The Challenge for New Forms of Social Capital: Knowledge, Innovation, and Stakeholder Alliances

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Challenge for New Forms of Social Capital

(A) What is the Nature of the Environmental Challenge?

(B) What Causes underlie Environmental & Resource Degradation?

(C) What Factors promote a Turning Point?

(D) What is the Way Forward for the Academy?

(A) Nature of the Environmental Challenge

A1: Environmental & Resource degradation

A2: Global – Local asymmetries

A1: Environmental & Resource Degradation ± linked to Income - 1

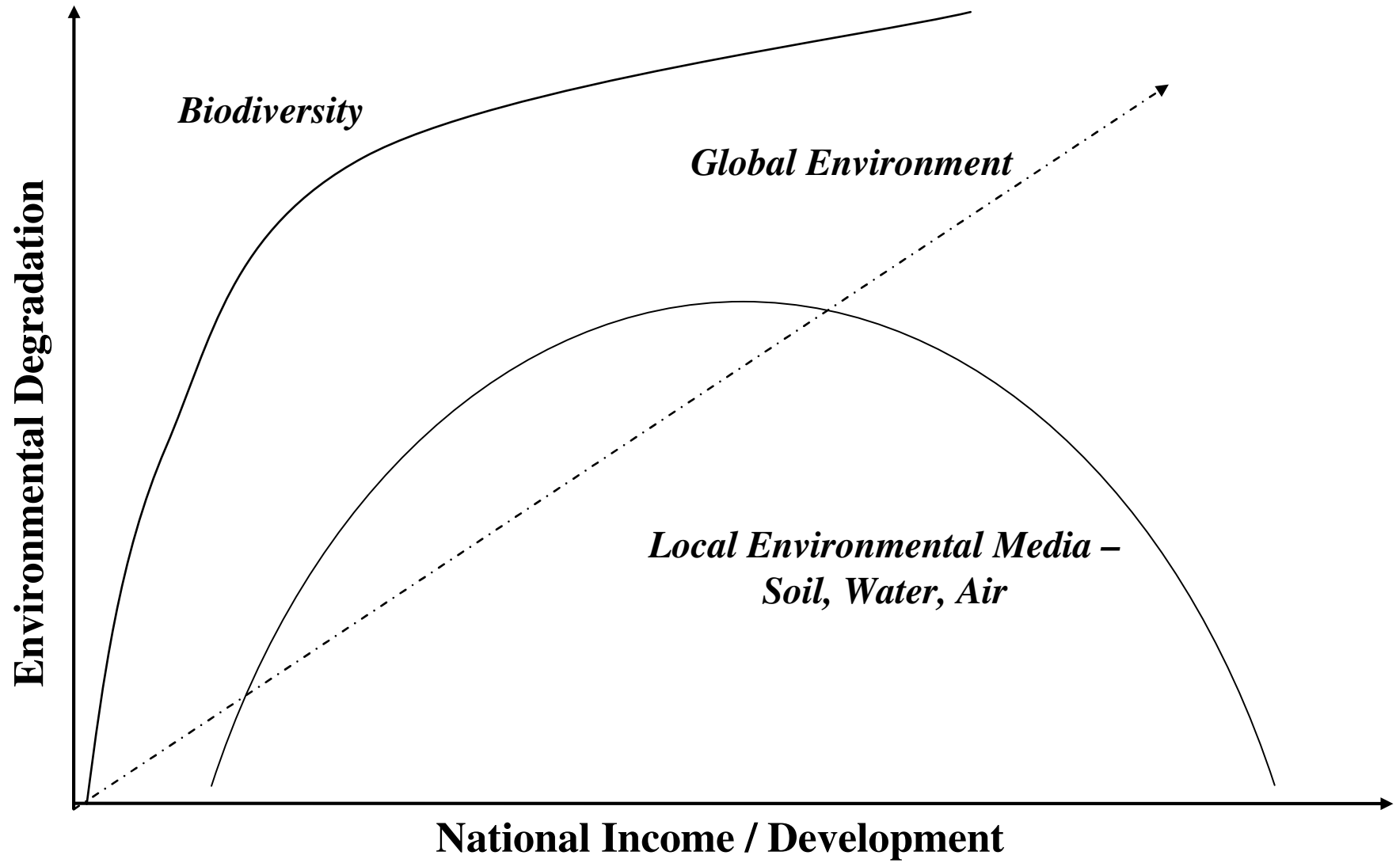
Environmental Kuznets Curve: **@ Local levels -**

- **Resource-Intensive primary industries**
  - Agriculture, Forestry, Fisheries, Mining
- **Pollution-intensive secondary industries**
  - Air pollution – Particulates, SO2
  - Water pollution – Organic wastes, Nitrites, Metals

→ **Environmental Media** initially degraded with increasing Income / Development & then improved

- **Turning points** ← Technology innovation + Social change

Environmental Degradation relative to National Income & Development



A1: Environmental & Resource Degradation ± linked to Income - 3

- **Biodiversity decreases** with Habitat transformation & Environmental pollution @ all levels
  - Exponentially in closed systems: e.g. Tropical & Temperate rain forests, Coral reefs, Antarctic kelp forests
  - Interconnectedness losses / 'Systems within systems'
- **Global pollution** increases potentially due to:
  - Release / Emission of > 200,000 chemicals into the oceans & atmosphere
  - Unknown Synergisms / Antagonisms + Bio-magnification

Information & Knowledge = Only Resource growing Exponentially

A2: Global – Local Asymmetries (1)

Environmental & Resource degradation caused by or exacerbate Global – Local Asymmetries in various types of Globalization:

- **Economic & Social**
- **Cultural**
- **Resource & Environmental**
- **Financial & Economic**
- **Knowledge**

(B) Causes underlying Environmental & Resource Degradation – 1

B1: Dynamics of 4 Macro Socio-Economic & Ecological Systems & their Components (especially @ Local – Global levels)

B2: Spatial Systems [Governance]

B3: Resource Systems ['Environment']

B4: Transformation – Conservation Systems ['Technology']

B5: Distribution – Exchange Systems [Equity & Investments]

(B) Causes underlying Environmental & Resource Degradation – 2

B6: Systemic Value Preferences

B6: Lead Role of Knowledge & Technology

B7: Global impacts of Local actions

B8: Confusion about Sustainability

B9: Emergence of -ve Social capital

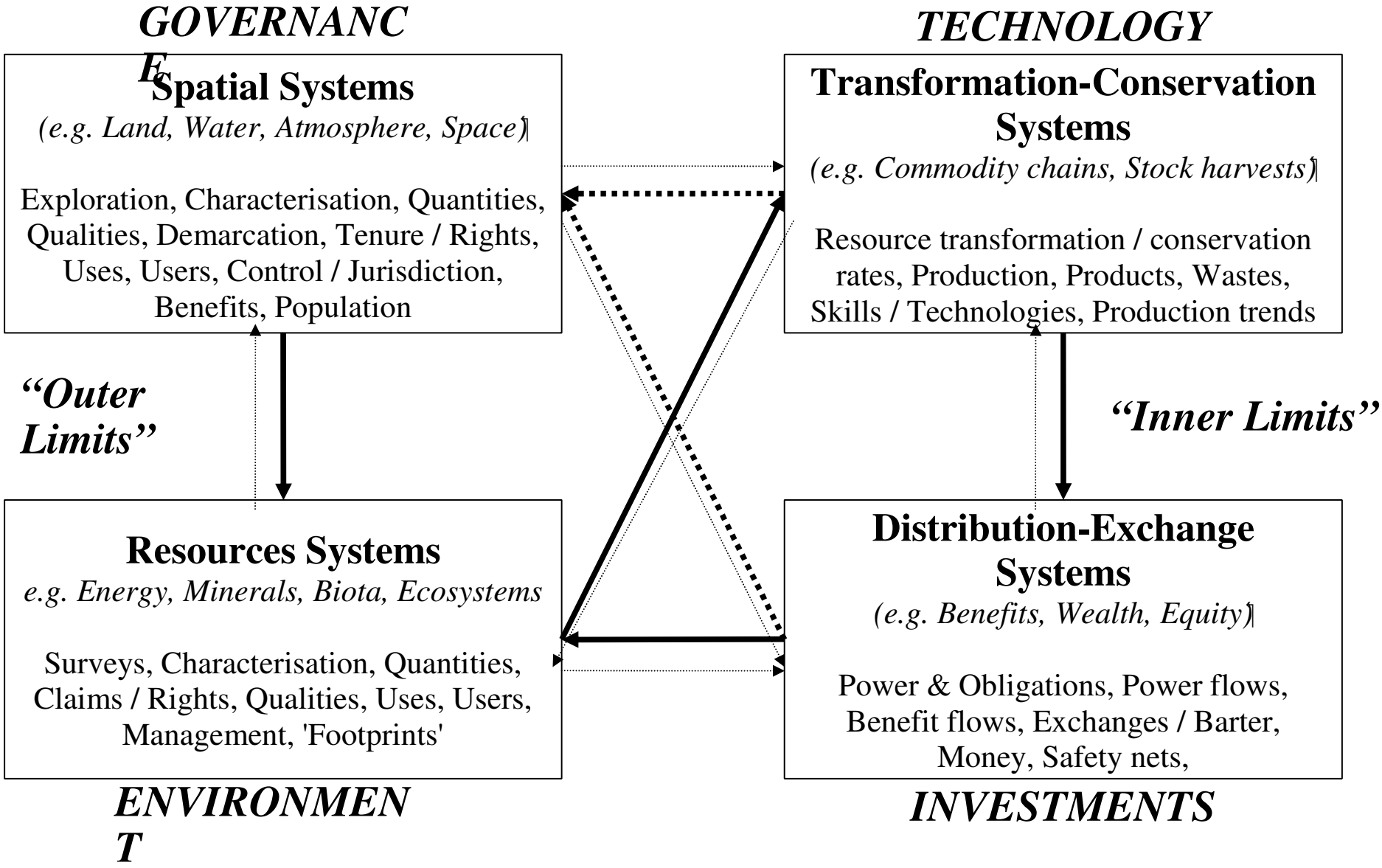
B9: Governance & Incentives

B1: Dynamics of 4 Macro Clusters of Socio-Economic & Ecological Systems - 1

Inadequate understanding of each System –

- ***"Outer Limits":***
  - **Spatial systems [Governance]**
  - **Resource systems ['Environment']**
- ***"Inner Limits":***
  - **Transformation – Conservation systems ['Technology']**
  - **Distribution – Exchange systems [Investments]**
- **? Structure, Functions, Players, Rules of the game, Outcomes, Local-Global linkages**

Macro-Ecological & Economic Human Dynamics



Information / Regulatory imperfections + Interest / Affected group differences on each local element in each system + Human needs (Basic / Supportive / Leisure) → Tensions / Conflicts resolution

B1: Dynamics of 4 Macro Socio-Economic & Ecological Systems - 3

- **Inadequate Knowledge → Tensions & Conflicts** around elements in each System: e.g.
  - **Information & Regulatory** imperfections
  - **Interest group vs. Affected groups** differences
  - **Human livelihood needs** differences @ Survival vs. Leisure levels
- **Inadequate understanding of Linkages between Systems, especially**
  - **Governance & Investments**
  - **Governance & Technology**

B6: Systemic Value Preferences

Individual & Social behaviours in different systems where:

- **Utilitarian & Speculative values >> Existential & Entrepreneurial values →**
  - **Resource throughput** >> Resource conservation
  - **Private benefits** >> Social & Environmental costs
  - **Competition** >> Cooperation
  - **Incremental change** >> 'Hard' innovations

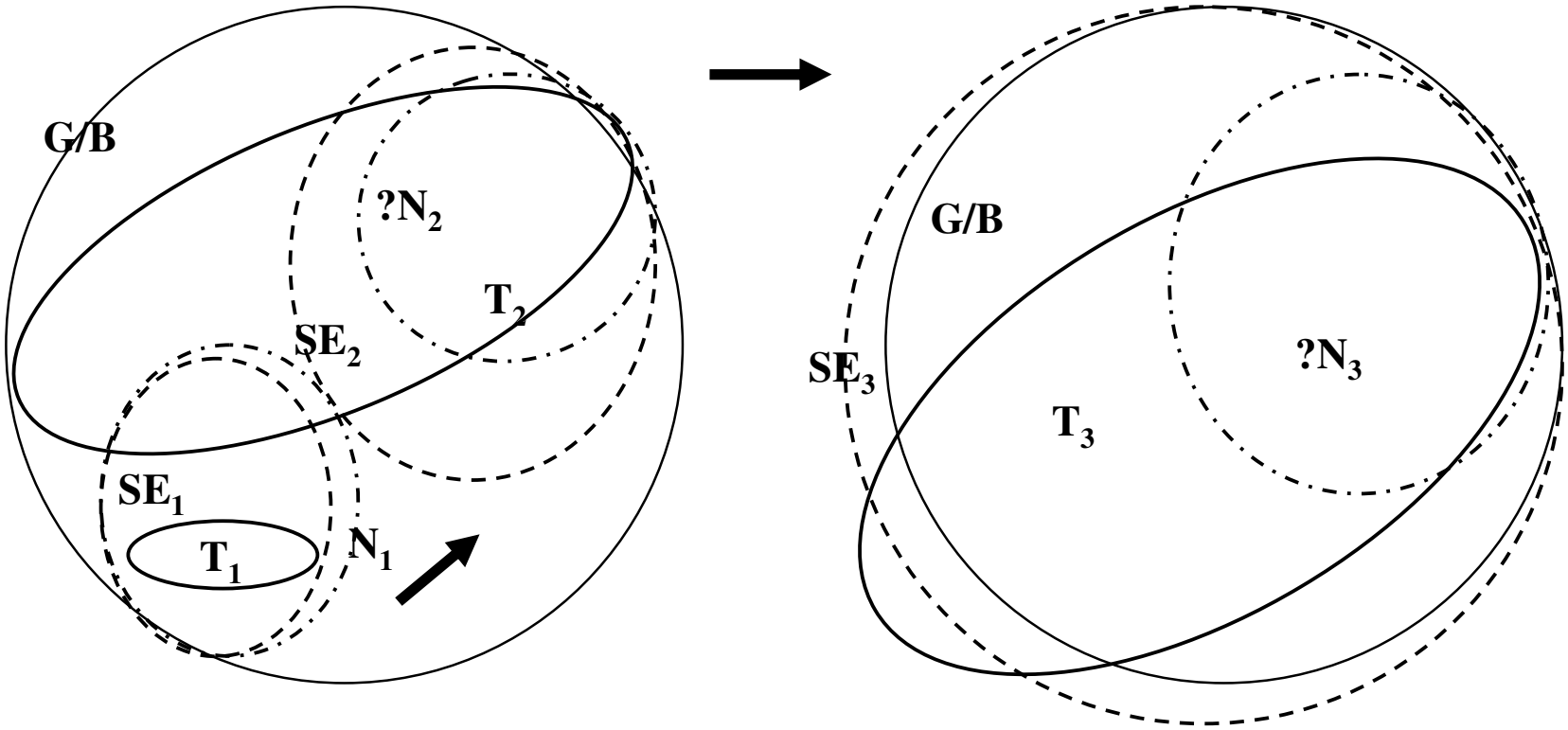
= ***r-Strategy of Immature systems*** supplied by pulsating scarce Resource →

- **Selected / Captured by Mature systems** → Systems re-organization

B7: Lead Role of Knowledge & Technology – *Poorly Understood*

- **Changing Role of Knowledge & Technology:**
  - **Development**: 'Handmaiden' → 'Leading edge'
  - **K&I clusters**: Local → Transnational / Global
  - **Military-Industrial complexes**: ↑Role for Innovations
- **Critical for Socio-economic development:**
  - New & Improved products, processes & organizations
  - Inadequate Risk / Investment linkages
- **Constrained by Norms & Values:**
  - Struggling to adjust to Transnational / Global challenges
  - Inadequate Transnational / Global governance regimes

Technology & Knowledge (T) lead Human Societies & Economies (SE) & Values (N) in Cosmic Evolution



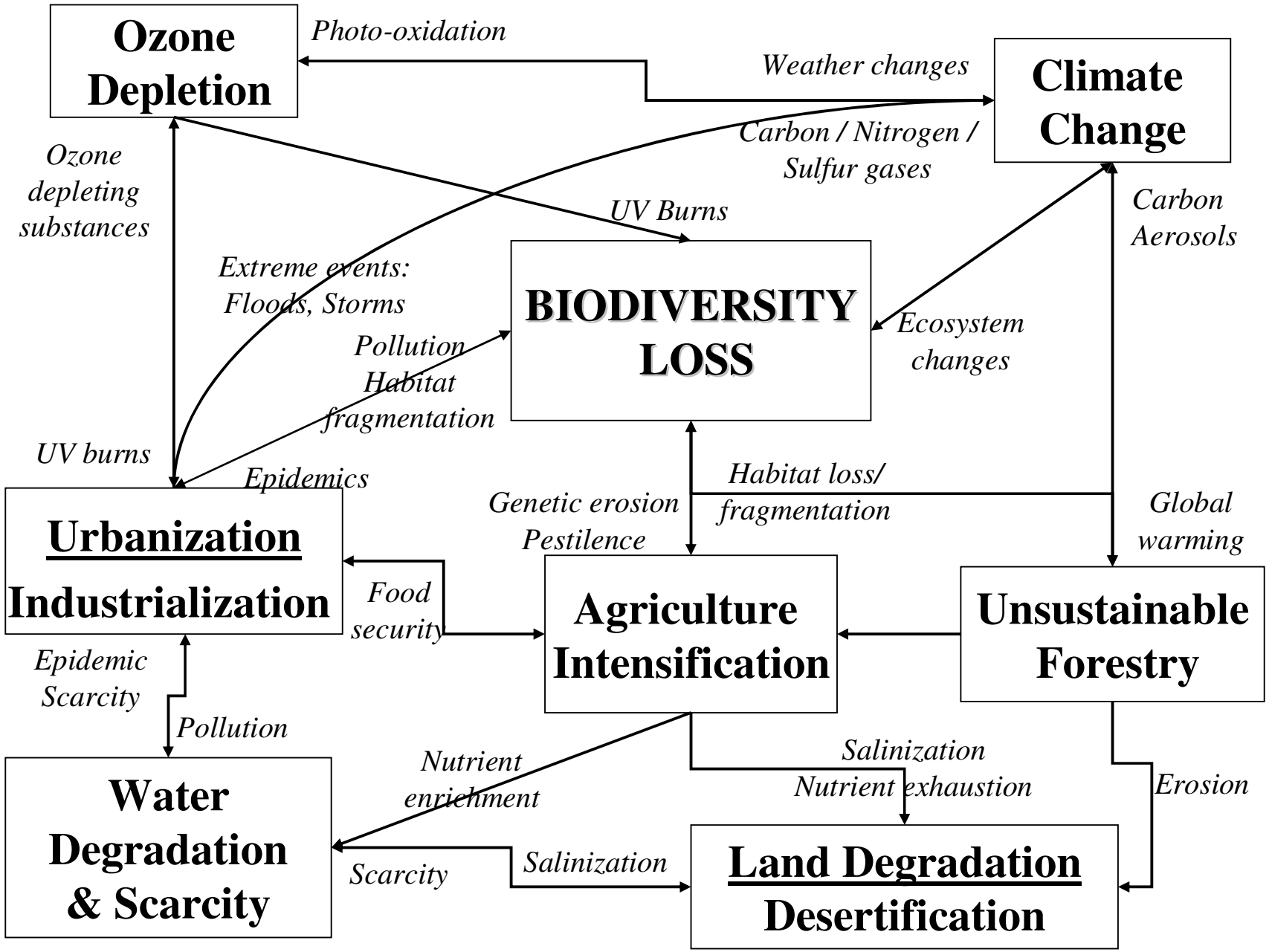
1 = Agrarian societies (SE_1) use Knowledge & Technologies (T_1) as tools to harness Geosphere / Biosphere (G/B) resources, within their cosmic values & mythologies, the Noosphere (N_1)

2 = Transnational industrial societies (SE_2) use Knowledge & Technologies (T_2) (including the Cybersphere) to harness Geosphere / Biosphere (G/B) resources & affect other societies, without equivalent cosmic values & mythologies ($?N_2$)

3 = Globalized industrial societies (SE_3) use Knowledge & Technologies (T3) (including the Cybersphere) to harness Geosphere / Biosphere's (G/B) resources exceeding 'carrying capacity', without equivalent cosmic values & mythologies ($?N_3$)

B8: Global Consequences of Local Actions – *Poorly Understood*

- **Local social / economic / economic enterprises → 'Downstream' Transnational / Regional / Global effects** – often difficult to comprehend / predict:
  - **'Externalities'** – Economic, Social, & Environmental
  - **Cumulative** effects
  - **Bio-magnification** through food chains
  - **Synergistic / Antagonistic** effects
  - **Dispersed** effects – due to global circulation patterns (atmospheric, oceanic, migratory patterns, plate tectonics)


Ozone Depletion
Photo-oxidation
Weather changes
Climate Change
Ozone depleting substances
Carbon / Nitrogen / Sulfur gases
UV Burns
Carbon Aerosols
Extreme events: Floods, Storms
BIODIVERSITY LOSS
Ecosystem changes
Pollution
Habitat fragmentation
UV burns
Epidemics
Habitat loss/ fragmentation
Genetic erosion
Pestilence
Global warming
Urbanization
Industrialization
Food security
Agriculture Intensification
Unsustainable Forestry
Epidemic
Scarcity
Pollution
Nutrient enrichment
Salinization
Nutrient exhaustion
Erosion
Water Degradation & Scarcity
Scarcity
Salinization
Land Degradation
Desertification

B9: Confusion about 'Sustainability'

- **'Image' generating public sympathy & trust** through marketing tools used to:
  - Promote particular projects & products
  - Manipulate production & consumption patterns

  e.g. 'green', 'environmentally-friendly', 'eco-sensitive'
- **Pious hope** that developing economies ***maintain their present*** resource consumption patterns, while rich industrial economies continue their unsustainable over-consumption patterns
- **Self-sufficiency in production** for one's own needs, when production & consumption patterns, & their impacts, are globally interconnected

B10: Emergence of -ve Forms of Social Capital @ Different Scales

- **Non-Behavioural Information**
  - Propaganda / 'Spin' on information / knowledge
  - Monopolistic / 'Rent-seeking' ideologies
- **Inter-Personal Behaviour**
  - 'Opportunism', 'Predation', 'Parasitism'
  - Dishonesty / Collusion by elites
- **Collective / Group Behaviour**
  - 'Free-riding' on 'commons'
  - Ripping-off scale economies / 'Mafias'

B11: Inadequate Governance & Incentives Structures

- **Saturation principle** ← Open access / 'Commons'
- **S/T Incentives → Private wealth accumulation → 'Gap'**
  - Perverse Incentives & Subsidies / -ve Social capital effects
  - Imperfect information: 'Sellers' > 'Buyers'
- **'Open access' regimes** for any resource (natural, synthetic), information / knowledge, & space-time →
  - 'Free-riding', 'Rent-seeking' behaviour
- **Inefficient Public administration / management** capacity especially of the 'Commons' @ Global levels

(C) Turning Point in Environmental & Resource Degradation – Causal Factors

C1: Health & Environmental quality

C2: Knowledge & Environmental quality

C3: Innovations & Environmental quality

C4: Policies & Environmental quality

C1: Health & Environmental Quality

- **↑Local Health effects → ↑Environmental Quality preferences**: e.g.
  - Organic pesticides (DDT) → Reproduction illnesses
  - Heavy metals (Hg, Pb, As) → Neurological disorders
  - Particulate matter (Smog) → Respiratory disorders
- **Indirect Local Health effects → Environmental Quality preferences**: e.g.
  - Eutrophication (N, P), Waste dumping
- **Environmental Quality preference with +ve Income elasticity**

C2: Knowledge & Environmental Quality

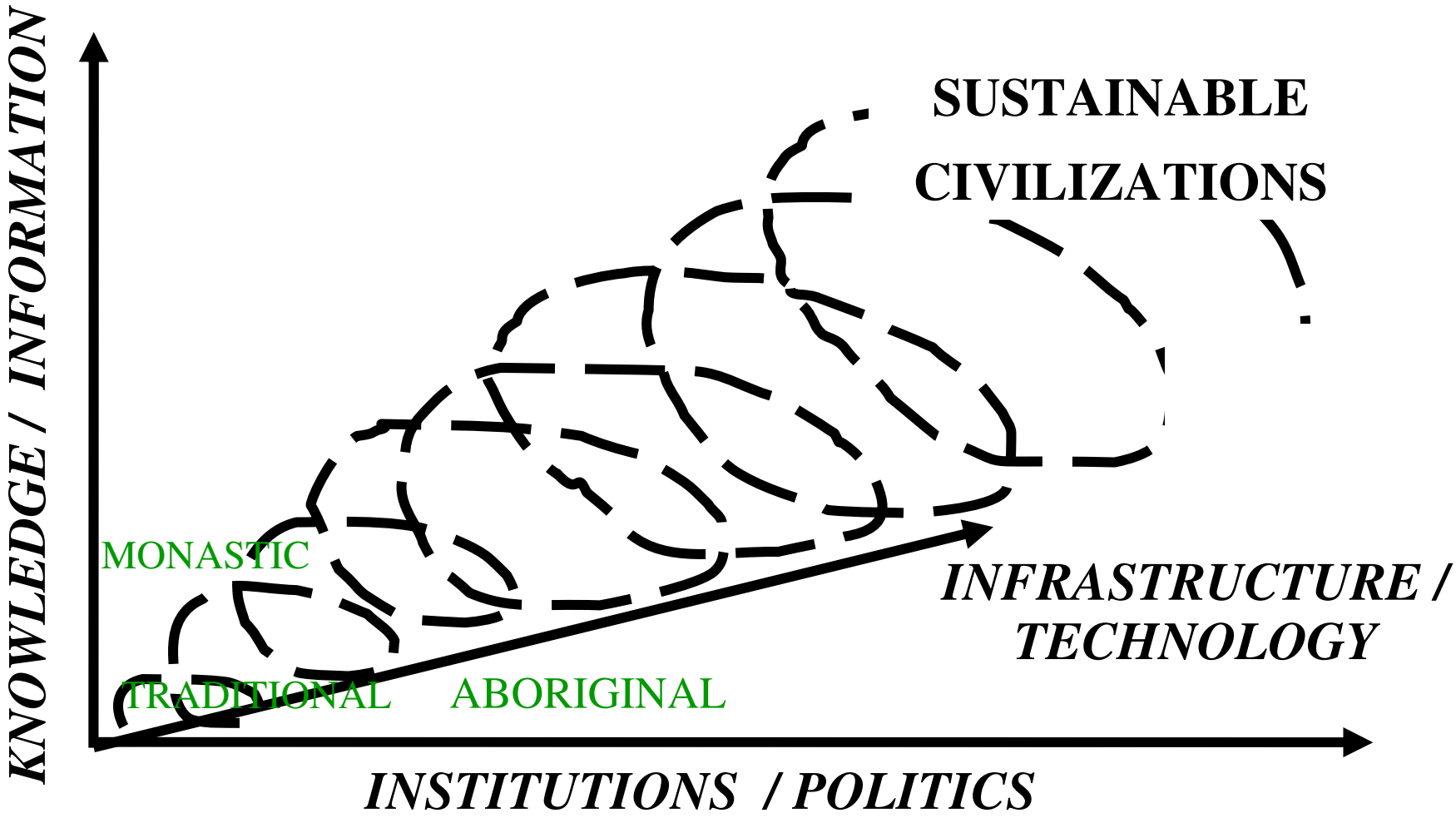
- **↑R&D & Knowledge Investments in 'industry' →**
  - ↑Clean production + ↑Efficiency + ↑Benefits
- **↑Dynamic modelling of Resource stocks & quality + Consumer satisfaction @ High level of Population & Pollution →**
  - ↑Integrated systems / Land use + Waste recovery
  - ↑Integrated industrial complexes: e.g. Yokkaichi
  - ↑Investment in O&M (operations & maintenance)

C3: Innovations & Environmental Quality

- **Structural changes in Production & Consumption with income**: e.g.
  - Polluting industries → Tertiary industries
  - Trade → Delocalization / Decentralization
- **↑Changes in Pollution Abatement + Production technologies →**
  - ↑Returns to scale in Abatement technologies
  - ↑Clean production technologies: e.g. Manufacturing
  - ↑Low-impact technologies: e.g. Forestry, Fisheries, Mining

C4: Policies & Environmental Quality

- **↑Establishment of Policies + Institutions → Internalization of Environmental 'externalities'**
  - Due to ↑Environmental Quality demands
- **Information (Knowledge), Institutional (Regulatory) & Infrastructure (Technological) availability / capability → Successful protocols**: e.g.
  - Montreal Protocol / Ozone convention
  - cf. Framework Convention for Climate Change (UNFCCC) or Convention on Biological Diversity (CBD)



Axes of Sustainable Development

(Each whorl represents development path involving chaos, escalating from the local to the global scale through a Fibanoucci series)

C5: Values & Environmental Quality

- **Crisis in Values affecting Health / Security → Change from Immature to Mature systems**:
  - High Consumption / Throughput / Wastes → Conservation / Investment / Distribution
  - 'Pioneer' species or professions / 'r' strategy → 'Climax' species or professions / 'K' strategy
  - Growth & Niche saturation in 'Open' systems → Selection & Niche creation in 'Closed' systems
  - 'Open' Temperate systems → 'Closed' Tropical systems
  - Incremental Knowledge change → 'Hard' Innovations

= *Creative destruction & re-organization*

(D) Way Forward for Academy - 1

C1: Cultivating Global Consciousness & Ethos

C2: Promoting Knowledge Innovation in Different Fields over Space & Time

C3: Promoting Ethical Consideration of Knowledge 'Externalities' in Macro & Micro Decisions

C4: Promoting the Strengthening of Social Capital for Ethical Policies

C5: Addressing the Challenges confronting Developing Economies

(D) Way Forward for Academy - 2

C6: Forming Stakeholder Alliances & Informal 'Commonwealths'

C7: Promoting Ethical Considerations at the 'heart' of Decision / Policy-making

C8: Promoting Sustainability in terms of Ethics / Values that reduce Entropy

C9: Challenge for a 'World University'

D1: Re-vitalize the Notion of a 'World University'

- **Promote Networking of Fellows** – in Arts & Sciences across all sectors
- **Harness Imagination / Ideas** – through Networks
- **Capture Enlightenment** – through fusion of Insights
- **Generate new Knowledge & Information**
- **Apply Knowledge** – design Innovative instruments
- **Open public minds / Awareness** – by Dissemination
- **Change public minds** – by Education & Learning

D2: Cultivate Global Consciousness about Values – based on 5 elements

- **Respect / Reverence** for nature, cultures & knowledge
- **Awareness of 'externalities'** affecting communities @ local & global scales / NIMBY
- **Reflecting on & Sharing experiences** → Designing novel products / instruments / experiments / methods
- **Knowledge generation & sharing** → Global-Local action in designing new policies & instruments.
- **Humility** → To cope with unknowns & uncertainties

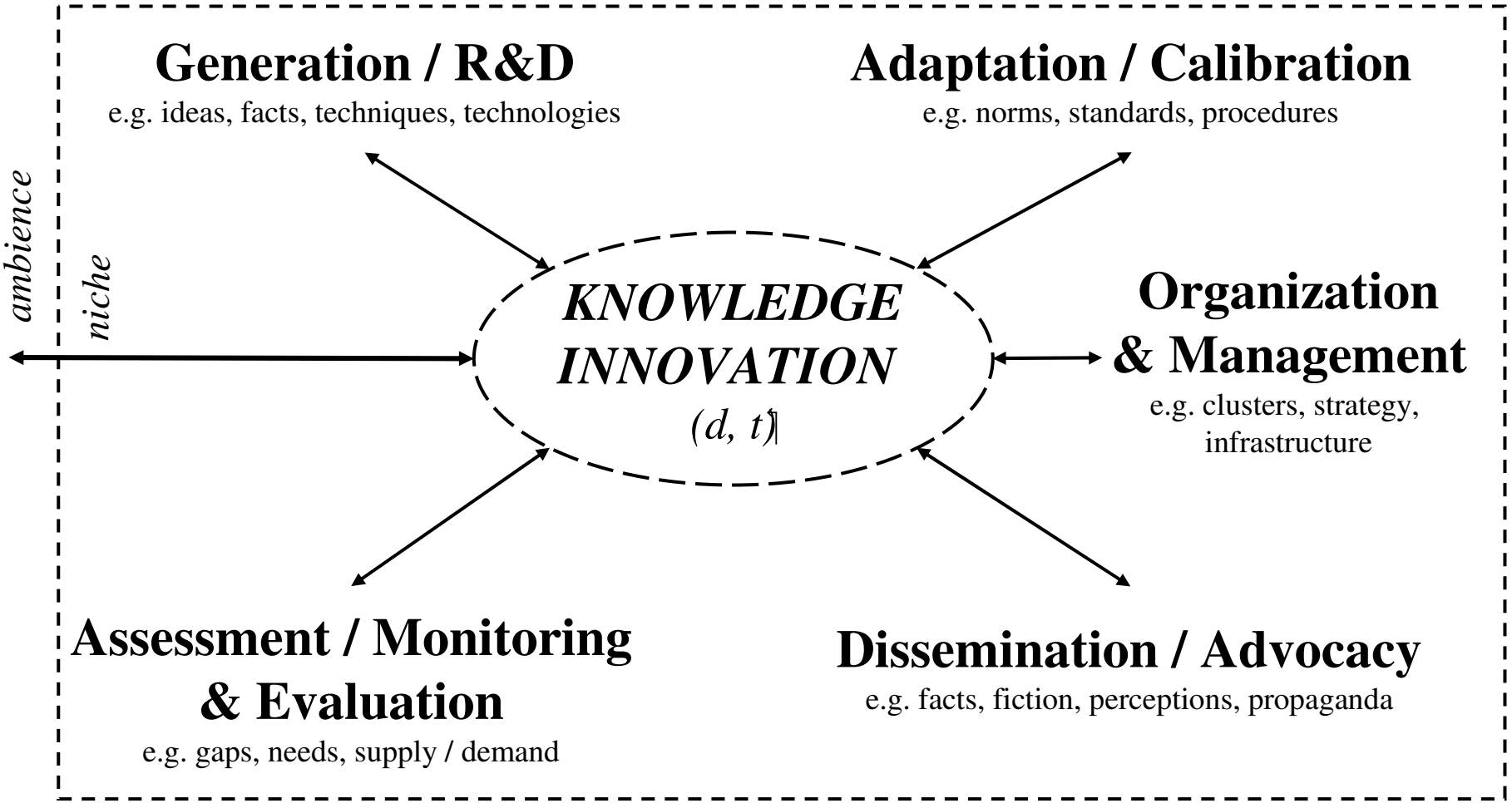
D3: Promote Knowledge Innovation in Different Fields over Space & Time

- **Generation / R&D**
- **Adaptation / Calibration**
- **Organization / Management**
- **Dissemination / Advocacy**
- **Assessment / Monitoring & Evaluation**

(Figure)

Knowledge Innovation Elements for Sustainable Futures

***Processes**: Liaison / Networks, Insights / Reflections, Experiments / Experiences, Analyses / Syntheses, Storage / Retrieval, Formation of Synthetic Capital (e.g. organization, technology, monetary units)*



D4: Form Stakeholder Alliances & Informal 'Commonwealths'

For Competitive + Cooperative:

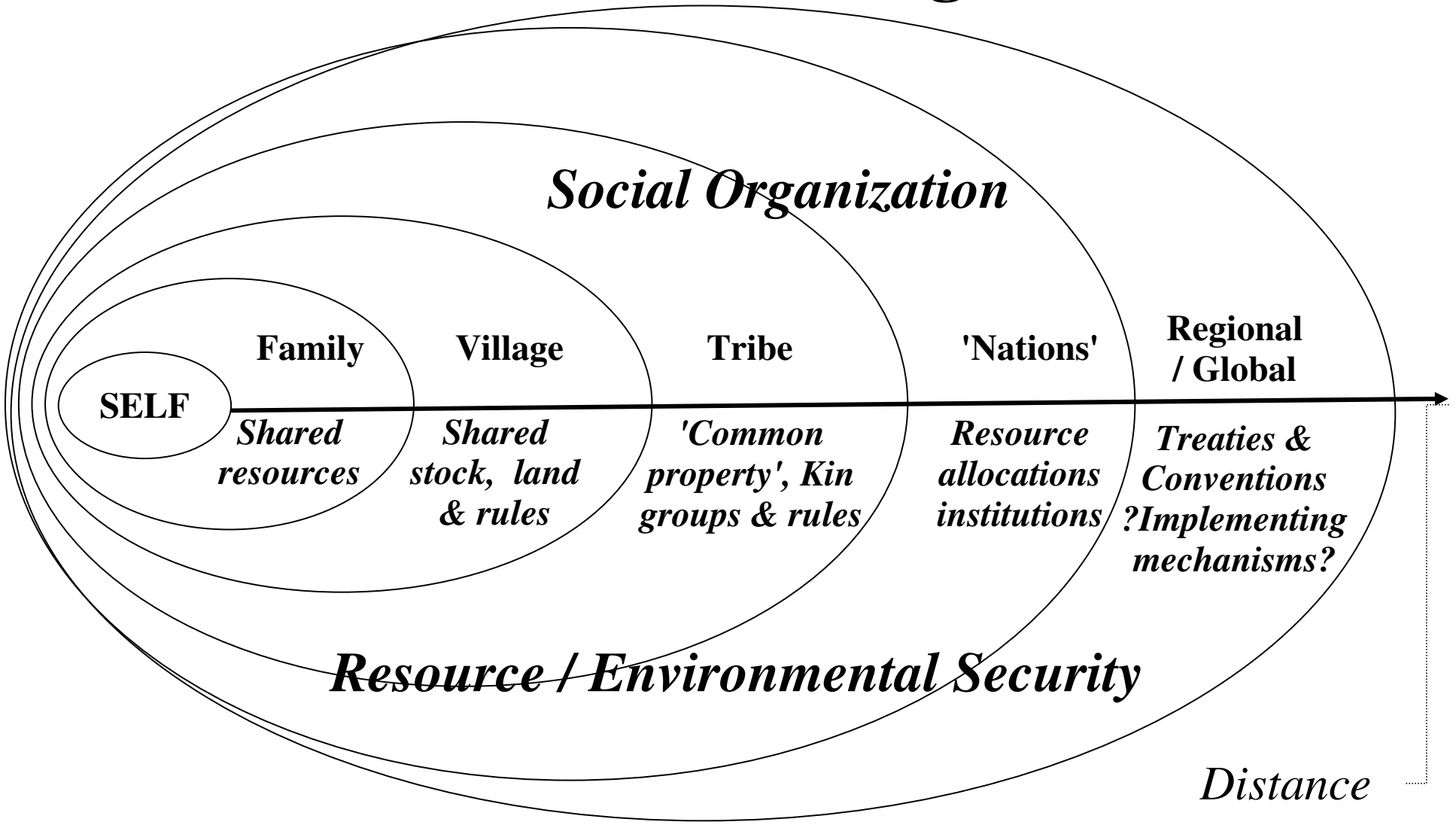
- **Exploration + Learning**
- **Knowledge generation & application**
- **Innovations – *'Hard' + 'Soft'***
- **Ethical Policy alternatives**
- **Piloting → Demonstrating → 'Mainstreaming'**

→ *Capacity development & strengthening*

→ *'Level' Playing field*

Goal = Reducing Entropy / Perturbations

Adapting Stakeholder Alliances for Resource & Environmental Management



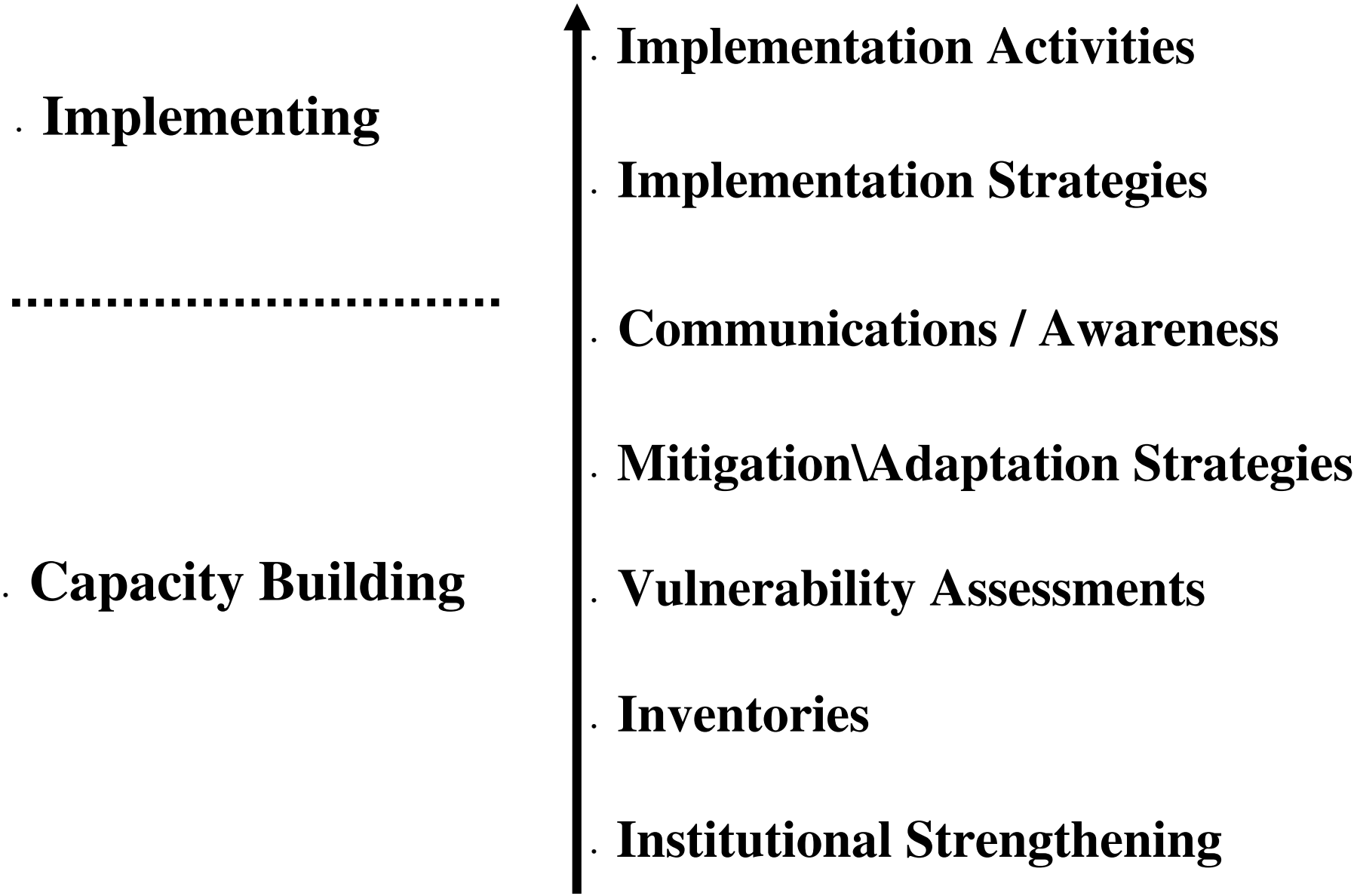
D5: Strengthen Social Capital for Global & Macro-Systems Dynamics

- **Trust**: Build understanding of intangible cognitive Values, Norms & Trust @ micro / local level
- **Facilitation**: Enable functioning of tangible structural Networks & Institutions @ micro / local level, & intangible Governance @ macro / national & transnational levels
- **Transaction costs**: Reduce transaction costs in tangible structural Institutions & Rule of Law @ macro / national & transnational levels

D6: Address Challenges confronting Developing Economies

- **Local Capacity**: Develop robust expertise & capacity to identify & harness largely tacit Knowledge & 'external' Technologies for adaptation @ local & national levels without risking global 'isolation'
- **Innovative Groups**: Support the formation of Key innovative groups (e.g. Entrepreneurs, National ‘godfathers’, Foreign ‘intermediaries’) to adapt & innovate knowledge & technologies for addressing Global-Local impacts
- **Institutional Reforms**: Enhance Regulatory frameworks, administrative capacity & transparency to reduce transaction costs, & offset -ve forms of social capital in managing socio-economic & environmental transitions & 'commons'

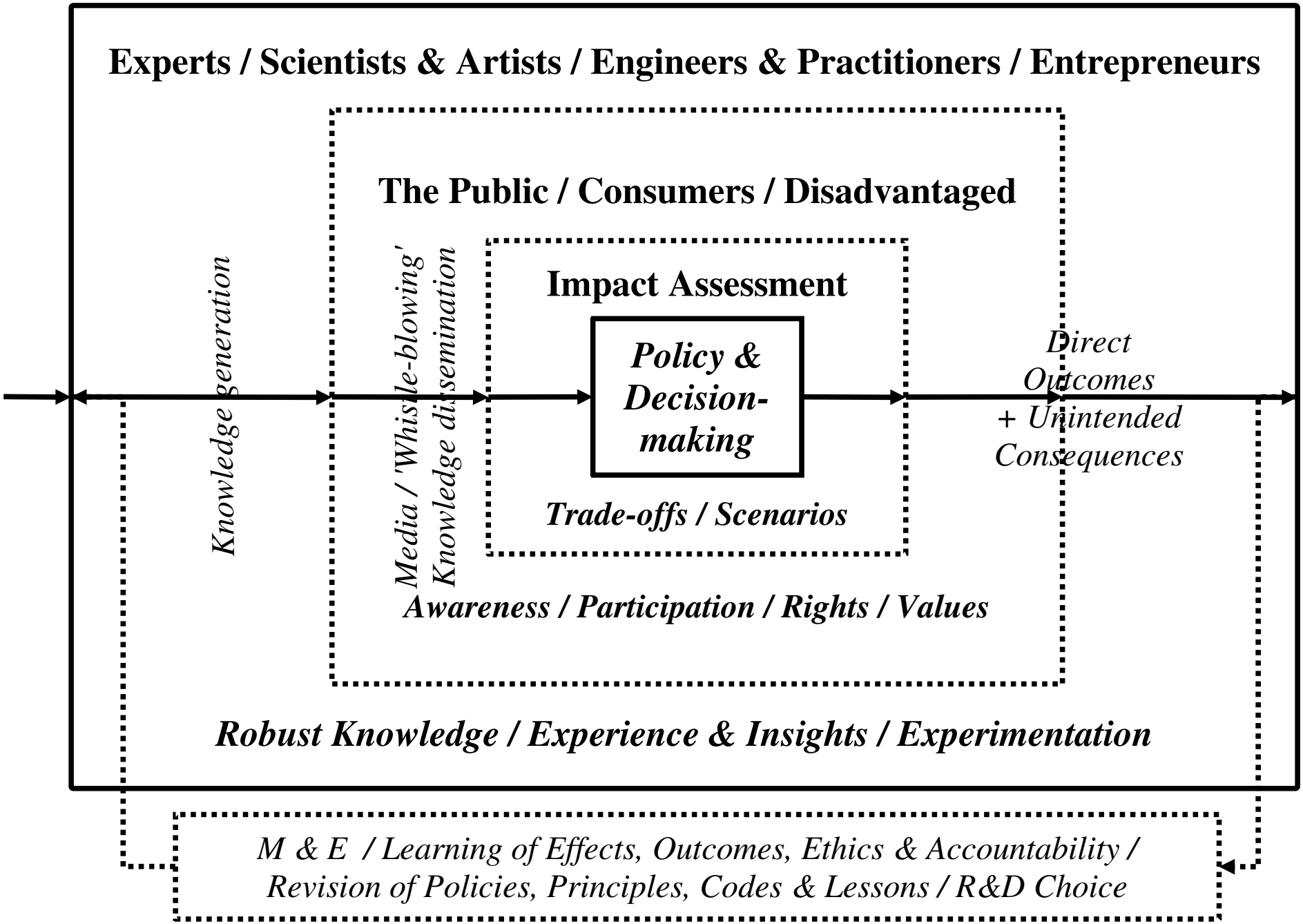
Strengthening National Capacity for Implementing International Environmental Conventions (e.g. UNFCCC)



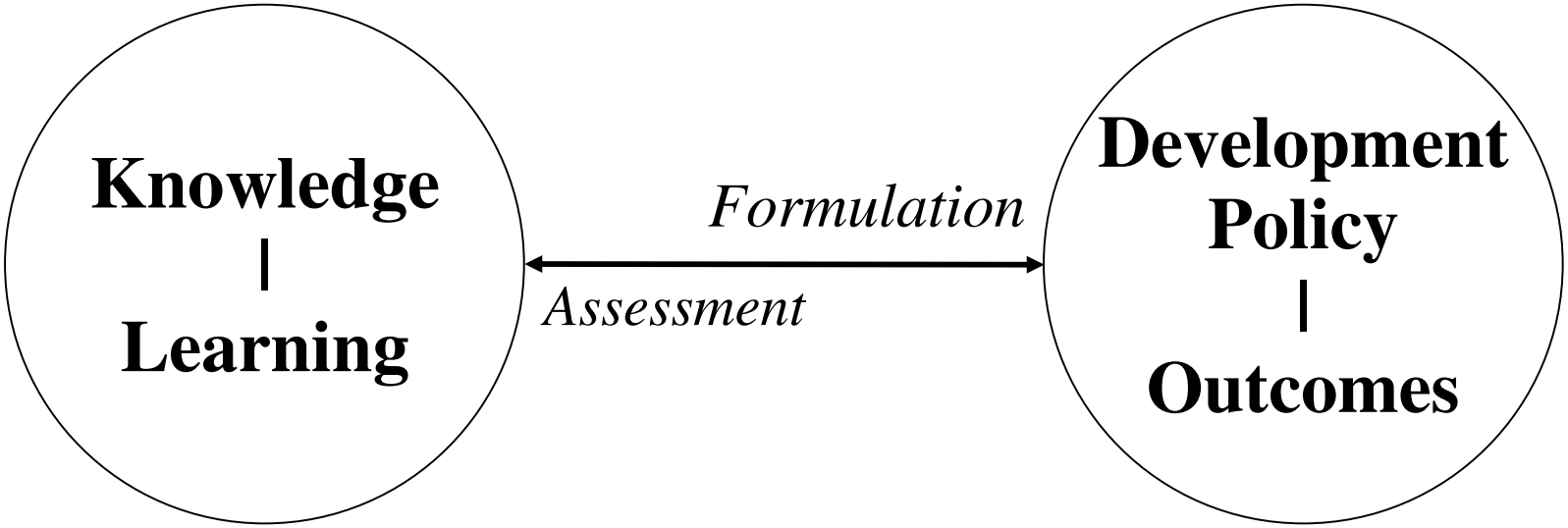
D7: Promote Ethical Considerations at the 'heart' of Decision / Policy-making - 1

- **@ Point of Impact & Trade-off consideration**
- **Based on robust Knowledge / Information, Institutions / Regulatory framework, & Infrastructure / Technology**
- **By Learning-by-Doing** through Pilots & Demonstrations before 'Mainstreaming'
- **Opportunistically using crises** that drive Policy & Decision-making
  - Health & Security issues

Ethics & Policies for Sustainable Futures



Links between Knowledge & Development Policy



- **Knowledge:** Explicit & Tacit knowledge critical for Policy formulation & successful Outcomes
- Explicit knowledge readily available; Tacit knowledge difficult to harness
- **Tacit knowledge abuse** → Hidden agendas, Covert power relations, Domination, Exploitation, Enslavement, etc.; = 'Open access' behaviour → Unsustainable human development
- **Change:** Change dynamics = Partial ability to satisfy escalating human needs through research, learning new skills & re-training
- **Development:** Development = Tension field between Sensory Perception (Needs) & Actual Realization (Satisfiers)

D7: Promote Ethical Considerations at the 'heart' of Decision / Policy-making - 4

- **'Internalizing' externalities:**
  - Cost-Benefit Analysis approaches
  - Precautionary Principle approaches
- **Monitoring 'External' Interception of Knowledge Acquired / Generated / Applied:**
  - Leakages, Mutualism, 'Predation', & Parasitism¶
  - Social Benefits / Disbenefits – “Social capital”

D8: Promote Sustainability Values that reduce Entropy - 1

- @ **Local scale**: Understood in terms of Resource management for human needs & community livelihoods (e.g. CBNRM)
- @ **Trans-national / Regional / Global scales**: Needs successful determination of Ethical disputes about:
  - **'External' social & environmental effects** between 'neighbours' & stakeholders involved in resource use & transfers across several regions
  - **'Life cycle' effects** of scarce resource transformations & uses

D8: Promote Sustainability Values that reduce Entropy - 2

- **Explore Ideologies & Policy Instruments →**
  - Propagating Entrepreneurial, Conservative & Humane values for Sustainable futures @ Global scale
  - Appropriate 3 axes:
    - Information & Knowledge
    - Institutions / Controls & Investment
    - Infrastructure & Technology
  - Institutions addressing 3 elements:
    - **Psycho-Social needs**: Social cohesion / empathy
    - **Beliefs**: Reverence for Nature + Human ingenuity
    - **Ideological motivation**: Social good / Equal opportunity → Public participation / acceptance