

# **“ENVIRONMENTAL DEGRADATION, SQPMBLS & THE SEEA”**

(SOCIETAL QUALITY PERFORMANCE MULTIPLE BOTTOM LINES)

**(OR)**

**(TOWARDS) GUIDELINES FOR ...  
GOOD STATISTICAL AND ANALYTICAL PRACTICE  
TAKING INTO ACCOUNT  
(SOCIO-ECONOMIC-ENVIRONMENTAL) SYSTEM COMPLEXITY  
AND DIVERSITY OF POLICY NEED**

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## **THREE KINDS OF ENVIRONMENTAL DAMAGE**

- \* Adverse effects to the physical, chemical and biological systems which are required for the possibility of human life and economic activity being sustained over a long period of time.**
- \* Adverse effects of human activity upon the natural world — in the loss of biodiversity, the destruction of habitats and so on.**
- \* Detrimental impact of human activity upon aesthetically and culturally significant landscapes and places and the environment as a source of recreation.**

*The sources of environmental concern are complex, and so these broad categories overlap in various ways.*

# *KEY THEMES OF THE PRESENTATION*

- Attention to the CONTEXTS-OF-USE of environmental degradation data as information relative to SQPMBLS (societal quality-performance multiple bottom lines), e.g., in CSR reporting, territorial policy sustainability assessments.
- Status and organisation of QUALITATIVE, QUANTITATIVE AND MONETARY EVALUATIONS of distinct classes of degradation within the SEEA.
- META-INFORMATION for contexts-of-production and contexts-of-use of monetary valuation data.

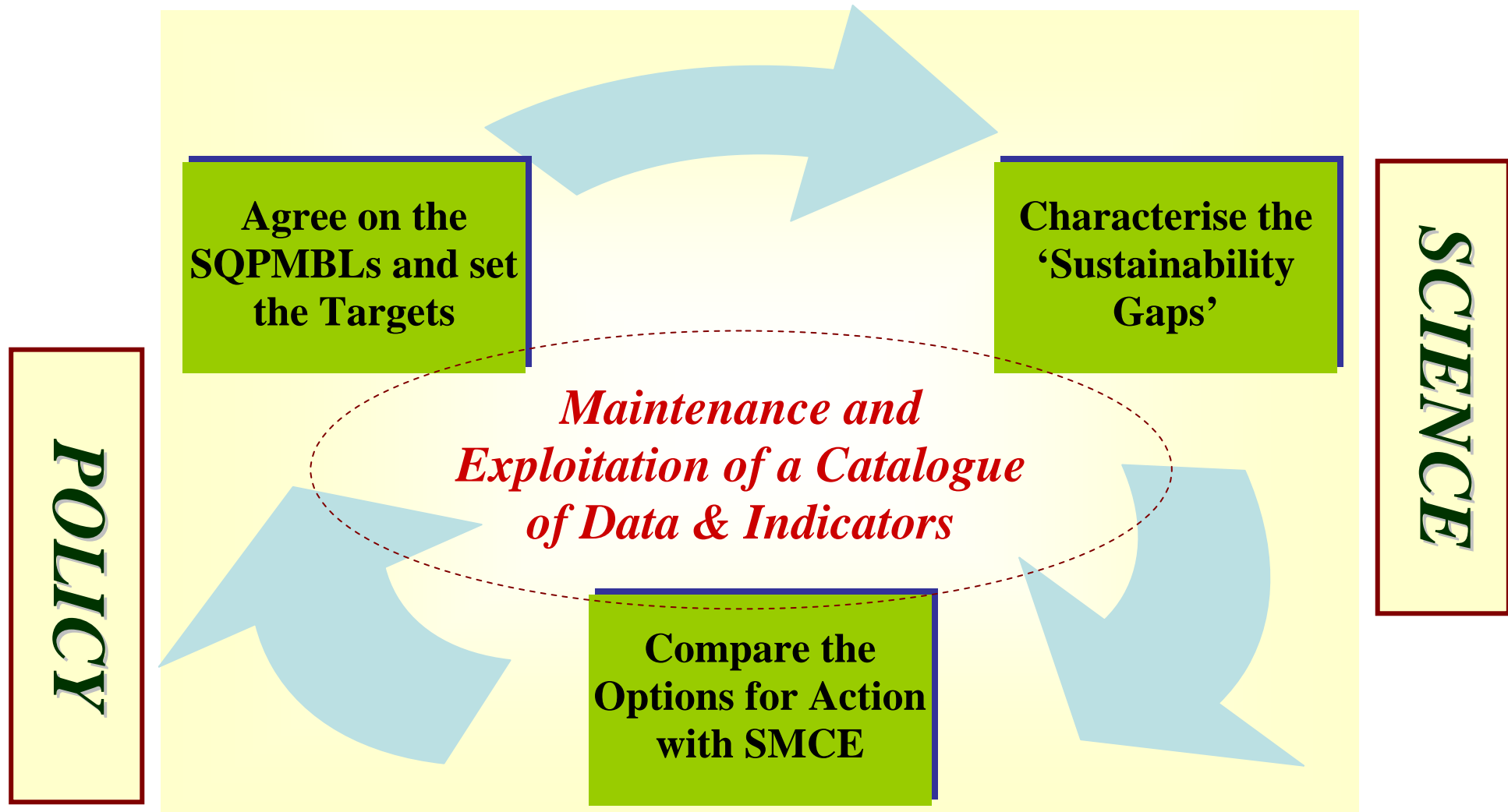
# **WHAT IS THE VOCATION OF THE SEEA?**

**IS IT**

**... for making a year-by-year  
Inventory of (perceived) Environmental Damages?  
... and for (declared) risks of Future Changes?**

**OR IS IT**

**... an Knowledge Management Tool in the service of  
...(inter alia) Sustainability Assessments  
... for Countries, Companies, Local Authorities  
(and so on?)**



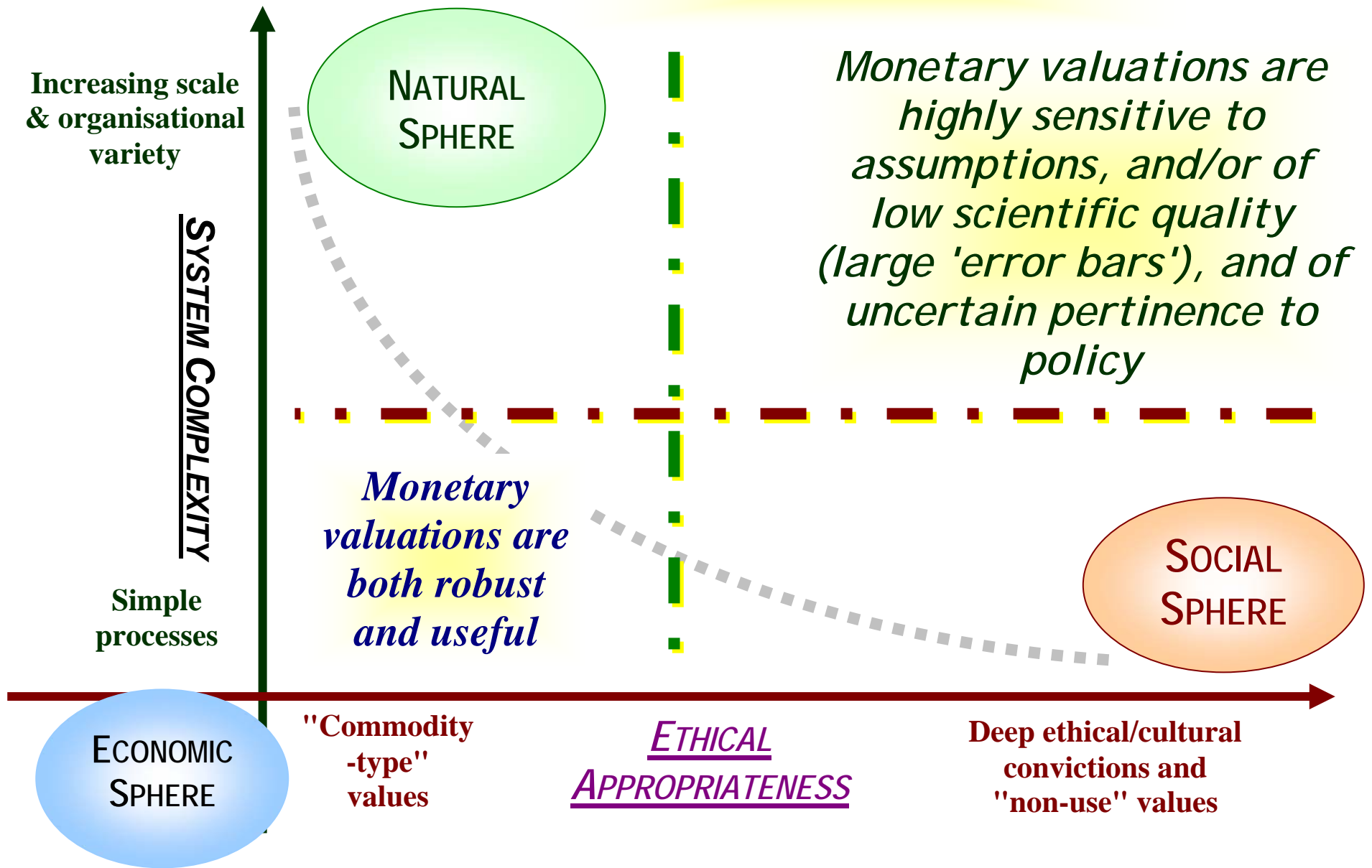
**Monetary valuations of, or associated with environmental changes, or with the avoidance of environmental changes, are classes of indicator information.**

- ◆ They may be ways of CHARACTERISING BENEFITS (what, why, to whom?), in the sense of a presumed *willingness to pay or receive money* in exchange for the environmental services in question;
- ◆ They may be ways of characterising (economic) OPPORTUNITY COSTS *associated with the respect of (environmental) sustainability goals.*

**In order to know how best to organise information on environmental damages and degradation, it is helpful to know something about typical USES AND USERS of these categories of information...**

- ◆ These uses, and contexts of use, may include monetary CBA (for project analyses) and macro-economic analogues of CBA (such as 'genuine savings' for macro-economic asset score-keeping);
- ◆ But in general the uses and the contexts of use are *a lot more complex.*

# THE "MONETISATION FRONTIERS"

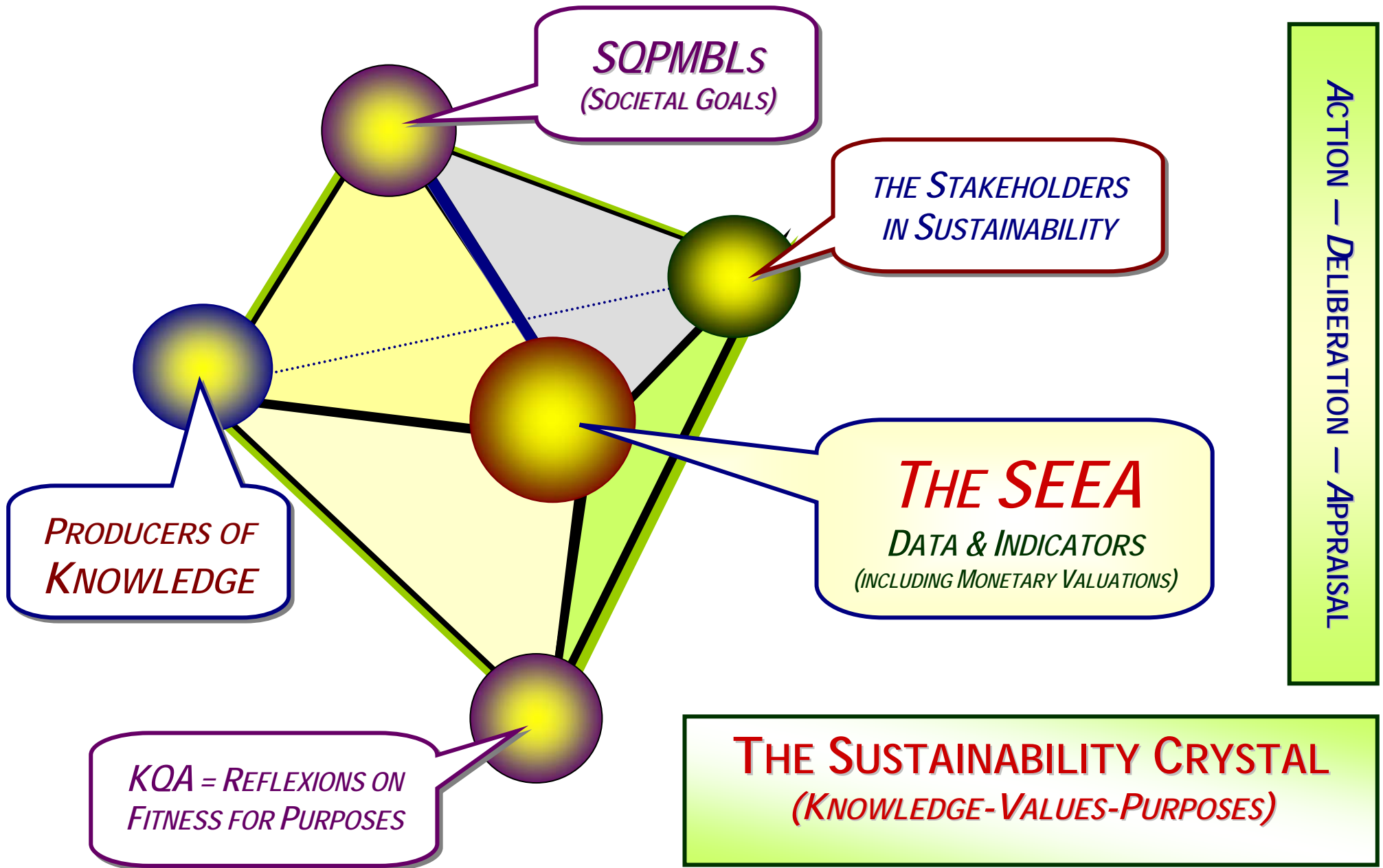


# SUSTAINABILITY ASSESSMENTS . . .

- **ESTABLISHING PRIORITIES**
- **SETTING TARGETS**
- **MEASURING THE GAPS**
- **DESCRIBING THE TRADE-OFFS**  
... THROUGH CHARACTERISING ...  
... **BENEFITS & COSTS** (WHAT, TO WHOM?)
- **AND SO ... JUSTIFYING THE ACTIONS**

**GOVERNING, GUIDING, JUSTIFYING**  
**APPRAISAL — DELIBERATION — ACTION**  
**(RECURSIVE ASSESSMENT — EX ANTE & EX POST)**





*§1. AFFIRMING SUSTAINABILITY (OF WHAT, WHY AND FOR WHOM?)*

*§2. THE PILLARS / DIMENSIONS OF SUSTAINABILITY  
(E.G., SUSTAINING THE 4 CAPITALS; OR THE 4 SPHERES IN COEVOLUTION)*

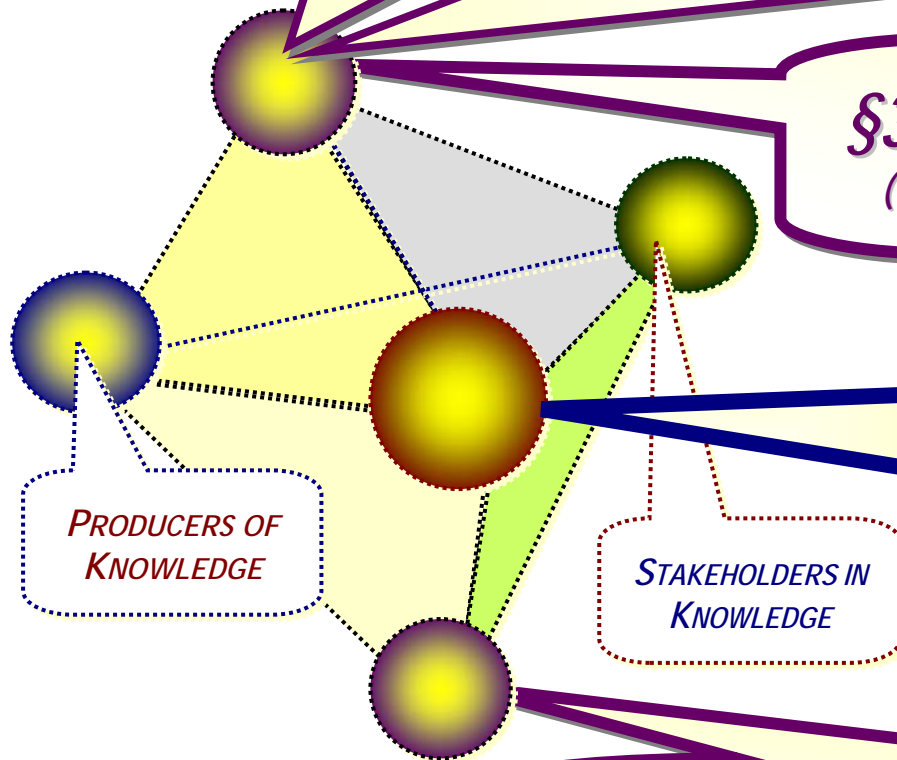
*§3. DISCURSIVELY ESTABLISHED SQPMBLS  
(THE CHALLENGE OF GOVERNANCE WITH MULTIPLE GOALS)*

*§4. DATA & INDICATORS  
(INCLUDING MONETARY VALUATIONS)*

*VOCATION OF THE SEEA*

*KQA: REFLECTIONS ON FITNESS OF KNOWLEDGE FOR PURPOSES*

THE KNOWLEDGE PYRAMID FOR SUSTAINABILITY





### *ESCHER'S "RELATIVITY" ENGRAVING*

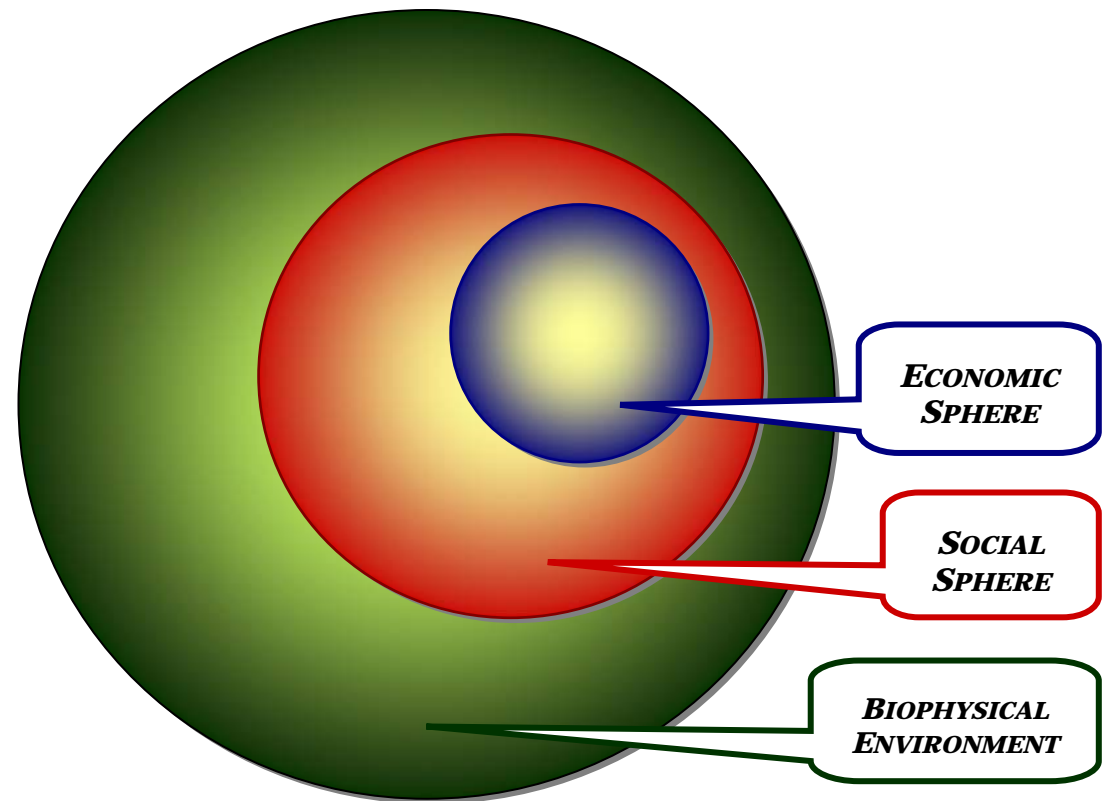
(1) There is no unique hierarchy as you move around the stairs and corridors ; (2) Often, you find yourself "outside the wall" rather than face-to-face with each other....

A  
Visual Metaphor  
for  
the problems  
of  
Navigating  
"UP"  
&  
"DOWN"  
in the  
Knowledge Pyramid  
for  
Sustainability

## THE FOUR SPHERES MODEL OF SUSTAINABILITY

Systems approaches to sustainability highlight the interdependence of the economic, social and environmental spheres. This is an asymmetric interdependence: the ECONOMIC is embedded in the SOCIAL sphere; and HUMAN COMMUNITY (including the “economic”) is embedded within the BIOSPHERE.

- ◆ The economic sphere, often the focus of development policy discourses and indicators, depends for its viability on the vitality of the social and environmental spheres.
- ◆ Environmental assets are our ‘natural capital’ that is both limited and fragile.
- ◆ In the social sphere, by analogy, the cultural forms, symbolic bonds and community infrastructures are our ‘social capital’ upon which social cohesion and economic performance completely depend.

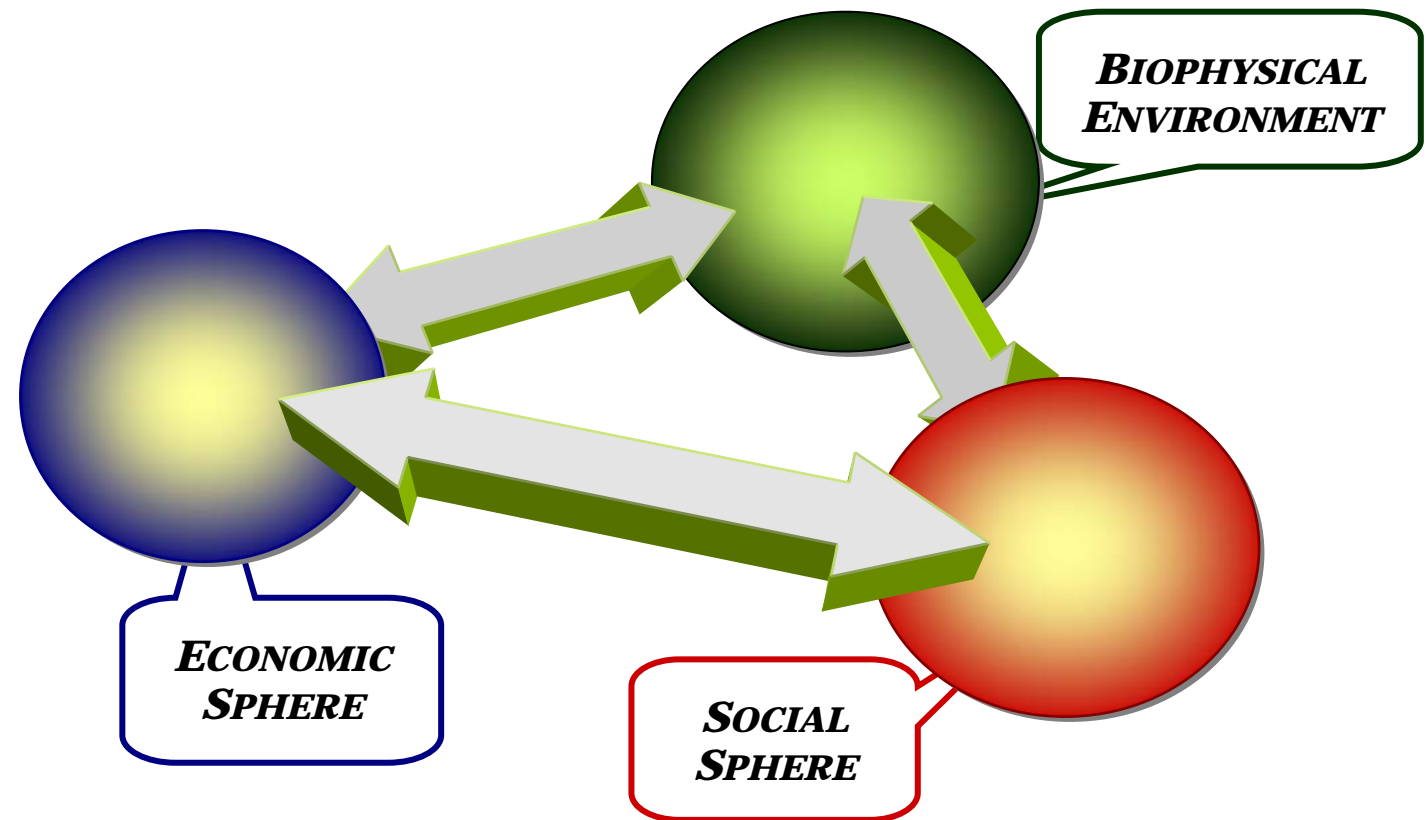


# THE TRIPLE BOTTOM LINE

Achieving sustainability ... means a process of co-evolution respecting a TRIPLE BOTTOM LINE, that is, *the simultaneous respect for (or satisfaction of) quality/performance goals pertaining to each of the three spheres.*

None of "the economy", "the environment" or "the society" is treated as the be-all and end-all of things.

**GOVERNANCE FOR SUSTAINABILITY** then centres on the problem of reconciling multiple system maintenance and development goals.



# SUSTAINABILITY SCIENCE AND POLICY SCIENCE

Analyses for sustainability must focus attention on many different facets of systems maintenance and change — the interfaces, the interactions and the interdependencies between the ECONOMIC, SOCIAL and ENVIRONMENTAL spheres. Scientific enquiry for sustainability must focus attention on:

- ◆ The characterisation of principles of performance and quality in each sphere (ECONOMIC, SOCIAL, BIOPHYSICAL) and
- ◆ The interfaces, the interactions and the interdependencies between the three spheres.

These two features are complementary. The norms and principles of performance and quality that are specific to each sphere depend strongly on the ways that the system interactions/interfaces are regulated and this, in turn, is a function of relative system dominance and of principles of rights, respect or responsibility proposed for one sphere in relation to another.

In the present context, systems understanding is intended not as an end in itself, but as a knowledge base for policy and governance. Moreover, speaking of governance implies collective agency, hence the existence of a fourth type of organisation — the POLITICAL sphere — that exercises these functions of inter-system and interface regulation.

## THE TETRAHEDRAL MODEL

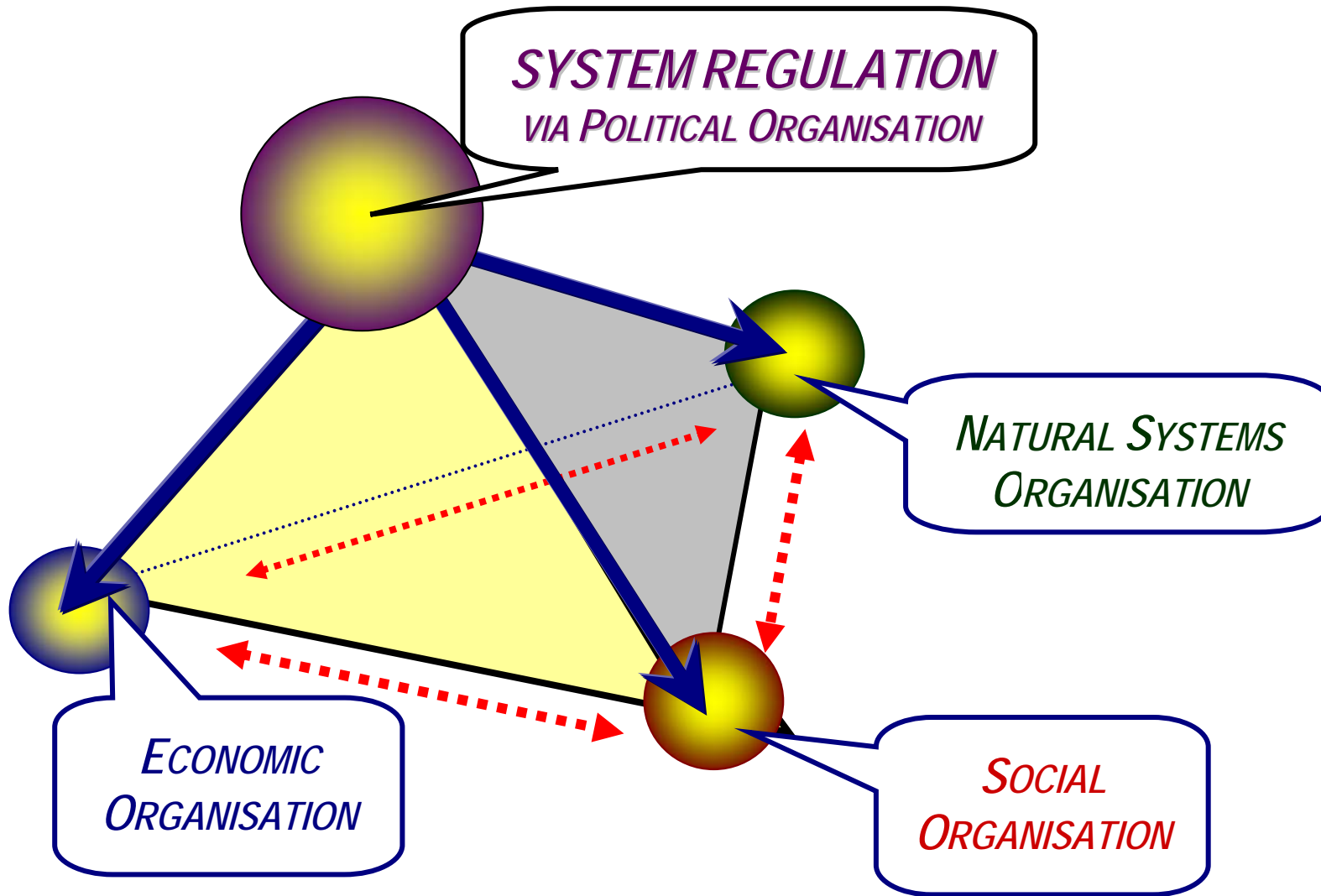
This schema of “four spheres” provides a convenient framework for a clustering of sustainability research and policy themes.

If we consider interfaces between each pair of “spheres”, then with the 4 spheres there are 6 pairings. We show (on the next pages), the four spheres as the corners of a tetrahedron [they could equally well be portrayed as the four “faces” of the tetrahedron] and then, using a 4x4 matrix array, the 10 corresponding facets of analysis.

- ◆ The 4 DIAGONAL cells of the matrix evoke performance concepts and criteria that relate principally to a single organisational form.
- ◆ The 6 OFF-DIAGONAL cells signal performance concepts and criteria arising as “interferences” of two organisational forms.

Research on the interface aspects can be characterised through investigation of the claims or demands made by each sphere relative to the others.

For expository purposes, it is convenient to class the interfaces into two sub-groups: the three “governance” interfaces engaging the POLITICAL sphere; and the three interfaces that are identified as pairings of the “three spheres” (SOCIAL-ECONOMIC-ENVIRONMENTAL).



**GOVERNANCE FOR SUSTAINABILITY: THE « FOURTH SPHERE »**



	POLITICAL	SOCIAL	ECONOMIC	ENVIRONMENTAL
POLIT	<i>Coordination, Power, &amp; Governance: THE POLITICAL SPHERE</i>			
SOCIAL	SOCIAL POLICY: (Capacity of communities; citizen/public participation)	<i>Forms of Collective Identity &amp; Community: THE SOCIAL SPHERE</i>		
ECON	ECONOMIC POLICY: (Shaping the rules and limits of markets)	OPPORTUNITIES & IMPACTS: Tensions of "The economy versus the community"	<i>Performance, Products and Output: THE ECONOMIC SPHERE</i>	
ENVIR	ENVIRONMENTAL POLICY: (Regulation of what counts as an environmental value)	LIVING WITH(IN) NATURE Meanings, Values & Risks: <i>sustaining what &amp; for whom?</i>	ENVIRONMENTAL FUNCTIONS: Pressures on & services of the environment	<i>Energy, Matter, Natural Cycles &amp; Biodiversity: ENVIRONMENTAL SPHERE</i>

## A NOTE ON GOVERNANCE: THE 4TH SPHERE

The fourth dimension of organisation, **the POLITICAL sphere**, is constituted through the emergence of conventions and procedures for the regulation of each of the three spheres — most directly the ECONOMIC and SOCIAL spheres and, more indirectly the ENVIRONMENTAL sphere — in relation to the others.

- ◆ Political organisation is a creation of the social sphere (and hence a part of it). But, political forms tend to take on a life of their own and so (just like the economic sphere) the political sphere expresses strong autonomy relative to the rest of the social (cf., tensions between the State and civil society, the public, the people), justifying demarcation from the other spheres.
- ◆ The political sphere has the role of the “referee” that arbitrates in relation to the different — and often incompatible — claims made by the actors of the social and economic spheres for themselves and with regard to the other spheres (including the environmental sphere).
- ◆ Governance for sustainability presumes the establishment of *procedural* capacities, within the political sphere, for decisions and policymaking ensuring the simultaneous respect for (or satisfaction of) quality/performance goals pertaining to each of the three *substantive* spheres, that is, governance with reference to the triple bottom line.

## THE FOUR CAPITALS IN THE 4-SPHERES MODEL

'Sustainability' is a normative orientation for the simultaneous *maintenance of capacities* within and across the four spheres. Because of interdependencies, there is a problem of reciprocal fit, which leads to a 'co-evolution' perspective. All four spheres must (with caveats about systems complexity, timescale, uncertainty) "be reconciled" in favour of sustainability.

'Strong Sustainability' norms, within the "four capitals" model, translate all this into a principle of STEWARDSHIP OF THE FOUR CAPITALS.

### THE FOUR CAPITALS are:

- ◆ the respective "FUNDS" OF THE "THREE SPHERES"  
(ECONOMIC, NATURAL and SOCIAL CAPITAL),

- ◆ ... *plus* "HUMAN CAPITAL"

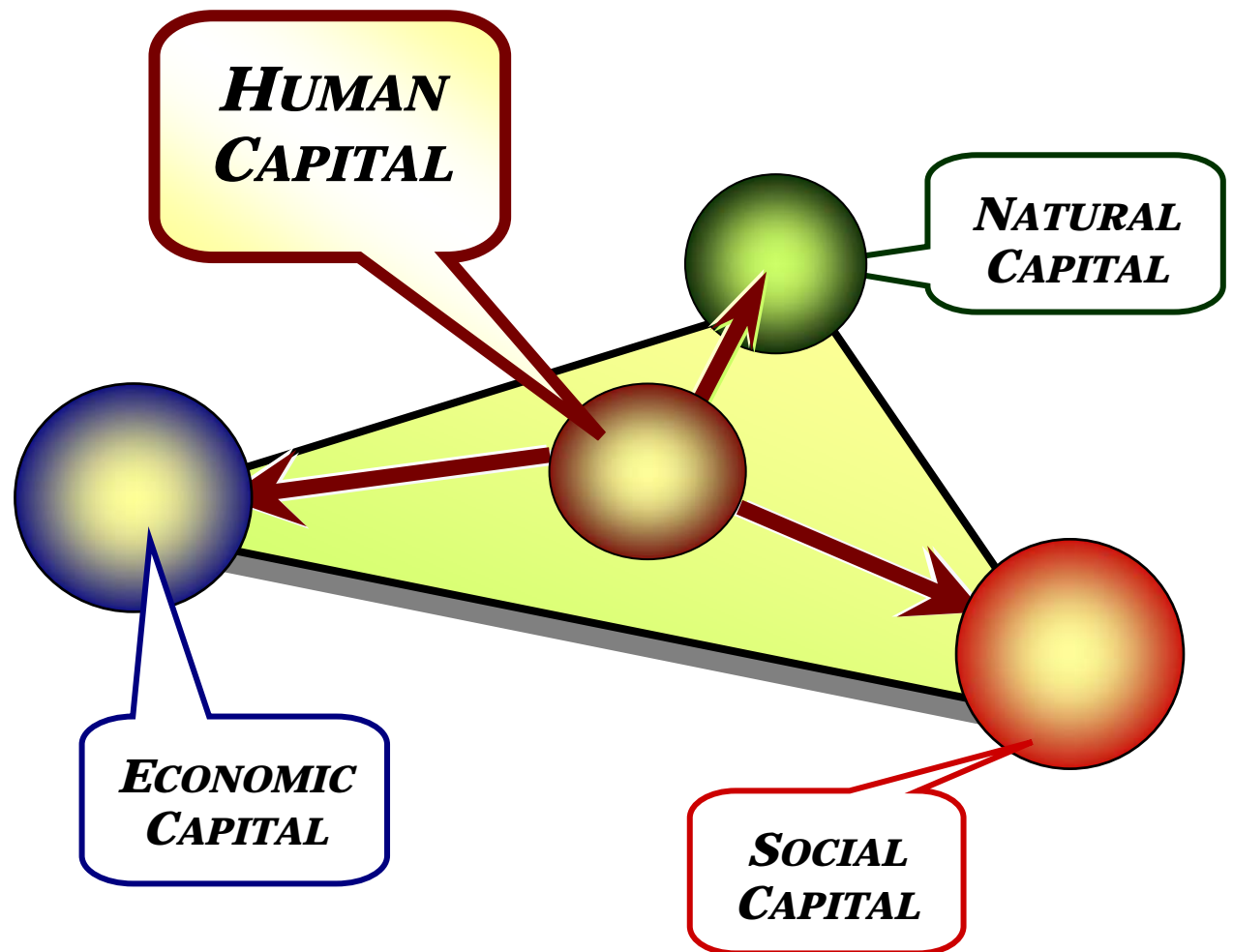
which is not attributed to any single sphere but is the "*go-between*" linking the three "funds" and also the active agent of the political sphere.

*(Note: there is no "fund" (viz., class of capital) specific to the political sphere.)*

**THE FOUR CAPITALS are the respective “FUNDS” OF THE “THREE SPHERES”, plus “HUMAN CAPITAL” which is the “go-between” of the three spheres**

**HUMAN CAPITAL** is not associated with a single organisational type; rather it is a constituent in all four organisational forms. The human organism is:

- (1) a biological entity  
*(relating to the natural or biophysical sphere),*
- (2) a factor of production  
*(relating to the economic sphere),*
- (3) a member of communities  
*(relating to the social sphere),*
- (4) and, a political actor and citizen  
*(relating to the political sphere).*



But, 'generic' formulations of sustainability are not enough...

**PROBLEM §1** — Attempts at measuring the “stock” of these funds or capitals encounter all sorts of problems (even for the category of “economic capital”).

**SOLUTIONS:** Introduce such concepts as Critical Natural Capital, Environmental Functions and Environmental Services permitting the specification of Performance Targets at a Disaggregated Level  
e.g., the CRiTiNC Methodology

## THE CRiTiNC DIAGNOSTIC FRAMEWORK FOR SUSTAINABILITY ANALYSES

*The multi-country research project CRiTiNC funded during 1998–2000 by the European Commission (co-ordinated by Paul Ekins, then at the University of Keele, now PSI, UK), tested a framework for identification of environmental functions and categories of critical natural capital in relation to sustainability requirements.*

***IN THE CRITINC APPROACH, THERE ARE 4 SUCCESSIVE STEPS OF ANALYSIS:***

- ❑ Level 1 is the defining of the parameters (characteristics) of the ecosystems being studied, so as to describe (inter alia) the capacities of the ecosystem or natural area to provide **environmental functions or services** furnished to human societies.
- ❑ Level 2 describes which economic sectors affect which environmental services and functions via the **pressures** imposed by different categories of economic activities.
- ❑ Level 3 presents **maintenance or restoration** requirements for sustainability, at the scale of analysis being undertaken. **Thresholds, standards and targets** are proposed in relation to specific economic activities, ecosystem functioning and the services they provide for societies, and the interfaces between economic and environmental activities.
- ❑ Level 4 makes the comparison between the standards given in Level 3 and the current impacts or state indicators described in Level 2, and allows the identification of **sustainability 'gaps'** corresponding to the distance between the current situation and what it would be if resources/ecosystems were managed sustainably.

***Examining the various gaps can become the basis for multi-criteria analyses of costs and benefits associated with alternative policy response options.***

**PROBLEM §2** —Due to the complexity of ecosystem processes and differing perspectives over the extent to which a function is “critical” or not (and to whom), there can be controversy over scientific justifications for the threshold levels or norms that are proposed.

**SOLUTIONS:** Introduce reflexive Knowledge Quality Assessment (KQA) procedures that provide for characterisation of uncertainties and of the positioning of different societal groups around uncertainties and their significance.

e.g., see the spectrum of KQA tools proposed in

- ◆ van der Sluijs J., Douguet J.-M., Janssen P.H.M., O’Connor M. & Peterson A.C. (2007), “Tools to Assess Uncertainty in a Deliberative Perspective: A Catalogue”

**PROBLEM §3** — Sustainability policy targets always have multiple social, as well as (multiple) environmental & ecological dimensions.

**ETHICAL & DISTRIBUTIONAL JUSTICE PREOCCUPATIONS, not reducible to the maintenance of the four capitals, may be expressed along such lines as:**

- ◆ Principles of care for, or duty towards an extended set of communities — including future generations and the non human world (biodiversity).
- ◆ Considerations of **POVERTY ALLEVIATION** that may bear on priorities for respect of specific societies or sectors within any given society.

**SOLUTIONS:** Introduce social science dimensions of analysis for the identification of the full spectrum of **STAKEHOLDERS IN SUSTAINABILITY** and their reasons, values and principles as claims to be sustained, viz.,

**“SUSTAINABILITY OF WHAT, WHY, AND FOR WHOM?”**



**COMMENT: We are concerned here with classes of situations characterised by *three features* that, as complicating factors for appraisal and policy advice, reinforce and interfere with each other:**

- ◆ **SCIENTIFIC KNOWLEDGE** — here economic science — advising of irreducible uncertainties and/or irreversibilities associated with courses of action;
- ◆ **PLURALITY OF VALUE SYSTEMS**, political and moral convictions, and justification criteria within society;
- ◆ **HIGH DECISION STAKES** including economic and strategic security concerns, technological risks and consequences of environmental change for public health, organism integrity and future generations.

*This formulation is developed by Silvio Funtowicz and Jerry Ravetz to characterise the situations where a "Post-Normal Science" practice may usefully be applied. See for example, S. Funtowicz & J. Ravetz (1991), "A new scientific methodology for global environmental issues," in R. Costanza (editor, 1991), Ecological Economics, Columbia University Press, New York, pp.137-152.*

**PROBLEM §4** — None of the traditional methods of 'decision support' — such as Multi-criteria Analysis and monetary Cost-benefit Analysis — can in themselves determine rankings for complex societal choice situations.

**SOLUTIONS:** Adopt a Deliberative Multi-Stakeholder Multi-Criteria approach for ex post or ex ante assessment of situations & policy options, based on the mobilisation of a *representative diversity of indicators* whose role is to signal the preoccupations of the full spectrum of stakeholders across the spectrum of performance issues and to permit an assessment that is transparent and robust for this full spectrum of issues and stakeholders.

**Rittel (1982, pp.35-48):** An analyst needs to be like a “**midwife of problems**”, helping to raise into visibility, “*questions and issues towards which you can assume different positions, and with the evidence gathered and arguments built for and against these different positions*”.

## SUSTAINABILITY POLICY & DIALOGUE

*"... the policy process will enter the realm of the hermeneutic where there is no prior agreement on the key questions, appropriate framework or essential facts. With an expansion of worldviews and a broader conception of knowledge, we will find little consensus on questions, methodologies and data for determining optima. **Good policymakers will be those who can lead enlightening conversations between scientists with different disciplinary backgrounds and between people of different cultures and knowledges.**"*

*— Richard Norgaard (1988)*

*“Sustainable Development: A Co-evolutionary View”,  
in Futures, Vol.20, pp.606-620.*

## CHARACTER OF THE CONTENTS OF THE SEEA ACCOUNTS CONCERNING ENVIRONMENTAL CHANGE / DAMAGE / DEGRADATION

Information on Environmental Change / Damage/ Degradation falls, from a measure point of view, into 4 broad categories, ranging from:

- “Weak signals” where diversity may be rich but also ambiguous;
- Qualitative information that hold clear sense as indicators;
- Quantitative indicators within a multiple dimensional space of ‘metrics’ of measure;
- Synthetic indicators established with a single unit of measure (e.g., money for some CBA and adjusted GDP estimation techniques, and also some classes of ‘ecological footprints’).

All these types of information can be important in SA as bases for pertinent signals of performance or of ‘distance from’ or ‘progress towards sustainability’. *Should the SEEA cope with “weak” or “qualitative” signals?*

**ARTICULATION  
OF SQPMBLS**  
as guiding  
principles of  
Governance for  
Sustainability  
IN THE  
POLITICAL SPHERE

*Mobilisation of knowledge and know-how in a discursive and deliberative process of distilling « weak signals » into a relatively small number of “strong SQPMBLS”...*

ENVIRONMENTAL SPHERE  
*(Domain par excellence of non-monetary quantifications; but also of systems uncertainties...)*

ECONOMIC SPHERE  
*(Domain par excellence of monetary quantifications)*

*Plethora of “Weak signals” about what is to be sustained, for whom and why...!*

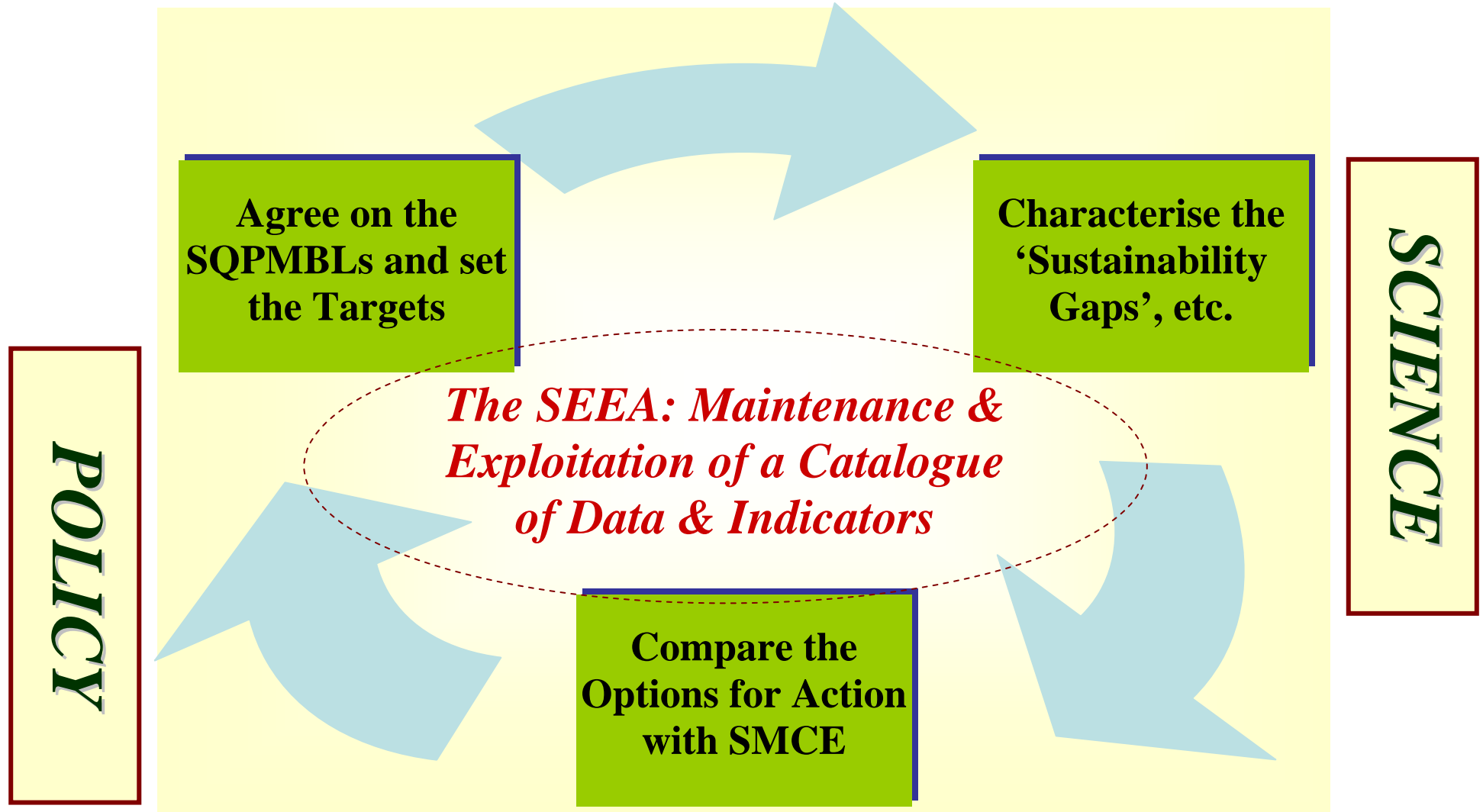
SOCIAL SPHERE  
*(Domain par excellence of qualitative meaningful declarations)*

# STEPS IN A DISCURSIVE SUSTAINABILITY ASSESSMENT

- ◆ Identification of SA goals: Define the spectrum of sustainability concerns (viz., SQPMBLs) and the key reporting & stakeholder dialogue contexts;
- ◆ Mobilisation of an “Indicator Kiosk” that makes an inventory of data categories and provides a profile of candidate indicators for use in SAs;
- ◆ Exploitation of a selection of the “candidate indicators” in any specific SA situation, through a process of stakeholder dialogue with a full spectrum of target stakeholder groups, in order to produce an evaluation that responds transparently to the spectrum of performance issues (the SQPMBLs) and stakeholder perspectives;

*Cf., M. O’Connor & J. Spangenberg (2007), “A Methodology for CSR Reporting: Assuring a Representative Diversity of Indicators across Stakeholders, Scales, Sites and Performance Issues”*

# The SEEA appears as having a standard role as a DELIBERATION SUPPORT TOOL within the *Science-Policy Cycle*



# DOMAINS OF SA ⊗ FIELDS OF SEEA APPLICATION

- ◆ National scale Sustainability Indicators, e.g., geGDP, AICCAN (and other classes of adjusted GDP),
- ◆ International contexts of AGGREGATION–COMPARISON–ARBITRATION–ARGUMENTATION–NEGOTIATION (e.g., GHG, biodiversity & land uses, water, toxic wastes...)
- ◆ Profiles at Individual 'lifestyle' and Household scales of assessment...
- ◆ Site-level & Company level CSR reports (Corporate Social Responsibility)
- ◆ Project evaluations (ex ante and ex post) in national, regional and local development contexts
- ◆ Territorial Analyses for integrated natural resources & environmental management development at sub-national (local and regional) scales;
- ◆ Integrated Technology, Process or Sectoral Impact Assessments as inputs to sectoral or cross-cutting policy domains (e.g., 'ExternE')



<i>e.g., CSR as SA</i>	<b>VISIBLE OUTCOMES — NEGOTIATING C.S.R.</b>
<p>Articulating the relevant CSR “Bottom Lines”  “Sustaining of What, Why and for Whom?”</p>	<p>Agreement by Stakeholders on the set of Performance/Quality considerations that are affirmed as “Bottom Lines” for the specific CSR policy situation and class of management, communication, negotiation challenges being addressed.</p>
<p>Proposing and Mobilising Baskets of Indicators for each category or sub-category of Performance</p>	<p>Consensus about baskets of appropriate indicators to be mobilized, as a function of the CSR issues and targets, stakeholder diversity, the range of sites, scales and strategies (etc.) under discussion, the time-frames.</p>
<p>Carrying out ex post or ex ante CSR Sustainability Assessments</p>	<p>Assessment of the situation (for sites, companies, industrial sectors; relative to territory, country or international contexts) in a SMCE framework, viz., multi-stakeholder multi-criteria appraisal of CSR performance relative to the society’s multiple bottom lines (SQPMBLs).</p>

An important feature of this perspective on SEEA Applications for Evaluation, is that this 'generic' Sustainability Assessment (SA) method can be used meaningfully...

... with very incomplete information sets;

... with a great diversity of 'candidate indicators';

... in a dynamic way (both contributing to and benefiting from improvements in the supporting information sets);

... and with very modest technical expertise.

# RECOMMENDATIONS FOR THE SEEA (I)

*R.1 – Within each SA domain, there could be given, within PART III of the envisaged SEEA, EXAMPLES OF GOOD PRACTICE as illustrations of ‘typical’ applications and exploitations of the data organised and maintained by the SEEA.*

*Q.1 – Can we now work ‘backwards’ from these domains of application/exploitation, to make suggestions about ‘STANDARDS’ FOR THE ORGANISATION OF DATA (including monetary valuations) concerning environmental degradation in the SEEA?*

# SA — CONTEXT-SPECIFICITY AND STRUCTURAL SIMILARITY

Looking across the spectrum of these SA fields, we can see plainly that the contexts are extremely diverse:

- ◆ The relevant scales are very different (from household to planet);
- ◆ There is wide variability from place to place (sites, regions, countries...);
- ◆ The Targets & SQPMBLs are articulated in varied ways;
- ◆ The categories of Stakeholders are context-dependent;
- ◆ The Scenario framing (of futures & options) is specific to each SA scene;
  - ◆ ... and also ... the availability/quality of data varies greatly...

## SA — CONTEXT-SPECIFICITY AND STRUCTURAL SIMILARITY

Through & across all this variability,  
the structure of the 'generic' SA problem remains the same.

*Q.2 — Can this be made the basis for proposing...*

- ◆ *Standard categories of information (non-monetary and monetary) on environmental degradation ?*
- ◆ *Standard fields/categories of META-INFORMATION  
... relating to AVAILABILITY & QUALITY OF DATA ?  
... and also to CONTEXTS OF PRODUCTION AND USE ?*

## RECOMMENDATIONS FOR THE SEEA (II)

*R.2 – Monetary valuation data for environmental in situ functions and degradation is heterogeneous and piecemeal. To ensure policy-usefulness, the SEEA should include standard META-INFORMATION FIELDS and/or GUIDELINES ABOUT META-INFORMATION relating to THE CONTEXTS OF PRODUCTION AND USE of Data and Indicators organised and maintained by the SEEA concerning Environmental Degradation.*

*Note: If this recommendation is accepted, then its scope may not be limited to “env-degr” information alone*

## R.2A – Relative to each Category of Env-Degradation, there should be included in the SEEA

- ◆ A Dynamic 'Data-Bank' of EXAMPLES OF TECHNIQUES EMPLOYED for the production of MONETARY EVALUATION DATA / COEFFICIENTS ...
- ◆ ... with ACCOMPANYING META-INFO on: the Producers/Sources of the information; the Methods employed, the Scale(s) at which these methods are applied; the Place(s) or types of situations for which results are obtained; the Time-frames for which results are developed (and the associated assumptions, e.g., discounting, scenarios); and Sensitivity/Uncertainty characterisations.
- ◆ ... with the opportunity for progressive augmentation of this data bank by new producers of environmental degradation data;

... and / ...

## R.2B – Relative to each Category of Env-Degradation, there could be included in the SEEA

- ◆ A Dynamic 'Data-Bank' of **EXAMPLES OF USES of MONETARY EVALUATION DATA / COEFFICIENTS ...**
- ◆ ... and with complementary **ACCOMPANYING META-INFO permitting progressive documentation of CONTEXTS OF USE** of data/information in each Env-Degr category, e.g.,
- ◆ - Assessment procedure or Method or Model;  
- Scale of analysis;  
- Place (sites, sector or country, etc.);  
- the Institutions producing the evaluation or indicators;  
- the Time-frames (and assumptions);  
- Sensitivity/Uncertainty characterisations;
- ◆ and – last but not least – **THE POLICY ROLE OF THE RESULTS.**



# TYOLOGY OF CLASSES OF ENV'AL DEGRADATION AND OF TYPES OF ACCOUNTS ???

- \* Adverse effects to the physical, chemical and biological systems which are required for the possibility of human life and economic activity being sustained over a long period of time.
- \* Adverse effects of human activity upon the natural world — in the loss of biodiversity, the destruction of habitats and so on.
- \* Detrimental impact of human activity upon aesthetically and culturally significant landscapes and places and the environment as a source of recreation.

## RECOMMENDATIONS FOR THE SEEA (III)

*R.3 — Building on existing (dispersed?) experiences, there needs to be developed a PRAGMATIC CLASSIFICATION OF CATEGORIES OF ENVIRONMENTAL CHANGE/DEGRADATION*

*R.3A – For real implementation of the SEEA (2010 or 2012), there is a need for a PRAGMATIC CLASSIFICATION OF CATEGORIES OF ENVIRONMENTAL CHANGE/DEGRADATION that can act as a ‘bridge’ between*

- ❑ detailed classifications of environmental assets & services (etc.) such as figure elsewhere in the SEEA, and*
- ❑ typical fields of environmental sustainability objectives found in SA/policy contexts (Targets & SQPMBLs) and*
- ❑ demarcations that take account of the scientific features and moral/political status of the environmental systems/features (see MONETISATION FRONTIER, below)*

*Q.3A – How well do SEEA-type ENV-DEGR accounts ‘fit’ to objectives set in SA/policy contexts (Targets & SQPMBLs)*

<b>SQPMBL</b>	<b>Performance Norms (Econ)</b>	<b>Pressures <u>on</u> the Environment</b>	<b>State <u>of</u> the Environment</b>	<b>Services <u>from</u> the Environment</b>
<b>Climate</b>	<i>BATNEEC</i>	<i>GHG emissions</i>		<i>Climate change</i>
<b>Biodiversity</b>		<i>Land uses?</i>	<i>Species nos.</i>	
<b>Durable Toxics</b>	<i>Accidents</i>	<i>Discharges</i>	<i>Containment?</i>	
<b>Soil quality</b>		<i>Stocking rates</i>		<i>Flood retention</i>
<b>Air quality</b>			<i>Concentrations</i>	
<b>Water quality</b>			<i>Good water</i>	
<i>... / ...</i>	<i>... / ...</i>	<i>... / ...</i>	<i>... / ...</i>	<i>... / ...</i>

*E.g., In the New Zealand Resource Management Act (1990), Section §7 states an array of matters which persons exercising powers under the Act "shall have particular regard to":—*

- (a) Kaitiakitanga:*
- (b) The efficient use and development of natural and physical resources:*
- (c) The maintenance and enhancement of amenity values:*
- (d) Intrinsic values of ecosystems:*
- (e) Recognition and protection of the heritage values of sites, buildings, places, or areas:*
- (f) Maintenance and enhancement of the quality of the environment:*
- (g) Any finite characteristics of natural and physical resources:*
- (h) The protection of the habitat of trout and salmon.*

*This New Zealand SQPMBL list has since changed  
... and continues to evolve over time...*

### *Q.3.B – Monetary and Non-Monetary Information: Where to draw the lines?*

The question of “**DECIDING WHICH ASSETS TO VALUE**”, is determined by the societal purposes of the envisaged indicators obtained through applications of the SEEA.

Societal purpose ought to be informed by knowledge of the ‘object’ being measured and also of the ‘objective’ of its measurement/appraisal.

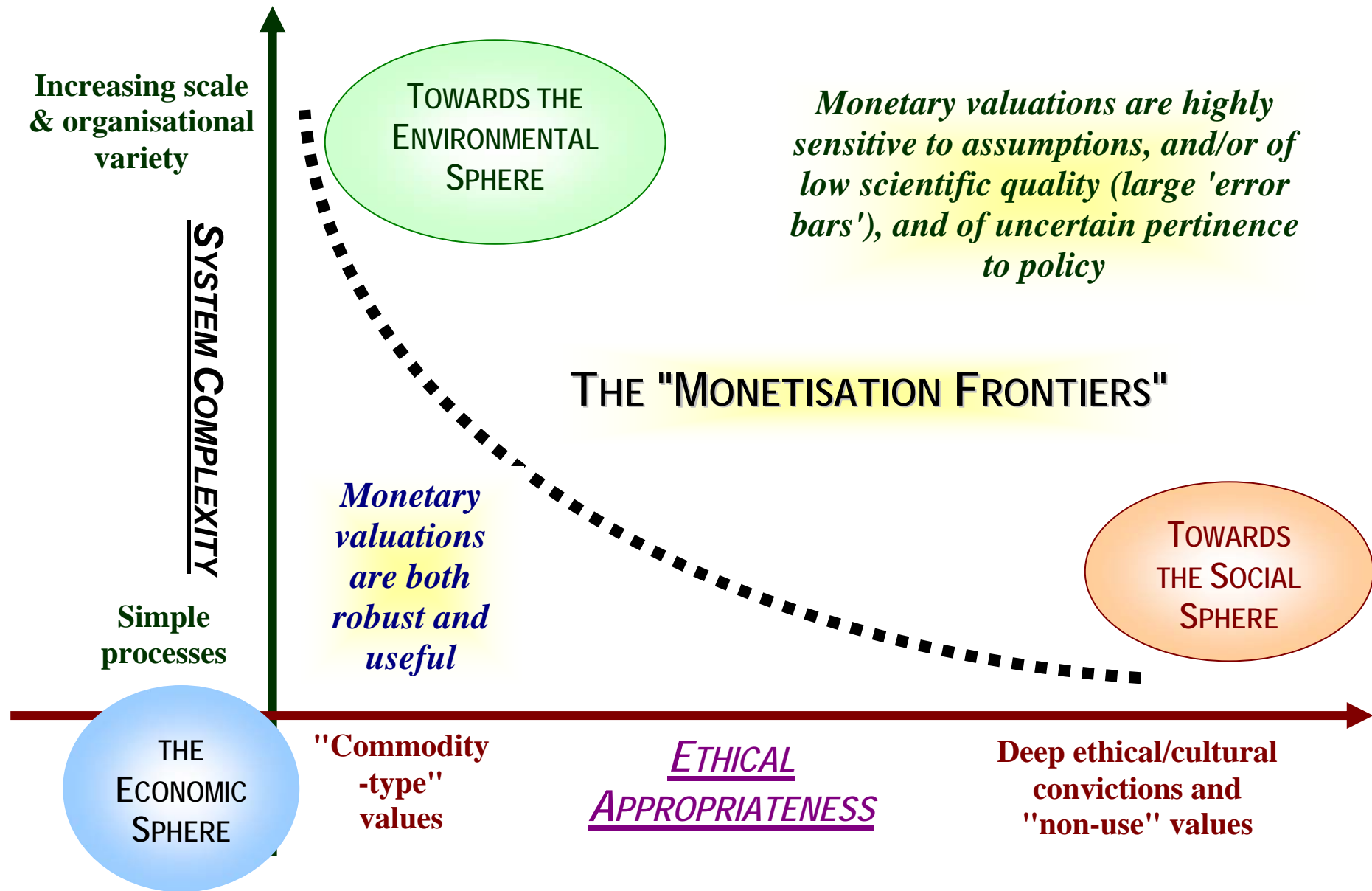
O’Connor & Steurer (1999, 2006) have introduced the concept of the MONETISATION FRONTIER, whose role is to signal thresholds or limits beyond which assessing trade-offs, choices or the consequences of choices on the basis of monetary measures alone is of questionable pertinence. They present, in this perspective, some examples towards asset classification.

## RECOMMENDATIONS (III CONTINUED)

According to the Monetisation Frontier concept, a demarcation of environmental changes to be made the object of monetary evaluation, relative to those 'beyond' the Frontier, should be made through application of two criteria:

- either meaningful estimation is scientifically very difficult,
- or a SQPMBL duty of respect exists, and so the proposition of making a "trade-off" implied by the opportunity cost considerations is morally inappropriate.

*R.3B – It is recommended that a pragmatic typology of broad categories of environmental 'assets' should be developed through application of the **MONETISATION FRONTIER** concept, and that examples be provided of good practices in this regard.*



## Exchange Value or Complementarity?

The demarcation principle proposed via the Monetisation Frontier, opens up the identification of distinct zones of wealth and communities of interest that are considered, for policy purposes, as "*ends in themselves*".

Their "respect" is made a bottom-line complementary to the economic performance bottom line.

- on one side of the Monetisation Frontier, resources and assets that are valued from the '**SNA point of view**' of their potential conversion into commercially priced goods and services (trees into wood products, for example).
- on the other side, assets recognised from the point of view of their permanent roles in the bio/natural sphere as *in situ* services as sites, scenery, moral & scientific interest and ecological life-support in complement to economic activity.



*Q.3.C – How, within the SEEA, should the accounts be developed for “assets” (or their degradation) that are recognised in policy but ‘without a price’?*

Some environmental issues (e.g., carbon sinks, biodiversity protection) are visibly given standing in policy (as SQPMBLs), even while there are controversies over indicators for observation of system quality/change. This ‘fuzziness’ limits applicability not only of monetary valuation concepts, but also norm-based analyses associated with outcomes.

Nonetheless, policy measures for protection of landscapes or target species (etc.), can sometimes be put into cost-effectiveness analyses, and thus incorporated as supply-side valuation data, or incorporated in adjusted-economy [geGDP] simulations for specific country purposes.

*Thus: a society can demonstrate its valuation of (respect & declared willingness-to-pay for) a thing, without necessarily being able to quantify it.*

### *Q.3.D – Do Restoration/Abatement Costs constitute Valuation Data for the purposes of the SEEA ?*

Many degradation/protection issues associated with high uncertainties (difficulties quantifying long run environmental & economic outcomes), can be treated with a cost-effectiveness approach. Examples are:

- ◆ Fisheries (where catch limits can be proposed);
- ◆ Soil and freshwater pollution (where concentrations can be measured and various emissions thresholds can be applied);
- ◆ atmospheric pollution (including GHG emissions and CFCs implicated in ozone-layer destruction, for which emissions and concentration targets can be policy reference points).

A societal commitment to respect a target, thus affirms its 'value'. So, *should such calculations of 'imputed' valuations be included in SEEA?*

## An 'applications' note: Valuation can be approached on *both* sides of the Monetisation Frontier...

- ◆ on one side of the Frontier, economic costs of meeting emissions targets can be estimated, based on various scales of firm, sectoral and national economy analyses.
- ◆ on the other side of the Frontier, economic analyses may seek to estimate monetary values for damages or lost benefits, e.g., losses to economic production due to soil erosion, or due to health and ecosystem damages from air pollutants such as acid rain, smog, particulates (etc.) ;

Costs of meeting targets, estimated through model economic analyses, can then be set (in policy processes) in comparison with the identified economic production and human welfare benefits of less pollution.

*Such integrated assessment as policy support involves EXPLOITATION OF SEVERAL COMPARTMENTS OF THE SEEA.*

## An 'applications' note: Valuation and Sustainability

Valuations of (changes in) environmental assets are not, in themselves, sustainability indicators, but can lend themselves to this function when incorporated into specific sustainability assessment (SA) frameworks.

For example:

- ◆ A negative 'genuine savings' (AICCAN) is a monetary signal, with reference to an expanded portfolio of economic assets, of a 'gap' in savings relative to the 'weak' sustainability criterion ;
- ◆ In physical terms, setting targets for Pressures on, or for the State of, or for levels/qualities of Services obtained from the environment, allowing estimation of 'gaps' between current and desired levels.
- ◆ Estimates of economic opportunity costs associated with achieving the respect of environmental norms relating to SQPMBLs, are examples of monetary 'sustainability gap' indicator information.

*IF THESE GENERAL RECOMMENDATIONS ARE ACCEPTED,  
THEN DETAILED WORK NEEDS TO BE CARRIED OUT...*

*ON BROAD CATEGORIES AND DEMARCATIONS OF ENVIRONMENTAL  
BENEFITS/VALUES AND THEIR DEGRADATION DATA, AND ON  
ASSOCIATED 'SUSTAINABILITY GAP' CONCEPTS AND DATA;*

*AND, IN PARTICULAR...*

*ON THE CONTEXT-OF-PRODUCTION AND CONTEXT-OF-USE  
META-INFORMATION FOR MONETARY INFORMATION SETS  
AND DERIVED INDICATORS*

# ANNEX – Comments /Suggestions

## – Concerning the June 2006 Questions (Chapter 9) –

**§9/23** [overlaps with **§9/27**]. The key **CLARIFICATION OF CONCEPTS** is to re-situate monetary valuation of env-degr as outputs of techniques that involve exploitation of other SEEA accounts in combination with ‘shadow prices’ obtained from diverse sources. Item valuation is the service of societal assessment goals expressed at many different scales and contexts. In this context (2) it is agreed that ‘geDGP modelling’ is an application of SEEA to a specific SA domain; and (3) it is pointed out that estimation of ‘genuine savings’ (for example) is just as much an application of SEEA to a specific SA domain. (*The valuation techniques are different, the concepts are different, the envisaged policy applications are different; see O’Connor & Steurer 2006*).

...

**§9/24** The question of “**DECIDING WHICH ASSETS TO VALUE**”, is determined by the societal purposes of the envisaged indicators obtained through applications of the SEEA. It can be resolved, in a pragmatic way, with the concept of the Monetisation Frontiers (O’Connor & Steurer). The role of the Frontier is to signal thresholds or limits beyond which assessing trade-offs, choices or the consequences of choices on the basis of monetary measures alone is of questionable pertinence. These limits will be identified for one or both of two reasons:

- either the estimation is scientifically very difficult,
- or a SQPMBL duty of respect exists, and so the proposition of making a “trade-off” implied by the opportunity cost considerations is morally inappropriate.

O’Connor & Steurer (2006) have presented some examples of such classification; and this work could be systematised (as envisaged by my Recommendations [§R.3A](#), [§R.3B](#)).

**§9/25** The accounting aspects of a systematic **TREATMENT OF TRANS-BOUNDARY POLLUTION** can be, and have been, resolved enough to permit some standardisation. See, for example:

- ◆ Muradian, R. and M. O'Connor (2001), 'Inter-country Environmental Load Displacement and Adjusted Aggregates: Concepts and their Policy Applications', *International Journal of Sustainable Development*, 4 (3), 321-347.
- ◆ Muradian, R., M. O'Connor and J. Martinez-Alier (2002), 'Embodied Pollution in trade: Estimating the Environmental Load displacement of Developed Countries,' *Ecological Economics*, 41(1), pp.51–67.

The accounting considerations for SEEA should not be confused with the so-called 'property rights' questions, which are about attribution of numbers to parties. (If there is any anguish, an agnostic solution would be to show options for attribution of the (costs' or 'burdens' as a domain of applications of the SEEA...)



**§9/26** Decisions about the placement of expositions of (monetary) **valuation techniques**, whether more logically in Ch.7 or in Ch.9, mainly have to do with methodological clarification of the role of these techniques.

Most monetary valuations of “environmental (asset) degradation” are obtained through some sort of two-step procedure, first identifying the environmental change (= damage, degradation; but sometimes an improvement) and, second, attributing a money value to the change. This is the logic of ‘shadow pricing’ (a price per unit of degradation, etc.). But, most often these prices do not exist in real markets, or, are rather indirectly to real pecuniary data of economic agents.

*This issue requires clarification*, and is/would be addressed within my Recommendations **§R.2A** and, by prolongation, **§R2.B**.

**§9/27** The issue here is of different approaches to the valuation of degradation and their relative status. In my view, there is not a question of reconciling the various approaches per se, because they address different contexts of needs. *(horses for courses: “The valuation techniques are different, the concepts are different, the envisaged policy applications are different”).*

The SEEA is a means and not an end; and (in particular) money valuation of “*environmental (asset) degradation*” is not an end in itself, it is merely one component of a wider concern with taking into account environmental quality and maintenance (etc.) *within the spectrum of SQPMBLs*.

For all the reasons mentioned above [**§9/23, §9/24, §9/25, §9/26**], producing estimates of monetary “environmental asset change” indicators is properly seen as a context-dependent ‘application’ of the core data organised in/by the SEEA. *This resolves most of the issue.*

– Concerning the June 2006 Questions (Chapter 10) –

§10/28 [Methods for valuing Depletion] – no comments.

§10/29 [Defensive expenditure] – no comments.

§10/30 – On the estimation of **DAMAGE-ADJUSTED AGGREGATES FOR INCOME, PRODUCT AND SAVING**. The statement is made that “there should be corresponding changes in the asset accounts”.

From a formal capital accounts point of view, logically this may seem to be so; but (1) this presumes that the “assets” in question can meaningfully be quantified as a stock; and (2) this returns us to the question of the sensitivity of any aggregate ‘savings’ indicator to the spectrum of asset changes included; and thus (3) to the question of the role and status of any such indicators in macro-economic performance assessment.

... / ...

With care and attention to work on 'both sides of the Monetisation Frontier', these questions of (1) description of changes to a full(er) spectrum of environmental assets/conditions and (2) SEEA conventions for the construction and interpretation of 'adjusted savings' or 'AICCAN' type indicators can be resolved (*see O'Connor & Steurer 2006*); but it is imperative to have some transparency, some stability, and some clearly explained political and scientific pertinence for the conventional choice of which 'environmental assets' are placed in the 'basket'.

**§10/31** – On the concept(s) of and interest in estimation of a nation's **ENVIRONMENTAL DEBT**. The concept has some policy pertinence and is intellectually justified; however it constitutes an application and operationalisation is still experimental.



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