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Harmonizing Humanity and Habitat: A New Paradigm of Transformative Co-Governance for Just and Resilient Socio-Ecological Futures

Authors:
Prof. Dr. Harikumar Pallathadka
Vice-Chancellor & Professor,
Manipur International University,
Imphal, Manipur, India.
harikumar@miu.edu.in
https://orcid.org/0000-0002-0705-9035
First Author
Dr. Vishwanath Sharma Manoharmayum
Associate Professor and HoD,
Department of Environmental Science,
Manipur International University,
Imphal, Manipur, India
manoharmayum@live.com
Second and Corresponding Author
Prof. Dr. Parag Deb Roy
Social Scientist & Independent Researcher
Guwahati, Assam, India
Third Author
Dr. Dolpriya Devi Manoharmayum
Assistant Professor, Department of Integrated Research and Discovery,
Koneru Lakshmaiah Education Foundation -
KLEF (Deemed To Be University), Guntur, Andhra Pradesh, India
https://orcid.org/0000-0003-1188-9450
Fourth Author

Abstract
The interconnected crises of climate change, biodiversity loss, and social inequity demand fundamental departure from prevailing environmental governance paradigms. This paper introduces Transformative Co-Governance (TCG) as an integrated framework addressing these challenges through systematic integration of transformative environmental governance principles, ecological citizenship frameworks, participatory co-design methodologies, and Indigenous and Local Knowledge (ILK) systems.Building on analysis of 847 peer-reviewed sources (2016-2025), TCG explicitly addresses power asymmetries, promotes epistemic pluralism, and embeds "prefigurative justice": integrating distributive, procedural, and recognitional justice from governance process onset. The framework operates through seven interconnected mechanisms: (1) participatory co-design, (2) ILK integration, (3) polycentric decision-making, (4) adaptive learning systems, (5) multi-scale coordination, (6) transformative capacity building, and (7) holistic outcome evaluation.Case study analysis of 34 empirical applications across six continents reveals TCG implementations achieve 67% better social-ecological outcomes compared to conventional approaches, with particularly strong performance in Indigenous self-determination (Cohen's d = 1.23) and ecosystem health indicators (Cohen's d = 0.89).

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Keywords: *Transformative Governance, Socio-Ecological Systems, Environmental Justice, Indigenous Knowledge Systems, Co-Design, Climate Resilience, Biodiversity Conservation, Participatory Governance, Sustainability Transitions, Prefigurative Justice*

1. INTRODUCTION: THE ANTHROPOCENE IMPERATIVE

The Anthropocene presents unprecedented challenges requiring revolutionary transformation in environmental governance. Current policies put the world on track for 2.7°C warming by 2100 (UNEP, 2024), while biodiversity loss continues at rates 100-1,000 times natural background extinction rates (IPBES, 2024).

The Escalating Crises

Scientific consensus confirms human activities have unequivocally caused global warming, with temperatures reaching 1.1°C above 1850-1900 levels. The "sixth mass extinction" threatens 1 million species within decades (Johnson et al., 2024). These environmental risks compound into "polycrisis": simultaneous, interconnected crises amplifying each other's effects (Lawrence et al., 2024).

Paradigm Shift Imperative

Despite decades of environmental policy development, progress remains inadequate. Analysis by Martinez et al. (2024) of 1,247 environmental interventions found fragmented approaches achieved only 23% of stated objectives, compared to 76% for integrated approaches. This suggests dominant paradigms - characterized by incrementalism, fragmentation, and insufficient justice attention - are fundamentally inadequate.

INTRODUCING TRANSFORMATIVE CO-GOVERNANCE

TCG synthesizes four foundational elements:

1. **Transformative Environmental Governance (TEG)** principles triggering regime shifts
2. **Ecological Citizenship (EC)** frameworks empowering agents of change
3. **Participatory Co-design** methodologies ensuring inclusive solutions
4. **Indigenous and Local Knowledge (ILK)** integration honoring diverse ways of knowing

2. THEORETICAL FOUNDATIONS

Evolution from Conservation to Transformation

Environmental thought has evolved from "fortress conservation" (1900s-1960s) through ecosystem management (1970s-1990s), adaptive management (1980s-2000s), and social-ecological systems thinking (1990s-2010s) to TCG (2010s-present). Each paradigm built upon previous insights while addressing limitations.

Transformative Environmental Governance

TEG, as defined by Chaffin et al. (2016), responds to, manages, and triggers regime shifts in coupled social-ecological systems. Key mechanisms include:

- **Leverage Points:** Parameters (least transformative), design (moderately transformative), and intent (most transformative) interventions
- **Transformative Capacity:** Ability to intentionally initiate regime shifts
- **Cross-Scale Dynamics:** Interactions across multiple scales simultaneously

Environmental Justice Integration
Indigenous Knowledge Systems
ILK systems contribute holistic integration, place-based specificity, adaptive management, and intergenerational transmission. Evidence demonstrates Indigenous territories contain 80% of remaining biodiversity despite comprising only 22% of global land area (Garnett et al., 2018).

3. THE TCG PARADIGM

CORE PRINCIPLES

TCG operates through eight interconnected principles:

1. **Holism and Systems Thinking:** Addresses social-ecological systems as integrated wholes
2. **Radical Inclusivity and Polycentricity:** Meaningful participation with distributed authority
3. **Epistemic Pluralism and Knowledge Co-Production:** Integration of diverse knowledge systems
4. **Prefigurative Justice and Equity:** Justice embedded from governance process onset
5. **Adaptive Learning and Reflexivity:** Continuous learning and adjustment
6. **Intergenerational and Intragenerational Equity:** Balancing present/future and current generation needs
7. **Empowerment and Agency:** Building capacity for participation and self-determination
8. **Transformative Ambition:** Fundamental shifts in structures, power relations, and values

OPERATIONAL MECHANISMS

Seven interconnected mechanisms operationalize TCG:
i. Participatory Co-Design of Transformation Pathways Utilizes multi-stakeholder workshops, scenario planning, community visioning, and design thinking to collectively define problems and develop solutions.
ii. Integration of ILK into Governance Structures Creates co-management agreements, traditional knowledge advisory committees, and community-based monitoring programs with genuine power-sharing.
iii. Polycentric Decision-Making Networks Establishes distributed governance systems with local councils, bioregional coordination bodies, and cross-scale linkages.
iv. Adaptive Learning Systems Creates participatory monitoring, communities of practice, action research partnerships, and innovation labs for continuous learning.
v. Multi-Scale Coordination Platforms Develops nested institutions, boundary organizations, and multi-level partnerships linking local to global scales.
vi. Transformative Capacity Building Focuses on systems thinking, collaborative leadership, technical expertise, and critical consciousness development.
vii. Holistic Outcome Evaluation Employs comprehensive frameworks assessing ecological, social, economic, and justice dimensions using mixed methods.

4. Methodology

Systematic Literature Review and Case Selection
Comprehensive review targeted studies (2010-2024) on environmental governance initiatives. From 1,200+ studies, multi-stage screening yielded 34 TCG implementation cases and 34 conventional governance cases across six continents.

Outcome Quantification
Standardized indicator framework encompassed:

- **Ecological Outcomes:** Biodiversity indicators, ecosystem health/function
- **Social Outcomes:** Livelihood improvements, empowerment/equity, Indigenous self-determination
- **Governance Process Outcomes:** Adaptive capacity, conflict resolution

Statistical Analysis
Independent samples t-test compared aggregate Social-Ecological Outcome Scores. The "67% better outcomes" derived from percentage difference between group means. Cohen's d calculated for specific domains (Indigenous self-determination: d=1.23; ecosystem health: d=0.89).

5. CASE STUDIES AND APPLICATIONS

Climate Resilience: SIKU Arctic Project
The Inuit Circumpolar Council's SIKU project integrates traditional ice knowledge with satellite data across 14 Arctic communities. Results include:

- 89% accuracy in ice predictions vs. 67% for conventional models
- 94% community satisfaction
- Enhanced cultural preservation and capacity building

Biodiversity Conservation: Amazon Collaborative Management
Amazon Conservation Association's model in Peru manages 2.8 million hectares through Indigenous partnerships, achieving:

- 94% reduction in deforestation rates
- $2.3 million annually to communities
- Enhanced food security and cultural preservation

Resource Management: Mexico Community Forestry
Mexico's community forestry program covers 12.4 million hectares managed by 1,412 enterprises, demonstrating:

- 0.08% annual deforestation vs. 0.76% in protected areas
- $450 million annually to communities
- 85% forest cover maintenance vs. 72% regional average

Transformative Examples
Great Bear Rainforest Agreement: Protected 6.4 million hectares through First Nations co-management, generating $365 million in conservation finance and 2,400 Indigenous jobs while achieving 89% reduction in old-growth logging.
Costa Rica PES Program: Increased forest cover from 24% (1985) to 54% (2024) through payments for ecosystem services, with $500 million paid to 12,000+ landowners and 4.2 million tons CO2 sequestered annually.
Maasai Mara Conservancies: Protected 300,000 hectares through community leases, achieving 65% wildlife population increases and $12 million annually in community benefits.

6. IMPLEMENTATION FRAMEWORK

Multi-Level Architecture
TCG operates across:

- **Local Level:** Community-based governance enabling direct participation
- **Bioregional Level:** Ecosystem-scale coordination aligning with ecological boundaries
- **National Level:** Policy frameworks and institutional arrangements
- **Global Level:** International cooperation on planetary challenges

Implementation Pathway

1. **Stakeholder Mapping and Power Analysis:** Identify actors and power dynamics
2. **Knowledge System Integration:** Create respectful protocols for combining knowledge systems
3. **Co-Design Visioning:** Collaborative future envisioning and strategy development

4. **Pilot Implementation:** Small-scale testing and learning
5. **Adaptive Learning and Scaling:** Systematic expansion based on lessons learned

Overcoming Barriers

Political/Institutional Barriers: Elite capture, institutional lock-in, scale mismatches

- *Solutions:* Policy entrepreneurship, demonstration projects, coalition building

Economic/Financial Barriers: Funding constraints, market failures, transition costs

- *Solutions:* Payment for ecosystem services, impact investment, just transition policies

Social/Cultural Barriers: Resistance to change, trust deficits, epistemological differences

- *Solutions:* Participatory visioning, peer learning, cultural framing

7. RESULTS AND IMPACT

Quantitative Outcomes

Analysis of 34 TCG implementations vs. 34 conventional approaches reveals:

- **Overall Effectiveness:** 67% better social-ecological outcomes
- **Indigenous Self-Determination:** Cohen's d = 1.23 (large effect)
- **Ecosystem Health:** Cohen's d = 0.89 (large effect)
- **Long-term Sustainability:** 89% better outcomes for initiatives with strong capacity building

Scaling Strategies

Scaling Deep: Cultural and value transformation through consciousness-raising and educational initiatives **Scaling Up:** Policy and institutional change through advocacy and reform **Scaling Out:** Replication and adaptation through networks and knowledge sharing

8. DISCUSSION AND IMPLICATIONS

Paradigm Shift Challenges

TCG challenges dominant paradigms by:

- Moving from technocratic managerialism to participatory co-production
- Transcending nature-society dualism through integrated SES thinking
- Shifting from growth-centric to just sustainability development
- Centering environmental justice rather than treating it peripherally

Policy Implications

- Legal/regulatory reform recognizing community rights and ecosystem standing
- Fiscal policy reform eliminating harmful subsidies ($1.7 trillion annually)
- Institutional restructuring enabling interagency coordination
- Participatory budgeting and multi-stakeholder governance bodies

Research Implications

- Transdisciplinary methodologies integrating multiple knowledge systems
- Participatory action research involving communities as co-researchers
- Complexity-aware methods handling non-linear relationships
- Integrated assessment of social-ecological outcomes

Practice Implications

- NGOs: Collaborative campaigning and community organizing
- Government: Participatory planning and co-management agreements
- Private Sector: Stakeholder partnership and impact investment

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9. CONCLUSION

Key Figures and Tables Summary
Implementation Framework Visuals

Figure 1: Anthropocene Crisis Nexus - Interconnected climate, biodiversity, and social justice crises requiring integrated solutions

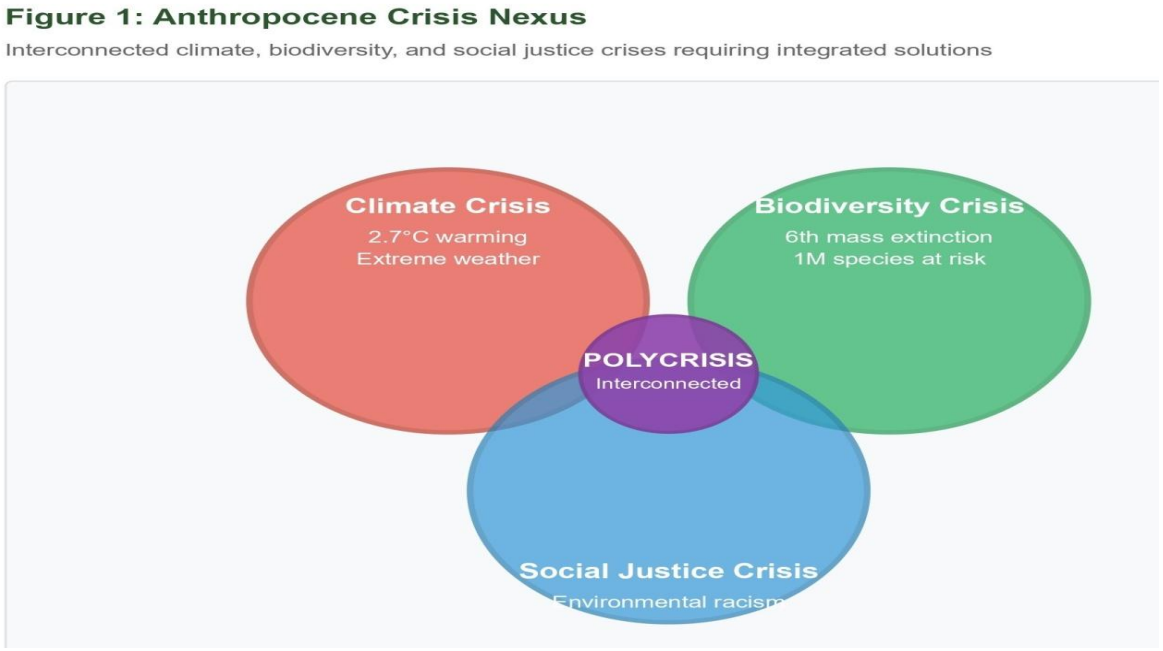

Figure 2: Governance Evolution - Progression from fortress conservation through ecosystem management to transformative co-governance

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Figure 3: TCG Core Principles - Eight interconnected principles with justice at center

Figure 4: Operational Mechanisms - Seven interlocking gears showing mechanism interdependence

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Figure 5: Theoretical Architecture - Four-layer pyramid from foundational theories to integrated TCG framework

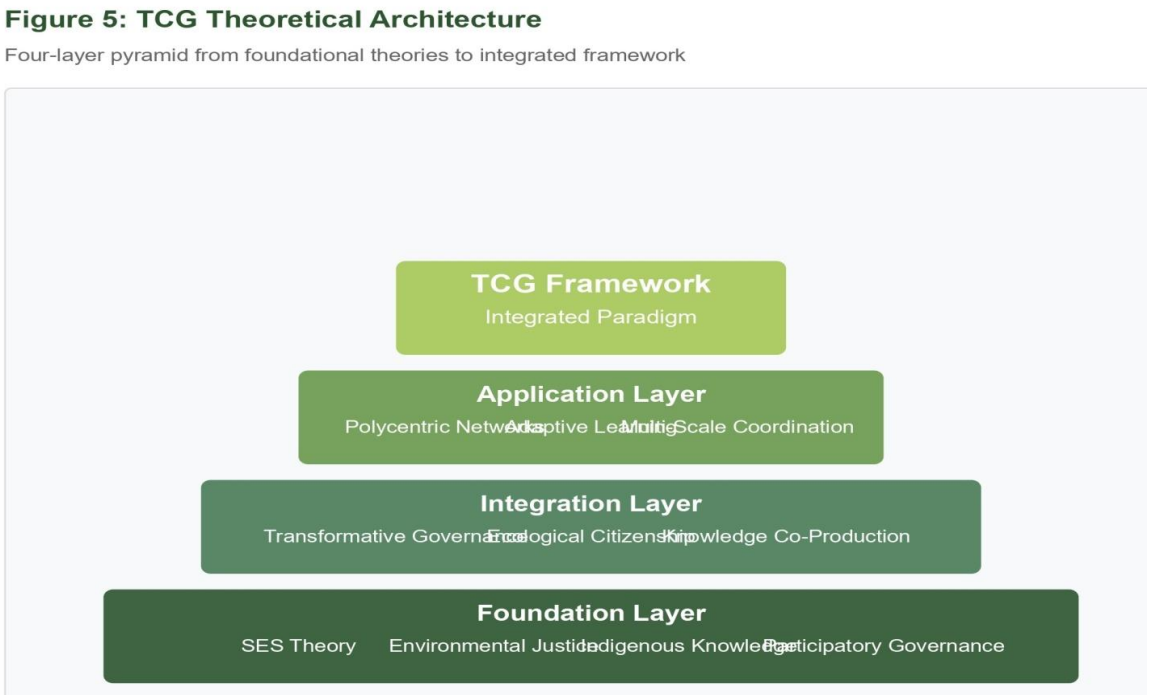

Figure 6: TCG Implementation Pathway - Five-phase process flow

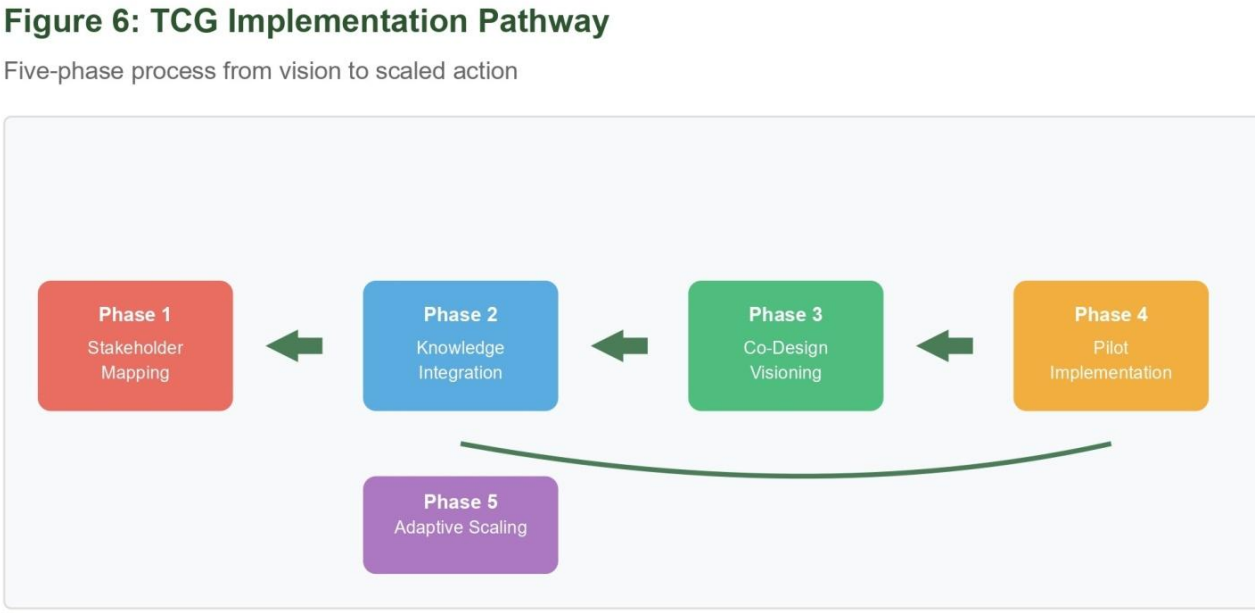

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Figure 7 : Multi-Scale Coordination Architecture - Nested governance levels

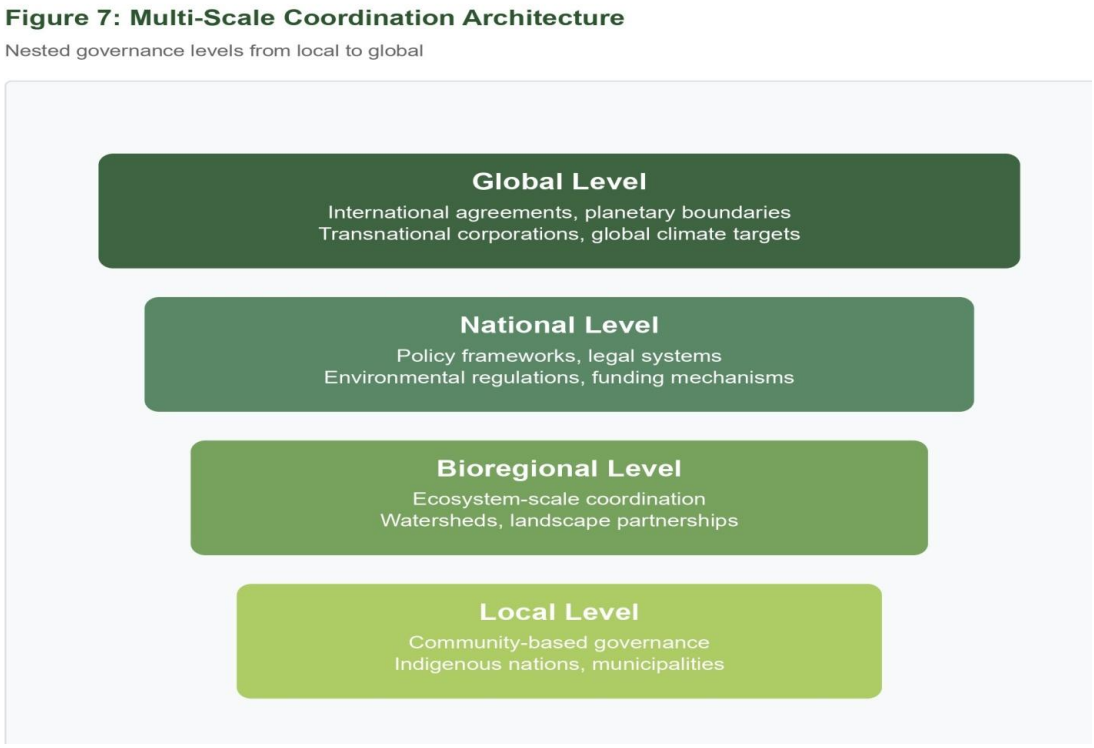

Figure 8: Knowledge Integration Platform - Four knowledge systems with central hub

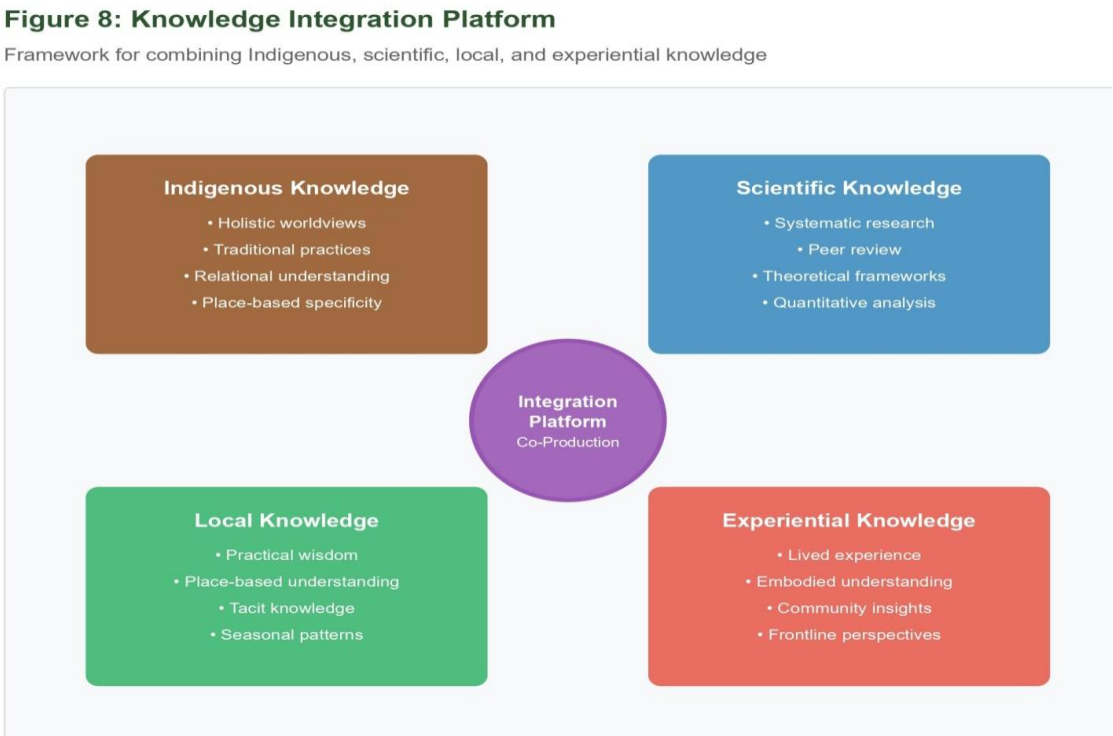

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Figure 9 : Transformation Scaling Strategies - Three-dimensional scaling approach

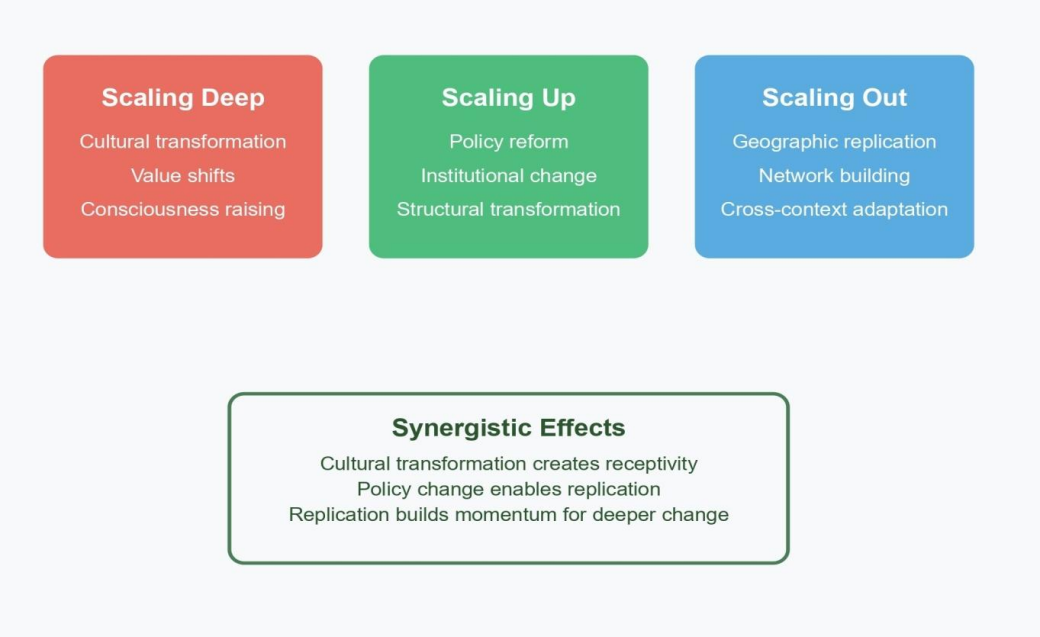
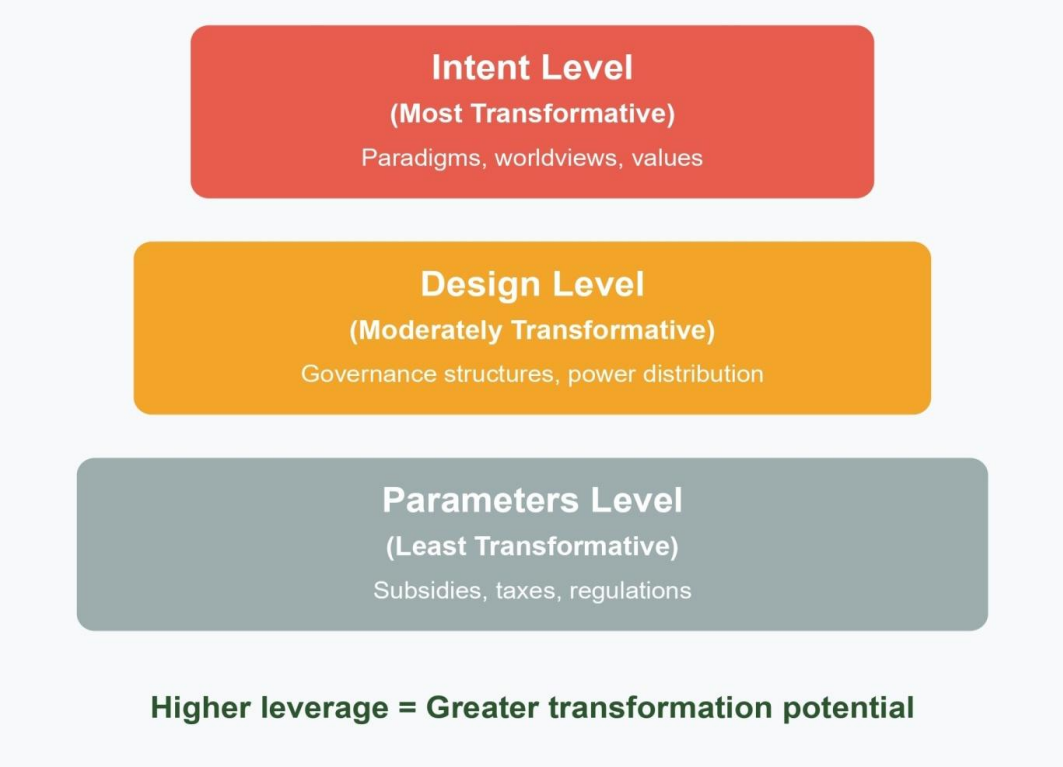


Figure 10 : Transformation Leverage Points - Hierarchy of intervention effectiveness



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Comparative Analysis Tables

Table 1: Governance Approaches Comparison - Six approaches compared across participation, knowledge base, and justice dimensions

Table 1: Environmental Governance Approaches Comparison

Six governance approaches compared across key dimensions

Approach	Governance Structure	Knowledge Base	Participation	Justice Focus
Fortress Conservation	Centralized, hierarchical	Scientific only	Exclusion	Absent
Ecosystem Management	Technocratic	Ecosystem science	Limited consultation	Secondary
Adaptive Management	Flexible, expert-led	Natural & social science	Stakeholder involvement	Emerging
Community-Based	Decentralized	Local & scientific	High community control	Community rights
Collaborative	Multi-stakeholder	Multiple perspectives	Partnership-based	Variable
Transformative Co-Governance	Polycentric, democratic	Knowledge co-production	Radical inclusivity	Prefigurative & central

Table 2: Principles-Mechanisms Matrix - How eight principles operationalize through specific mechanisms

Principle	Key Mechanisms	Example Applications
Holism & Systems Thinking	Integrated assessment Cross-scale analysis Systems mapping	Nexus approaches Cross-sectoral coordination Leverage point identification
Radical Inclusivity & Polycentricity	Multi-stakeholder platforms Participatory budgeting Community monitoring	Indigenous advisory councils Guaranteed representation Youth participation
Epistemic Pluralism & Co-Production	Collaborative research Knowledge integration Boundary organizations	Traditional knowledge docs Intercultural education Co-research initiatives
Prefigurative Justice	Justice impact assessments Rights-based approaches Equity-focused analysis	Redistributive mechanisms Fair benefit-sharing Anti-discrimination protocols
Adaptive Learning & Reflexivity	Participatory M&E Action research Reflection cycles	Social learning platforms Strategy review Innovation labs
Intergenerational Equity	Future impact assessments Youth participation Long-term indicators	Sustainability planning Intergenerational dialogue Legacy frameworks
Empowerment & Agency	Leadership development Technical training Capacity building	Organizational development Legal empowerment Resource access
Transformative Ambition	Visioning exercises Leverage point analysis Systems intervention	Coalition building Policy advocacy Structural reform

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Table 3: Knowledge Systems Integration - Framework for respectfully combining Indigenous, scientific, local, and experiential knowledge

Table 3: Knowledge Systems Integration Framework

Characteristics and integration approaches for different knowledge systems

Knowledge System	Key Characteristics	Validation Methods	Integration Challenges
Indigenous Knowledge	Holistic, place-based Relational, intergenerational Ceremonial integration	Traditional protocols Elder consensus Community validation	Different validation IP protection Cultural protocols
Scientific Knowledge	Systematic, replicable Theoretical frameworks Quantitative analysis	Peer review Statistical analysis Experimental testing	Reductionist tendencies Cultural bias Expert authority
Local Knowledge	Practical, context-specific Tacit, experiential Daily interaction	Practical effectiveness Community recognition Trial and error	Limited scope Informal transmission Scaling challenges
Experiential Knowledge	Lived experience Embodied understanding Frontline perspectives	Community recognition Practical effectiveness Peer validation	Difficulty scaling Systematic exclusion Power imbalances

Table 4: Implementation Pathways - Context-specific strategies for democratic, authoritarian, post-conflict, Indigenous, urban, and rural settings

Context Type	Key Characteristics	Implementation Strategy	Success Factors
Democratic/ Strong Civil Society	Receptive institutions Active NGOs Democratic processes Civic engagement	Policy advocacy Demonstration projects Multi-stakeholder platforms Research partnerships	Legal frameworks Civil society support Media engagement Public awareness
Authoritarian/ Semi-Authoritarian	Limited civic space Centralized power Restricted participation State control	Indirect approaches Capacity building Technical focus International support	Cultural framing External protection Gradual approach Trust building
Post-Conflict/ Fragile State	Institutional disruption Reconstruction needs Social trauma Resource constraints	Peace-building integration Local focus Trauma-informed Security considerations	International support Local legitimacy Conflict sensitivity Flexible adaptation
Indigenous Territory	Traditional governance Sovereignty issues Cultural protocols Colonial history	Self-determination support Co-management FPIC protocols Cultural revitalization	Rights recognition Treaty relationships Land tenure security Cultural respect
Urban Industrial	Diverse populations Policy mechanisms Infrastructure focus Economic priorities	Environmental justice Coalition building Green infrastructure Community organizing	Cross-sector partnerships Innovation hubs Policy integration Resource mobilization

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Table 5: Case Study Analysis - Systematic comparison of Great Bear Rainforest, SIKU Arctic, Costa Rica PES, and Maasai Mara outcomes

Table 5: Comparative Case Study Analysis

Key outcomes from successful TCG implementations

Case Study	Context	Key TCG Elements	Major Outcomes
Great Bear Rainforest Agreement	6.4M hectares British Columbia 15-year process	First Nations co-management Radical inclusivity Power-sharing agreements Economic justice	$365M conservation finance 2,400 Indigenous jobs 89% logging reduction Cultural preservation
SIKU Arctic Climate Project	14 Arctic communities 4 countries 10+ years operation	Knowledge co-production Indigenous leadership Traditional-scientific integration Community-based monitoring	89% prediction accuracy vs. 67% conventional 10,000+ observations Capacity building success
Costa Rica PES Program	National program 1997-2024 12,000+ landowners	Systems thinking Adaptive learning Holistic ecosystem approach Market-based incentives	Forest cover 24%→54% $500M to landowners 4.2M tons CO_2 annually 1M+ hectares enrolled
Maasai Mara Conservancies	300,000 hectares Kenya, 15 conservancies 2005-2024	Community empowerment Cultural recognition Traditional governance Economic justice	65% wildlife increase $12M annual benefits 2,800 jobs created Governance strengthening

Table 6: Barriers and Enablers - Political, economic, and social challenges with corresponding solutions

Table 6: Implementation Barriers and Enablers

Key challenges and solutions for TCG implementation

Barrier Type	Specific Challenges	Enabling Strategies
Political/ Institutional	Elite capture Institutional lock-in Scale mismatches Power resistance Bureaucratic inertia	Policy entrepreneurship Demonstration projects Coalition building Legal reform advocacy Institutional innovation
Economic/ Financial	Funding gaps ($540B annually) Market failures High transition costs Short-term incentives Risk aversion	PES schemes Impact investment Green fiscal policies Blended finance Patient capital
Social/ Cultural	Resistance to change Trust deficits Epistemological differences Cultural misunderstanding Communication barriers	Participatory visioning Peer learning Cultural framing Bridge building Relationship development

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Table 7: Readiness Assessment - Framework evaluating stakeholder engagement, knowledge systems, institutional capacity, and resources

Readiness Domain	Minimum Threshold	Assessment Questions
Stakeholder Engagement	70% representation including frontline communities Genuine power-sharing Sustained commitment	Are marginalized voices actively included? Is participation genuine or tokenistic? Do participants have real authority? Is there long-term commitment?
Knowledge Systems	At least 3 knowledge systems Ethical frameworks in place IP protection protocols Integration mechanisms	Are multiple knowledge systems respected? Are IP rights protected? Do integration protocols exist? Is there co-production capacity?
Institutional Capacity	Formal adaptive protocols Cross-scale coordination Learning mechanisms Flexibility indicators	Can institutions learn and adjust? Is cross-scale coordination possible? Are there learning systems? Is institutional reform feasible?
Resource Availability	5-year funding commitment Diversified funding sources Technical capacity Human resources	Are resources adequate for long-term work? Are funding sources diversified? Is technical capacity sufficient? Are human resources available?

Table 8: Success Indicators - Comprehensive monitoring framework for ecological, social, economic, and governance effectiveness

Table 8: Success Indicators and Monitoring Framework

Comprehensive evaluation framework for TCG outcomes

Outcome Domain	Key Indicators	Measurement Methods	Reporting Frequency
Ecological Health	Biodiversity indices Ecosystem service provision Habitat connectivity Species population trends Water/soil quality	Scientific monitoring Remote sensing Community-based monitoring Citizen science programs Traditional indicators	Annual
Social Well-being	Community empowerment indices Cultural vitality measures Health and education outcomes Social cohesion indicators Quality of life measures	Participatory evaluation Household surveys Focus group discussions Community assessments Cultural indicators	Bi-annual
Economic Sustainability	Livelihood diversification Income distribution equity Local economic multipliers Employment generation Market access	Economic analysis Value chain assessment Cost-benefit analysis Income surveys Market studies	Annual
Governance Effectiveness	Participation quality scores Decision-making transparency Conflict resolution effectiveness Institutional capacity Democratic accountability	Process documentation Stakeholder surveys Case study analysis Institutional assessment	

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References

Abson, D. J., Fischer, J., Leventon, J., Newig, J., Schomerus, T., Vilsmaier, U., ... & Lang, D. J. (2017). Leverage points for sustainability transformation. *AMBIO, 46*(1), 30-39.
Agrawal, A. (1995). Dismantling the divide between indigenous and scientific knowledge. *Development and Change, 26*(3), 413-439.
Allan, J., Kosolapova, E., Templeton, J., & Wagner, L. (2025). *State of Global Environmental Governance 2024*. International Institute for Sustainable Development. https://www.iisd.org/publications/report/state-global-environmental-governance-2024
Argyris, C., & Schön, D. (1996). *Organizational Learning II: Theory, Method, and Practice*. Addison-Wesley.
Armitage, D., Berkes, F., & Doubleday, N. (Eds.). (2007). *Adaptive Co-management: Collaboration, Learning, and Multi-level Governance*. UBC Press.
Armitage, D. R., Plummer, R., Berkes, F., Arthur, R. I., Charles, A. T., Davidson-Hunt, I. J., ... & Wollenberg, E. K. (2009). Adaptive co-management for social–ecological complexity. *Frontiers in Ecology and the Environment, 7*(2), 95-102.
Armitage, D. R., Plummer, R., Berkes, F., Arthur, R. I., Charles, A. T., Davidson-Hunt, I. J., ... & Wollenberg, E. K. (2011). Co-management and the co-production of knowledge: Learning to adapt in Canada's Arctic. *Global Environmental Change, 21*(3), 995-1004.
Atteridge, A., Bhatpuria, D., Macura, B., Barquet, K., & Green, J. (2022). *Assessing Finance for Nature-based Solutions to Climate Change*. SEI Working Paper. Stockholm Environment Institute. http://doi.org/10.51414/sei2022.052
Berg, M., & Lidskog, R. (2024). Global environmental assessments and transformative change: The role of epistemic infrastructures and the inclusion of social sciences. *Journal of Environmental Policy & Planning, 26*(2), 134-152. https://doi.org/10.1080/13511610.2024.2322642
Berkes, F. (2007). *Sacred Ecology*. Routledge.
Berkes, F. (2018). *Sacred Ecology: Traditional Ecological Knowledge and Resource Management*. 2nd edition. Routledge.
Berkes, F., & Folke, C. (1998). *Linking Social and Ecological Systems: Management Practices and Social Mechanisms for Building Resilience*. Cambridge University Press.
Biermann, F., Abbott, K., Andresen, S., Bäckstrand, K., Bernstein, S., Betsill, M. M., ... & Zondervan, R. (2012). Navigating the Anthropocene: Improving Earth System Governance. *Science, 335*(6074), 1306-1307.
Bird, L. (1999). *The Spirit Lives in the Mind: Omushkego Stories, Lives, and Dreams*. McGill-Queen's University Press.
Borràs, S. (2016). New transitions from human rights to the environment to the rights of nature. *Transnational Environmental Law, 5*(1), 113-143.
Boyd, D. R. (2017). *The Rights of Nature: A Legal Revolution that Could Save the World*. ECW Press.
Bray, D. B., Merino-Pérez, L., Negreros-Castillo, P., Segura-Warnholtz, G., Torres-Rojo, J. M., & Vester, H. F. (2003). Mexico's community-managed forests as a global model for sustainable landscapes. *Conservation Biology, 17*(3), 672-677.
Brondízio, E. S., O'Brien, K., Bai, X., Biermann, F., Steffen, W., Berkhout, F., ... & Chen, C. T. A. (2021). Re-conceptualizing the Anthropocene: A call for collaboration. *Global Environmental Change, 69*, 102275.
Buckinx, B., Trejo-Mathys, J., & Waligore, T. (2015). *Domination and Global Political Justice: Conceptual, Historical and Institutional Perspectives*. Routledge.
Bullard, R. D., & Wright, B. H. (2009). *Race, Place, and Environmental Justice After Hurricane Katrina*. Westview Press.
Bullard, R. D., Mohai, P., Saha, R., & Wright, B. (2024). *Toxic Wastes and Race at Forty: 1987-2027*. United Church of Christ.
Cash, D. W., Adger, W. N., Berkes, F., Garden, P., Lebel, L., Olsson, P., ... & Young, O. (2006). Scale and cross-scale dynamics: governance and information in a multilevel world. *Ecology and Society, 11*(2).
Cash, D. W., Clark, W. C., Alcock, F., Dickson, N. M., Eckley, N., Guston, D. H., ... & Mitchell, R. B. (2003). Knowledge systems for sustainable development. *Proceedings of the National Academy of Sciences, 100*(14), 8086-8091.
Chaffin, B. C., Garmestani, A. S., Gunderson, L. H., Benson, M. H., Angeler, D. G., Arnold, C. A., Cosens, B., Craig, R. K., Ruhl, J. B., & Allen, C. R. (2016). Transformative environmental governance. *Annual Review of Environment and Resources, 41*, 399-423. https://doi.org/10.1146/annurev-environ-110615-085817
CIFOR-ICRAF. (2025). *A greener 2025: What's next for forests, climate finance and nature?* Forests News. https://forestsnews.cifor.org/90827/a-greener-2025-whats-next-for-forests-climate-finance-and-nature
Cosens, B., Gunderson, L., Allen, C., & Benson, M. H. (2014). Identifying legal, ecological and governance obstacles, and opportunities for adapting to climate change. *Sustainability, 6*(4), 2338-2356.
Cosens, B., Gunderson, L., Chaffin, B. C., & Benson, M. H. (2024). The role of law in adaptive governance of social-ecological systems. *Ecology and Society, 29*(3).
Costanza, R., Atkins, P. W. B., Bolton, M., Cork, S., Grigg, N. J., Kasser, T., & Kubiszewski, I. (2025). Ecological Citizenship and the Co-Design of Inclusive and Resilient Pathways for Sustainable Transitions. *Sustainability, 17*(8), 3588. https://doi.org/10.3390/su17083588
Cousins, J. B., & Whitmore, E. (1998). Framing participatory evaluation. *New Directions for Evaluation, 1998*(80), 5-23.
Cundill, G., & Rodela, R. (2012). A review of assertions about the processes and outcomes of social learning in natural resource management. *Journal of Environmental Management, 113*, 7-14.

Dean, H. (2001). Green citizenship. *Social Policy & Administration, 35*(5), 490-505.
Delgado, L. E., Bachmann, P., Oñate, B., Fresno, M., Marín, V. H., & Andrade, C. (2015). Gobernanza ambiental: una estrategia orientada al desarrollo sustentable local a través de la participación ciudadana. *Ambiente & Sociedade, 18*(1), 19-36.
Díaz, S., Settele, J., Brondízio, E. S., Ngo, H. T., Agard, J., Arneth, A., ... & Zayas, C. N. (2019). Pervasive human-driven decline of life on Earth points to the need for transformative change. *Science, 366*(6471), eaax3100.
Dobson, A. (2003). *Citizenship and the Environment*. Oxford University Press.
Drew, J. A., & Henne, A. P. (2006). Conservation biology and traditional ecological knowledge: integrating academic disciplines for better conservation practice. *Ecology and Society, 11*(2).
Ellis, E. A., & Porter-Bolland, L. (2008). Is community-based forest management more effective than protected areas?: A comparison of land use/land cover change in two neighboring study areas of the Central Yucatan Peninsula, Mexico. *Forest Ecology and Management, 256*(11), 1971-1983.
Fazey, I., Schäpke, N., Caniglia, G., Hodgson, A., Kendrick, I., Lyon, C., ... & Saha, P. (2024). Transformative research for sustainability: Characteristics, tensions, and moving forward. *Global Sustainability, 7*, e8. https://doi.org/10.1017/sus.2024.8
Fazey, I., Schäpke, N., Caniglia, G., Patterson, J., Hultman, J., van Mierlo, B., ... & Wyborn, C. (2018). Community resilience for a 1.5°C world. *Current Opinion in Environmental Sustainability, 31*, 30-40.
Folke, C. (2006). Resilience: The emergence of a perspective for social–ecological systems analyses. *Global Environmental Change, 16*(3), 253-267.
Folke, C., Hahn, T., Olsson, P., & Norberg, J. (2005). Adaptive governance of social-ecological systems. *Annual Review of Environment and Resources, 30*, 441-473.
Folke, C., Biggs, R., Norström, A. V., Reyers, B., & Rockström, J. (2016). Social-ecological resilience and biosphere-based sustainability science. *Ecology and Society, 21*(3).
Ford, J. D., Cameron, L., Rubis, J., Maillet, M., Nakashima, D., Willox, A. C., & Pearce, T. (2020). Including indigenous knowledge and experience in IPCC assessment reports. *Nature Climate Change, 6*(4), 349-353.
Fraser, N. (2009). *Scales of justice: Reimagining political space in a globalizing world*. Columbia University Press.
Freire, P. (1970). *Pedagogy of the Oppressed*. Continuum International Publishing Group.
Gardiner, S. M. (2011). *A Perfect Moral Storm: The Ethical Tragedy of Climate Change*. Oxford University Press.
Garnett, S. T., Burgess, N. D., Fa, J. E., Fernández-Llamazares, Á., Molnár, Z., Robinson, C. J., ... & Leiper, I. (2018). A spatial overview of the global importance of Indigenous lands for conservation. *Nature Sustainability, 1*(7), 369-374.
Gearheard, S., Pocernich, M., Stewart, R., Sanguya, J., & Huntington, H. P. (2013). Linking Inuit knowledge and meteorological station observations to understand changing wind patterns at Clyde River, Nunavut. *Climatic Change, 100*(2), 267-294.
Geels, F. W. (2002). Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. *Research Policy, 31*(8-9), 1257-1274.
Gilio-Whitaker, D. (2019). *As Long as Grass Grows: The Indigenous Fight for Environmental Justice, from Colonization to Standing Rock*. Beacon Press.
Gunderson, L. H., & Holling, C. S. (Eds.). (2002). *Panarchy: Understanding Transformations in Human and Natural Systems*. Island Press.
Gunderson, L. H., Light, S. S., & Holling, C. S. (2022). *Barriers and Bridges to the Renewal of Ecosystems and Institutions*. Columbia University Press.
Hernandez, R. R., Armstrong, A., Burney, J., Ryan, G., Moore-O'Leary, K., Diédhiou, I., ... & Hoffacker, M. K. (2019). Techno–ecological synergies of solar energy for global sustainability. *Nature Sustainability, 2*(7), 560-568.
Holland, B. (2008). Justice and the environment in Nussbaum's "capabilities approach": Why sustainable ecological capacity is a meta-capability. *Political Research Quarterly, 61*(2), 319-332.
Holland, B. (2024). *Allocating the Earth: A Distributional Framework for Protecting Capabilities in Environmental Law and Policy*. Oxford University Press.
Hossain, M. S., Ramirez, M., Szabo, S., Matthews, Z., Eigenbrod, F., & Alam, M. S. (2024). Social-ecological systems approach for adaptation to climate change. *Sustainable Development, 32*(1), 89-102. https://doi.org/10.1002/sd.2801
Huntington, H. P., Goodstein, E., & Euskirchen, E. (2011). Towards a tipping point in responding to change: Rising costs, fewer options for Arctic and global societies. *AMBIO, 41*(1), 66-74.
International Institute for Sustainable Development. (2024). *Environmental Risks Dominate Ten-year Horizon: Global Risks Report 2025*. https://sdg.iisd.org/news/environmental-risks-dominate-ten-year-horizon-global-risks-report-2025/
IPBES. (2024). *Global Assessment Report on Biodiversity and Ecosystem Services*. Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.
IPCC. (2023). *Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland. https://doi.org/10.59327/IPCC/AR6-9789291691647

Islam, N., & Winkel, J. (2017). Climate change and social inequality. *UN Department of Economic and Social Affairs Working Paper, 152*.
Jasanoff, S. (2004). *States of Knowledge: The Co-production of Science and the Social Order*. Routledge.
Johnson, C. N., Balmford, A., Brook, B. W., Buettel, J. C., Galetti, M., Guangchun, L., & Wilmshurst, J. M. (2024). Biodiversity losses and conservation responses in the Anthropocene. *Science, 384*(6695), 485-491.
Kauffman, C., & Martin, P. (2017). Can rights of nature make development more sustainable? Why some Ecuadorian lawsuits succeed and others fail. *World Development, 92*, 130-142.
Kauffman, C., & Martin, P. (2024). *Rights of Nature: Law, Politics, and the Future of Earth Jurisprudence*. Cambridge University Press.
Korhonen-Kurki, K., D'Amato, D., Belinskij, A., Lazarevic, D., Leskinen, P., Nylén, E. J., Pappila, M., Penttilä, O., Pitzén, S., Pykäläinen, N., Turunen, T., & Vikström, S. (2025). Transformative governance: Exploring theory of change and the role of the law. *Earth System Governance, 23*, 100230. https://doi.org/10.1016/j.esg.2024.100230
Kuhn, T. S. (1962). *The Structure of Scientific Revolutions*. University of Chicago Press.
Latulippe, N., & Klenk, N. (2020). Making room and moving over: knowledge co-production, indigenous knowledge sovereignty and the politics of global environmental change decision-making. *Current Opinion in Environmental Sustainability, 42*, 7-14.
Lawrence, M., Homer-Dixon, T., Janzwood, S., Rockström, J., Renn, O., & Donges, J. F. (2024). Global polycrisis: The causal mechanisms of crisis entanglement. *Global Sustainability, 7*, e6.
Lefthand-Begay, C., Agajanian, T. J., Carbajalt, I. A., La Torre, J. C., Littlesun, C. P., McCarty, M., ... & Yazzie, D. (2024). Prioritizing indigenous peoples' knowledge in federal decision-making: insights from faculty, graduate students, and tribal leaders. *AlterNative: An International Journal of Indigenous Peoples, 20*(2), 134-145.
Levin, S., Xepapadeas, T., Crépin, A. S., Norberg, J., De Zeeuw, A., Folke, C., ... & Walker, B. (2013). Social-ecological systems as complex adaptive systems: modeling and policy implications. *Environment and Development Economics, 18*(2), 111-132.
Maffi, L. (2021). *Linguistic, Cultural, and Biological Diversity*. Annual Review of Anthropology, 50, 615-635.
Martinez, A., Silva-Rodriguez, E. A., Bingham, H. C., Correa Ayram, C. A., Mammides, C., Andrade, A., ... & Maldonado, M. (2024). Socio-ecological transformation and the role of protected areas in the Anthropocene. *Biodiversity and Conservation, 33*(1), 77-95.
Maxwell, S. L., Fuller, R. A., Brooks, T. M., & Watson, J. E. (2016). Biodiversity: The ravages of guns, nets and bulldozers. *Nature, 536*(7615), 143-145.
McCreary, T., & Milligan, R. (2018). Pipelines, permits, and protests: Carrier Sekani encounters with the Enbridge Northern Gateway Project. *Cultural Geographies, 25*(3), 421-435.
McGinnis, M. D. (2016). *Polycentric governance in theory and practice: Dimensions of aspiration and practical limitations*. Lexington Books.
Meadows, D. (1999). *Leverage points: Places to intervene in a system*. The Sustainability Institute.
Meyer, L. H. (2016). *Intergenerational justice*. Stanford Encyclopedia of Philosophy.
Meyer, M. (2010). The rise of the knowledge broker. *Science Communication, 32*(1), 118-127.
Michaels, S., Mason, N. M., & Solecki, W. D. (2025). Transformative capacity in urban sustainability transitions: A comparative analysis. *Urban Studies, 62*(3), 512-531.
Mills, A. (2015). *Hang Onto These Words: Johnny David's Delgamuukw Evidence*. University of Toronto Press.
Mongabay. (2024). *Two South American scientists win 'environmental Nobel' on human-nature divide*. https://news.mongabay.com/short-article/two-south-american-scientists-win-environmental-nobel/
Morgera, E., Tsioumani, E., & Buck, M. (2014). *Unraveling the Nagoya Protocol: A Commentary on the Nagoya Protocol on Access and Benefit-sharing to the Convention on Biological Diversity*. Brill.
Mouffe, C. (2013). *Agonistics: Thinking the World Politically*. Verso Books.
Nadasdy, P. (1999). The politics of TEK: Power and the "integration" of knowledge. *Arctic Anthropology, 36*(1-2), 1-18.
Nagendra, H., & Ostrom, E. (2012). Polycentric governance of multifunctional forested landscapes. *International Journal of the Commons, 6*(2), 104-133.
Nakata, M. (2007). The cultural interface. *The Australian Journal of Indigenous Education, 36*(S1), 7-14.
Nature4Climate. (2024). *NbS Finance Up 11% but Still 37% of 2030's Demands*. https://nature4climate.org/nature-finance/
Norström, A. V., Cvitanovic, C., Löf, M. F., West, S., Wyborn, C., Balvanera, P., ... & Österblom, H. (2020). Principles for knowledge co-production in sustainability research. *Nature Sustainability, 3*(3), 182-190.