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Day 1 – Monday September, 11 – Emerging issues talk of the day

# Natural Capital Accounting and Ecosystem Accounting: conceptual differences

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- Very diverse uses of “Natural capital” coexist.
- Labels are important. They convey ideas and world views. Providing definitions is part of our job.
- It is not purely a matter of labels. Does the term “Capital” add something to “Nature”? How does it qualify Nature’s stocks? The syntagm “Natural Capital” embeds Nature in Capital. **“Capital”** *substantive*, **“Nature”** *adjective*.
- Time to agree on an official use of “NC” & “NCA” terms!

## The specific issue: relation NC(A)-E(A)

Natural Capital Accounting (NCA) and Ecosystem Accounting (EA) are often used as synonyms. How should this be understood?

- Are “Natural Capital” and “Ecosystems” the same thing?
- Or are Ecosystems a kind of Natural capital (subset)?
- Or is “being capital” one *aspect* of Nature?
- Does “being capital” refer to the ability to produce, and, if so, in what sense?
  - In a purely physical sense, as in “net primary productivity”
  - In an economic sense
    - according to current SNA principles (macroeconomic)
    - according to the microeconomic concept of “utility”, in order to accommodate Nature’s physical productivity as “economic production”?

NCA is also often used as synonym of Environmental Accounting at large.

- Is this acceptable?

- An **Ecosystem** is “a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit” (Convention on Biological Diversity, article 2 “Use of terms”, as reported in the SEEA EA glossary).
  - **This is a purely physical definition, with no a-priori limitation to particular functions or aspects, and no value dimension.**
- **Natural Capital** is “that *part of nature which directly or indirectly underpins value to people, including ecosystems, species, freshwater, soils, minerals, the air and oceans, as well as natural processes and functions. [...] forms part of our wealth; that is, our ability to produce actual or potential goods and services into the future to support our wellbeing*” (UK Nat. Cap. Committee definition)
  - **The instrumental view defines the Capital approach. NC is “part of Nature”. Value is a constitutive element. “Our wealth”... whose wealth, precisely? (Ownership!)**

# Definitions, continued

- **Assets** “as defined in the SNA are entities that must be owned by some unit, or units, and from which economic benefits are derived by their owner(s) by holding or using them over a period of time. [...] the ownership criterion is important for determining which natural resources are treated as assets in the SNA” (§1.46 SNA2008)
  - ⇒ **Ecosystems may be *assets* according to the above definition. But are they also “*Capital*”?**
- **Capital** is not defined as such in the SNA. The main, common characteristics of the assets in relation to which the SNA uses the word “Capital” is of being **produced and productive** (*in the economic sense. For us: in the SNA sense*).
  - “produced in an economic sense” means, in the SNA, resulting on purpose from some **human** activity that is deemed productive.
  - “productive in an economic sense” means, in the SNA, contributing economic value to the output of some **human** activity.
    - ⇒ ***Ecosystems are not produced. This should suffice to exclude them from “Capital”.***

But are Ecosystems “***productive***” in the SNA sense?

# Does logic rule in official statistics?

So far, a straightforward application of Aristotelic logic.

Starting from definitions and general principles, conclusions follow.

Not mere opinions, but necessary consequences of the premises.

## **But does logic rule?**

Or are we caught in a game of power, where the fundamental rules of the game can be twisted according to convenience?

Judge from what is going to happen...

# Are ecosystems productive in the SNA sense?

“**Production** is understood to be a physical process, carried out under the **responsibility, control and management of an institutional unit**, in which **labour** and assets are used to transform inputs of goods and services into outputs of other goods and services.” (§1.40 SNA2008)

- Ecosystems generate ecosystem services, no doubt they are productive *in a physical sense*.
- Ecosystem services, by definition, are provided by Nature  
=> they are not carried out under the responsibility, control and management of an institutional unit. No labour is involved in their generation.
- Ecosystem services, by definition, are provided by Nature **for free**  
=> they have no exchange value independent from appropriation.

**Chapters 8-11 of the SEEA EA redefine “production” and “productive”, i.e. change the production boundary** by including Ecosystems in the economy, equalling Ecosystem Assets to economic units, made of “Natural Capital” only, able to produce ecosystem services with no other input. (These chapters are – not by chance, but by necessary conceptual connection – the ones devoted to monetary valuation).

⇒ **Ecosystems are Capital only within the limits of chapters 8-11 of the SEEA EA.**

(REMINDER: THESE CHAPTERS HAVE BEEN DISCARDED FROM THE STANDARD. CAN THE SNA-SEEA SYSTEM OF SYSTEMS ADOPT THEIR LOGIC?)

# THE REVOLUTION : Future SNA *Classification of non-financial assets*

## AN.1 Produced non-financial assets (excluding natural capital)

### AN.11 Fixed assets (excluding produced natural resources)

...

#### N.1121 Buildings other than structures

##### AN.1122 Other structures

of which Renewable energy installations  
of which Fossil fuel installations

##### AN.1123 Land improvements

#### AN.113 Machinery and equipment

...

##### AN.1133 Other machinery and equipment

of which Carbon capturing equipment  
of which Nuclear fusion equipment

#### AN.114 Weapons systems

#### AN.115 Intellectual property products

...

##### AN.1152 Mineral exploration and evaluation

...

### AN.12 Inventories (excluding produced natural resources)

### AN.13 Valuables

## AN.2 Non-produced non-financial assets (excluding natural capital)

...

## AN.3 Natural capital

### AN.31 Natural resources

#### AN.311 Land

#### AN.312 Mineral and energy resources

##### AN.3121 Non-renewable mineral and energy resources

...

##### AN.3122 Renewable energy resources

###### AN.31221 Wind energy resources

###### AN.31222 Solar energy resources

###### AN.31223 Water energy resources

###### AN.31224 Geothermal energy resources

###### AN.31224 Other renewable energy resources

#### AN.313 Biological resources

##### AN.3131 Biological resources yielding repeat products

...

##### AN.3132 Biological resources yielding once-only products

###### AN.31321 Migrating biological resources ...

###### AN.31322 Non-migrating biological resources ...

###### AN.31323 Work-in-progress on non-migrating ...

#### AN.314 Water resources

#### AN.315 Radio spectra and other natural resources

...

## AN.32 Ecosystem assets

## AN.4 Human capital

## AN.5 Social capital

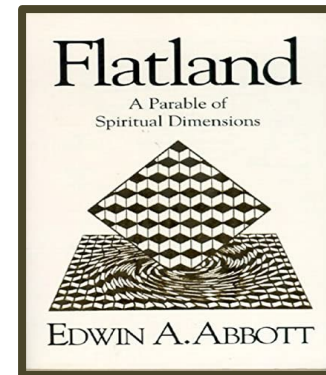
Extract from the "Consolidated List of Recommendations". Recommendations by the AEG on NA for the SNA Update – Draft for GC

- All Nature is under “AN 3. Natural Capital”.
  - *Of course* only when under well-enough defined property rights.  
EA does not care for property rights.  
⇒ **EA encompasses much more than NCA.**
  - However, AN3 includes living and non-living elements.  
Ecosystems are living only.  
⇒ **EA can at best a *part of* NCA**

## DIFFERENT, INTERSECTING DIMENSIONS:

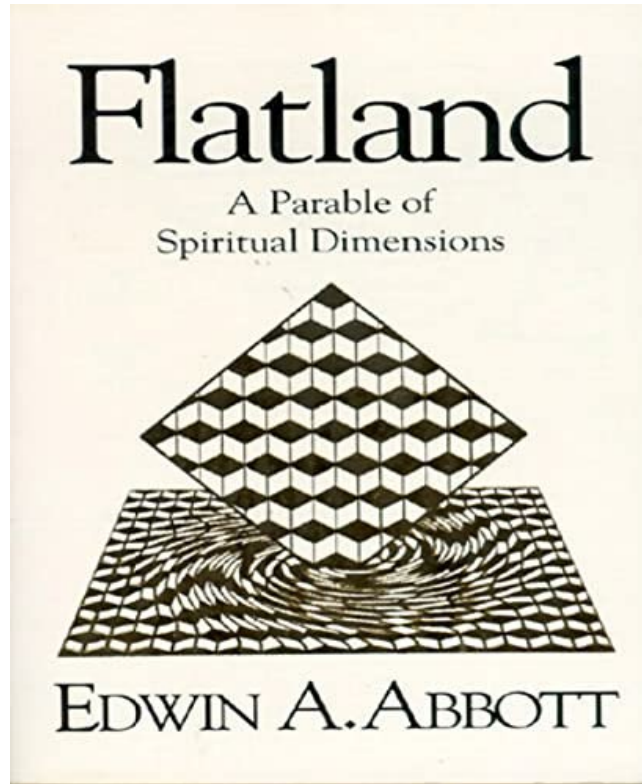
- Natural resources and ecosystems are no longer distinct into produced/non produced  
⇒ **substantial acceptance of the SEEA EA ch.8-11 extension of the production boundary.**
- **Substantial and problematic overlaps** between “AN31 Natural resources” and “AN32 Ecosystem assets” as for biological resources.

(**Wind** will be Capital. Do these words of mine enhance or pollute it? ;-)



# NC's essence is revealed by monetary valuation

- NCA is intrinsically monetary. It obliterates the physical dimension.
- And a quite specific kind of monetisation: “**the** economic value of Nature”.
- NCA considers underground hydrocarbons reserves and atmospheric carbon absorption wealth in the same way and sums up. This is not the case in EA.
- NCA first dissects the ecosystem in pseudo-independent parts, then squeezes them into economic value, then puts them together again in this one dimension. EA takes a more holistic view and does not need to express different functions in the same unit.



All values reduced to one (after leap service is paid to plurality of values, and even to «indigenous peoples' values»).

# Conclusions/proposals

- NCA is the application of the capital approach to Nature.
- NCA is inherently monetary. Ecosystem accounting physical.
- “Natural Capital” should be reserved to “produced natural resources”.
- More generally, we need to define hybrid subsystems such as agricultural, forest, landfill and other semi-natural or semi-artificial ecosystems.

# Additional reasoning

- NCA aims at measuring “nature's contribution to economic output”, as separable from and additive to other contributions. EA not concerned with production functions.
- Contributions to benefits well beyond SNA’s “output”. All benefits are outputs (utility) => all that participates in their generation is capital.
- Starting from EA, benefits can still be seen as psychological or social values, not necessarily sharing the characteristics of economic goods and services.
  - E.g. travelling to enjoy Nature can still be an activity that is *per se* final as economic activity and finalised to something extra-economic; in NCA it becomes an intermediate activity, functional to the production of something else (the output of enjoyment), that needs to be quantified in monetary terms.

- NCA only covers Nature's **positive contributions** to humankind. Disservices, defined by external pre-judgement, are ignored. Different logic from the SNA.
- EA not affected by such judgement, can deal with both services (e.g., soil erosion prevention, water retention) and their opposite (erosion, floods).
- Methodological problems of valuation only affect NCA, not EA. E.g.:
  - ES, at system level boundary, are free. Society as a whole pays zero. All societal interaction with Nature is biophysical. Satellite EA accounting describes interaction between two systems.
  - Exchange value (EV) and Capital stem in the market institutional context and a kind of social relationship (enforced property rights). EV of ES not “black matter” (need appropriation to arise).
  - Nature is necessary for production, does not mean it is “productive”. NCA requires a deep redefinition of production. This is what the SNA revision is pursuing (identification income-output; removal of non-cultivated). Like the moon falling on the earth.
  - Does the economic value of produced goods and assets already include the EV of ES and E. Assets?

## NCA:

- postulates that all Nature is subject to property rights (GG as trustee). No property rights => no economic assets (no benefits to well-identified subjects, no store of value). EA does not need that.
- income no longer different from output. Whatever brings income, is considered productive. Income from power to exclude is considered production. (Valid at the individual level, not at the system (aggregated) level: property income is a transfer between units.)
  - In case of Capital, the income is profit; in the case of Nature, it is rent. Rent may be explicitly paid to the, or embedded in an owner-producer's output price. Rent always is due to non-perfect market competition conditions.
  - Use of Ecosystem services affects labour productivity, but *per se* ES are not production nor additive contributions to production.

EA does not need to be concerned with those aspects, and may support more open views

# ...from the philosophical and epistemological points of view

## NCA:

- focusses on “contributions to benefits” => rooted in utilitarianism.
- extends of the production boundary: a) by including all human activity in Nature and b) by including several functions of Nature, seen as forms of production. => For NCA, there is no final objective beyond production: enjoying life and Nature is production.
- double-chain linked with valuation => subsumption of non-instrumental values into the most instrumental value of all: pure exchange value incorporated in money.
- reaffirms the prominence of economics over other disciplines => epistemologically closed
- is reductionist: dissection -> re-conduction to a single unit -> additive re-composition
- takes the simulated judgement of the market economy as measuring rod for Nature’s value
- postulates private property rights and markets also where there is no clear property rights or public economic intervention
- supports a growthist worldview: no longer GDP, but (GDP + the value of ecosystem services) (short run), total value of capitals (longer run).
- crowds out other values and mental-decisional processes.

## EA:

- not affected by those problems. Allows to keep different values of Nature separate and supports a “good balance” worldview.

# ...from the statistical point of view

- EA is covered by the standard part of the SEEA EA. Ch. 8-11 and beyond, are NCA.
- NCA is not a statistical system limited to observable collective phenomena (such as e.g. actual transactions and market prices and land cover). It is a model-based description of a fictitious reality, deemed to be more pregnant than observable phenomena.
- NCA needs EA as a basis, not the contrary.
- NCA relies on additional highly uncertain and questionable estimation methods and data, value transfer technique, an inconsistent mix of welfare and exchange values...

EA is subject to uncertainty and convention, like all statistics, but not biased nor arbitrary.

# ...from the political philosophy point of view

- Capital  $\leftrightarrow$  profit.
- Liberals justify profit on the basis of sacrifice (refraining from consumption => saving => investing and risking), which allows accumulating labour in Capital. Capital can only be produced, according to this theory. Extraction of income from non-produced Nature is, in a liberal-meritocratic philosophy, not admissible, as it lacks the necessary moral basis. Same applies, by extension, to considering nature's gifts "production".
  - => calling "capital" non-produced nature contradicts this idea.
- Marxists say Capital is a kind of social relationship, not (or before than) a thing. The kind of social relationship established by appropriation of Nature is a different one than that established by ownership of produced/productive means of production. Produced capital accumulation aims at extracting more value from the use of labour; appropriation of Nature aims at transferring income from those who need to consume it to those who own it. Both lack the necessary moral basis.
- NCA contradicts both political philosophies and supports rents. EA is compatible with both and any other, since the physical world does not bother about social relations, but only about material flows.

# ...from the policy use point of view

- **Comparability** across benefits and assets is at the core of the NCA approach: “The WB’s Changing Wealth of Nations aims to account for the wealth of nations by providing comparable monetary measures of natural capital and other asset classes” (from Michael Vardon’s paper).
- NCA is based on imputation
- EA does not require comparability and additivity and is compatible with the use of multiple monetary value estimates according to their original meaning, often different from “**of e.s.**” (e.g.: actual and potential costs and losses, ex-ante and ex-post...). Imputation is an obliteration of these meanings.
- NCA logic serves a decision model based on comparison of the total “**values of**” different alternatives, on trade-offs between monetary values, on Cost-Benefit Analysis applied to a closed range of alternatives, and favours a technocratic approach to decision-making. EA, with its sets of incomparable values, may better support participatory processes, favouring inclusion of people’s, civil society involvement etc.
- To the extent that peoples’ values and customs exclude property and calculation-based decisions (e.g. because of sacrality), it is impossible to incorporate them in NCA. NCA is rooted in the western worldview. EA not necessarily so.
- Do you want to maximise the economic value of NC? Monopolize all Ecosystem Assets! “Privatisation” of Ecosystem Assets is the almost obvious recipe stemming from NCA.

- Monetary values easily crowd out other messages.
- Monetary values move in funny directions sometimes (want to maximise value? Monopolise all!)

## ... from the stakeholder's push point of view

NCA is actively promoted by business, multinationals, corporation-funded think tanks, some international organisations renowned for their neo-liberal, finance-centered market-ist approach to countries' economic problems.

Civil society is, on the other hand interested in Ecosystems per se, as per their immediate meaning to populations, rather than mediated by valuation technicians.

# ...from the SNA revision perspective

- The distinction between Nature and Anthroposphere underpins the SNA (basically excludes Nature) and the SEEA (explicitly).
- Are we already at a point at which, as far as human control of (or human influence on) Ecosystems, this distinction, is no longer useful? Is it ok:
  - cancel the distinction between **cultivated and non-cultivated biological resources** (=Ecosystems as source of materials)?
  - include Ecosystems in the SNA classification of assets under Natural Capital?
  - deal with Ecosystems as productive assets, under the control and responsibility of some economic unit?
  - monetise biological resources loss as depletion (and subtract it from VA)
  - in a future SNA revision, add monetised non-SNA benefits of Ecosystems to GDP?
- Or do we still need to deal with two distinct but open systems?

## ...from the beyond-GDP perspective

- Satellite accounting is a strategy to make National Accounts relevant for environmental analyses and a support for environmental policy.
- EA can be directly connected to SEEA CF physical flows, NCA cannot
- The very idea that there is an ecosystem product that does not appear in GDP – i.e. made of non-SNA benefits – and that should be measured in monetary terms, prepares an **extension** of GDP, not an **overcoming** of the GDP logic.
- SGD's “wedding cake” inspires the opposite than embedding Nature in economy
- “beyond GDP” dashboards and frameworks maintain a fundamentally multidimensional perspective.