chart a way forward: **Societal metabolism and resource use** to reduce pressures at the source, **nature-based solutions** to restore ecosystems and strengthen resilience, and **systemic transformation** to address root causes and embed justice in governance and values. Together, they form a mutually reinforcing strategy that links reduced material pressures, healthy ecosystems, and transformative governance into a coherent response, showing how only justice-oriented, cross-sectoral action can meet the scale and urgency of the challenge.



Societal metabolism and resource use: Strategies for staying within planetary boundaries

Resource use & the triple planetary crisis

Material use can serve as a practical proxy for environmental impact by reflecting the general link between material flows and associated environmental effects. **Material extraction** has tripled over the past 50 years, reaching 100 billion tonnes/year. On the current trajectory, it will grow by **>2.3% annually**, increasing by **ca. 60% by 2060**.

Four domains drive 90% of global material demand, namely the built environment, mobility, food systems and energy systems. Resource extraction and processing account for >55% of global GHG emissions and >90% of land use related biodiversity loss and water stress.

***Societal metabolism** is defined as the continuous flow of materials and energy through economies. Shaped by social structures (institutions, technology, cultural norms), it underpins economic activity but drives the triple planetary crisis.*

Challenges and enabling conditions for resource efficiency and circularity

Governing societal metabolism is essential to solving the triple planetary crisis. While circular economy and material efficiency offer important tools, real transformation depends on reorganizing how societies meet human needs by mobilizing and transforming natural resources.

To address the challenges, improving resource efficiency and circularity – through strategies such as extending product lifespans, promoting reuse, and enhancing recycling– must be complemented by broader measures and a more systemic perspective.

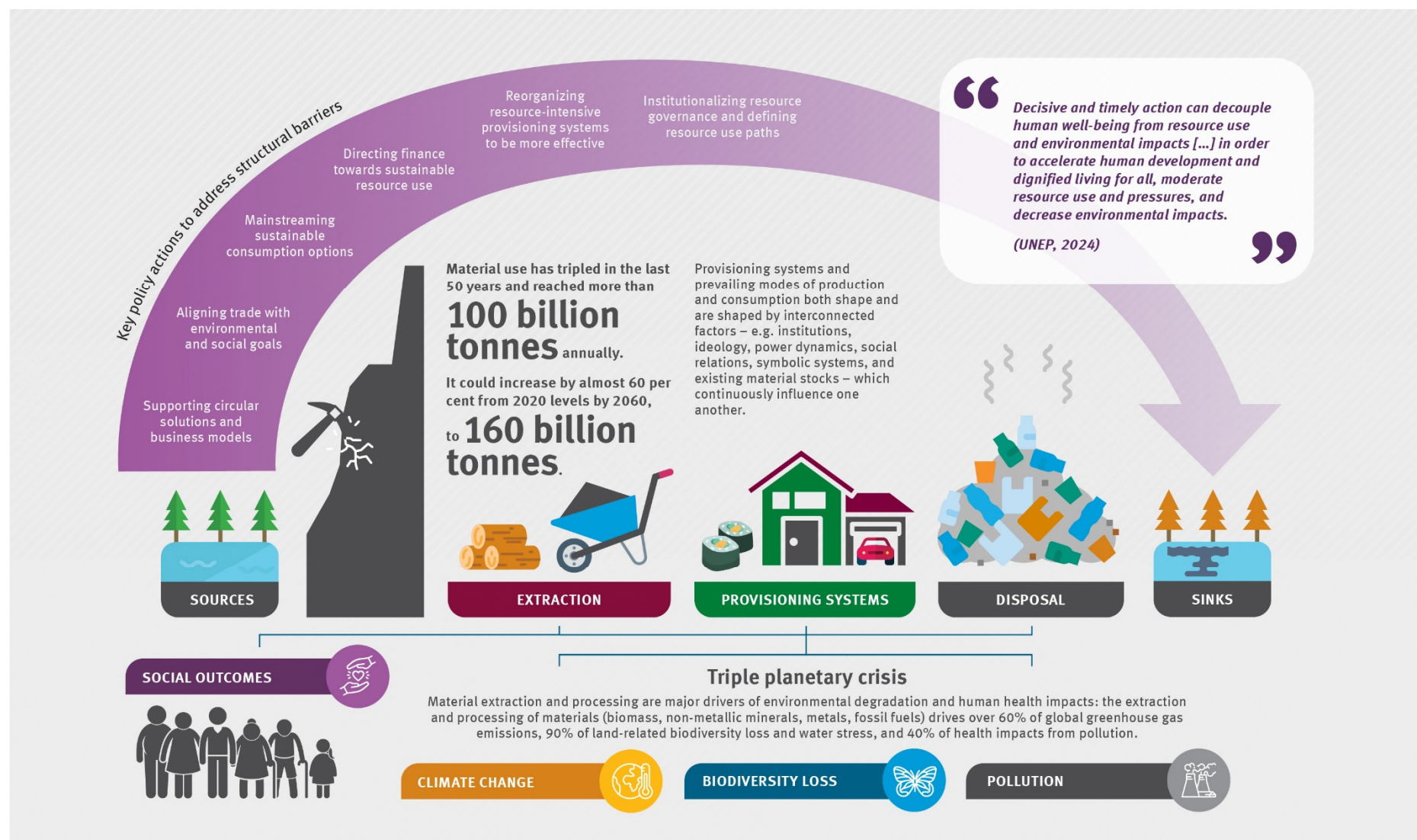
This might also require an increase in **economic democracy** and planning.

Several **structural barriers** hinder sustainable provisioning. This includes the **economic growth paradigm**, which prioritizes GDP expansion over human and ecosystem well-being, policy incoherence and weak governance, marked by conflicting objectives, fragmented responsibilities, limited capacity, and insufficient inclusion of local and scientific stakeholders, and vested interests such as harmful subsidies, entrenched investments, and concentrated corporate power. Additional obstacles arise from externalised environmental costs that remain unpriced or weakly regulated, from lack of transparency and accessible information constraining accountability and slowing progress and from social inequality, which amplifies vulnerabilities and limits societal support for transformation.

Key policy actions are:

- ▶ **Institutionalizing resource governance and defining resource-use paths** at both global and national levels through monitoring, benchmarking, and integration into existing international environmental agreements,
- ▶ **Aligning global finance with sustainable resource use**, by phasing out harmful subsidies (e.g. for fossil fuels), taxing virgin resource extraction, and mobilizing private capital through a mandatory sustainability taxonomy,
- ▶ **Transforming trade toward environmental goals**, by pricing in social and ecological costs, strengthening sustainability provisions and regulating commodity markets,
- ▶ **Promoting sustainable production and consumption** by making sustainable goods affordable and default, and regulating marketing, labelling, and greenwashing,
- ▶ **Supporting circular business models** through eco-design standards, repair, reuse & recycling, and landfill bans,
- ▶ **Improving provisioning system performance**, revealing less resource-intensive ways to fulfill needs beyond conventional sector-specific solutions such as public transport, compact urban design, and mobile working.

Figure 1: Current model of material use & key policy actions to address structural barriers



Source: Own illustration, Ecologic Institute.

Nature-based Solutions for a resilient planet

NbS potential to tackle the triple crisis

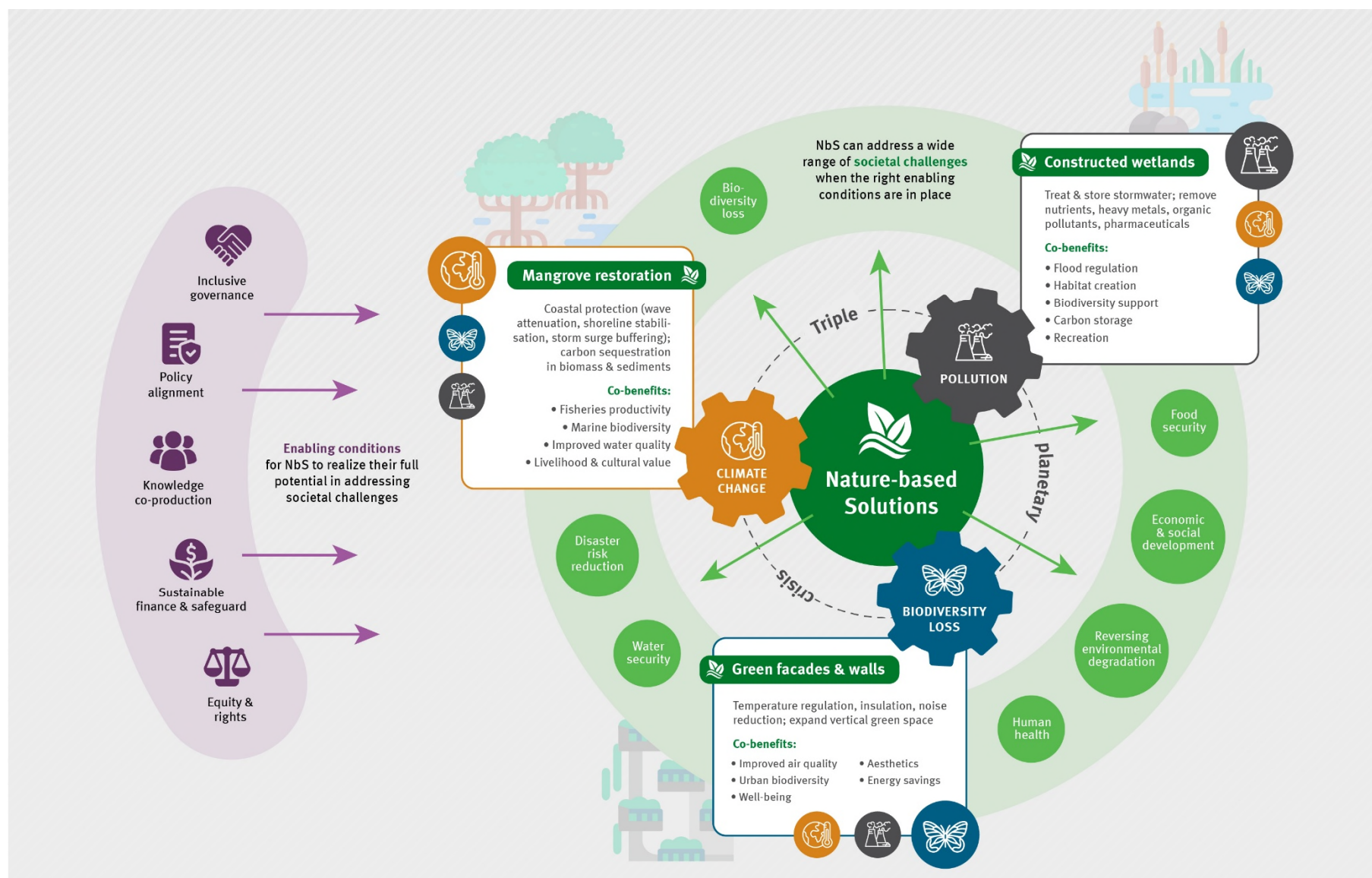
Unlike single-issue approaches, NbS work with nature’s processes, offering integrated responses to climate change, biodiversity loss, and pollution. NbS provide integrated responses where conventional approaches often fall short. They are multifunctional, delivering co-benefits across climate, ecosystems, and society. NbS enhance climate adaptation, sequester carbon, and protect communities from disasters while restoring degraded habitats and reversing biodiversity loss. By filtering water, regulating nutrient cycles, and reducing contamination, they also curb pollution. Beyond environmental gains, NbS sustain jobs, improve agricultural productivity, support health, and strengthen food and water security, making them a critical lever for systemic resilience.

Nature-based Solutions (NbS) are “actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits” (UNEA, 2022).

NbS for biodiversity loss prevention	By restoring habitats, enhancing ecological connectivity, and reducing pressures from human activity, NbS strengthen ecosystems while delivering wider societal benefits. In urban areas, measures such as green roofs, facades, walls, water retention ponds, and bioswales create habitats for pollinators and birds, improve stormwater management, and enhance local microclimates. In rural landscapes, approaches like reforestation, wetland restoration, ecological corridors, and agroforestry integrate biodiversity into productive systems, support soil and water health, and increase resilience to climate extremes
NbS for climate adaptation and mitigation	NbS contributes to climate action by both reducing greenhouse gas emissions and helping societies adapt to climate impacts. Mitigation measures such as reforestation, afforestation, agroforestry, cover cropping, peatland rewetting, and the protection of blue carbon ecosystems like mangroves, seagrasses, and salt marshes store carbon and restore ecosystem functions. At the same time, adaptation-focused measures—urban green roofs, tree canopies, permeable surfaces, and coastal mangroves—help buffer heat, flood, and storm risks, while maintaining the ecosystem services that are critical for food and water security.
NbS for pollution reduction.	Ecosystems also act as natural filters, reducing environmental pollution and improving both human and ecological health. Constructed wetlands and bioretention systems filter nutrients, heavy metals, organic pollutants, and pharmaceuticals from stormwater. Urban trees, roadside vegetation, hedgerows, and green roofs capture particulate matter and gaseous pollutants while improving local microclimates. Plant-based measures such as bio- and phytoremediation enhance soil quality and reduce contaminant loads. By harnessing natural processes, NbS not only mitigate pollution but also generate broader climate and social co-benefits.

Source: Own illustration, Ecologic Institute, based on Burgos Cuevas et al. (2025).

Figure 2: Examples of NbS as systemic solutions for the triple planetary crisis



Source: Own illustration, Ecologic Institute.

NbS enabling conditions

For NbS to reach their full potential in addressing biodiversity loss, climate change, and pollution, several enabling conditions must be in place:

- ▶ **Policy coherence** – NbS need to be embedded into climate strategies, biodiversity action plans, and urban planning frameworks so they are not implemented in isolation.
- ▶ **Financing** – Long-term and predictable funding is crucial, since NbS deliver public goods that conventional markets undervalue; innovative models and blended finance can help close this gap.
- ▶ **Inclusive governance** – Meaningful participation of Indigenous Peoples, local communities, and municipalities strengthens legitimacy and ensures that NbS are co-created rather than imposed.
- ▶ **Adaptive governance** – NbS must remain flexible under uncertainty, allowing adjustments as risks evolve and knowledge improves

Transformative change

Transformative change refers to “a fundamental, system-wide reorganization across technological, economic, and social factors, including paradigms, goals, and values” (IPBES, 2019a).

Unlike incremental adjustments, it requires a decisive shift away from the status quo toward sustainable and just pathways.

According to IPBES, this transformation should be guided by four core principles:

- Pluralism and inclusion
- Respectful human–nature relationships
- Adaptive learning
- Equity and justice

Systemic change and transformation

Why is transformation needed?

The deeply interconnected triple planetary crisis of climate change, biodiversity loss, and pollution is driven by a common set of root causes, including fossil fuel dependence, unsustainable resource use, and entrenched inequalities. Incremental measures are insufficient as these systemic drivers reinforce one another, creating feedback loops that amplify risks. At the same time, the impacts fall most heavily on the most affected people and areas (MAPA), including Indigenous Peoples and local communities, who have contributed least to these crises yet often lack resources and voice in decision-making. Therefore, achieving lasting change requires systemic transformation that addresses structural inequalities, power imbalances, and the undervaluation of nature, while grounding societies in justice, equity, renewed human–nature relationships, and diverse knowledge systems.

The central role of justice

Justice lies at the heart of systemic transformation. MAPA must be acknowledged not only as vulnerable groups but also as active agents of change, whose knowledge, rights, and agency are central to designing effective solutions. Equitable partnerships, inclusive governance, and the co-creation of knowledge are therefore essential to overcoming historical injustices and ensuring that transformation delivers mutual benefits for both people and ecosystems.

Dimensions of systemic transformation

Shifting views: Rethinking how we value nature	Transformation begins with a shift in worldviews, moving beyond treating nature as a mere economic resource towards recognizing its intrinsic, instrumental, and relational values. Re-establishing human–nature connectedness fosters care, responsibility, and pro-environmental behaviour, while co-creation of knowledge across scientific, Indigenous, and local systems ensures more legitimate, inclusive, and effective solutions.
Reshaping systems and practices: Reforming governance, markets, and consumption patterns	Lasting change requires aligning governance, financial systems, and consumption patterns with sustainability and justice. This means redirecting finance toward restoration and regeneration, reforming subsidies and incentives, embedding planetary boundaries and sufficiency into planning, and ensuring governance is inclusive, adaptive, and transformative. Structural reforms that dismantle harmful lock-ins and redistribute power are critical to enable systemic change.
Restoring places that matter: Co-managing conservation and regeneration	Conservation and regeneration must move from extractive, top-down models to inclusive, co-managed, and regenerative practices that restore both ecosystems and cultural ties. Recognizing Indigenous stewardship, strengthening legal innovations such as the rights of nature or ecocide laws, and embedding human rights to a healthy environment are essential to restore ecological integrity and build resilient societies.

Source: Own illustration, Ecologic Institute, based on Burgos Cuevas et al. (2025).

Lessons learnt

- ▶ **Govern societal metabolism:** Establish ambitious, science-based targets for resource use. Reform provisioning systems to reduce material throughput and democratize access. Pair efficiency with sufficiency and justice.
- ▶ **Scale transformative NbS:** Mainstream NbS into climate, biodiversity, and urban planning. Mobilize long-term finance and ensure inclusive governance.
- ▶ **Advance systemic transformation:** Reshape governance and finance to dismantle harmful incentives. Recognize MAPA and Indigenous Peoples as central actors. Foster synergies across policy domains to avoid trade-offs and build resilience.

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