Improving corporate performance with final ecosystem services

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Abstract: The "final ecosystem services perspective" embodied by the Final Ecosystem Goods and Services Classification System (FEGS-CS)[1] and the National Ecosystem Services Classification System (NESCS)[2,3] can improve corporate decision making because it is arguably easier to use, improves materiality analysis and aids stakeholder engagement.

I. FROM GROUPINGS OF SERVICES TO AN EFFECTIVE SYSTEM

Despite Millennium Ecosystem Assessment (MA) authors' caution against using the four groups of ecosystem services as a formal classification system, the MA typology (depicted in Figure 3, left of arrow) was widely adopted (e.g. TEEB[5], CICES[6], ESR[7], IFC PF6[8]).

"These categories overlap extensively, and the purpose is not to establish a taxonomy but rather to ensure that the analysis addresses the entire range of services."[4]

Ecosystem services can be differentiated into ecosystem processes and functions ("intermediate ecosystem services") and "final ecosystem services" (FES).[9] This takes into account the steps necessary to translate components of an ecosystem into a "service" that directly impacts well-being. For example, for a fish to make it to market, a boat, fishing supplies, fuel and labor are needed in addition to a ready stock of fish. The fish depend on numerous environmental functions, from habitat quality to nutrient cycling.

MA-based classification systems consider multiple points along a production function continuum to be ecosystem services (Figure 1). FES, however, are defined at the point where the environmental service transitions from being predominately ecological to being a benefit provided as a result of mixing with man-made capital. In this example, that transition point occurs when the fish is catchable by the fisher. The transition point is also determined by who is using the service. A farmer benefits from the soil, water and air on her farm, while tourists value that farm's aesthetics.

These principles—(1) focusing on the transition point and (2) noting the beneficiary at that transition point—can be considered the "final ecosystem services perspective." When applied to classification systems, as with the Final Ecosystem Goods and Services Classification System (FEGS-CS) and the National Ecosystem Services Classification System (NESCS), it helps to:

1. Eliminate double counting, see Figure 2
2. *Make more efficient analytical choices.* Clearly stating the beneficiary, for example between "water for a farmer" versus "water for manufacturing" allows practitioners to immediately consider the most appropriate ecological modeling and valuation techniques.
3. *Improve stakeholder engagement.* By defining FES as directly used or appreciated by humans, ecological contributions to welfare are more readily understood, providing an accessible common language among experts and non-experts from different disciplines.
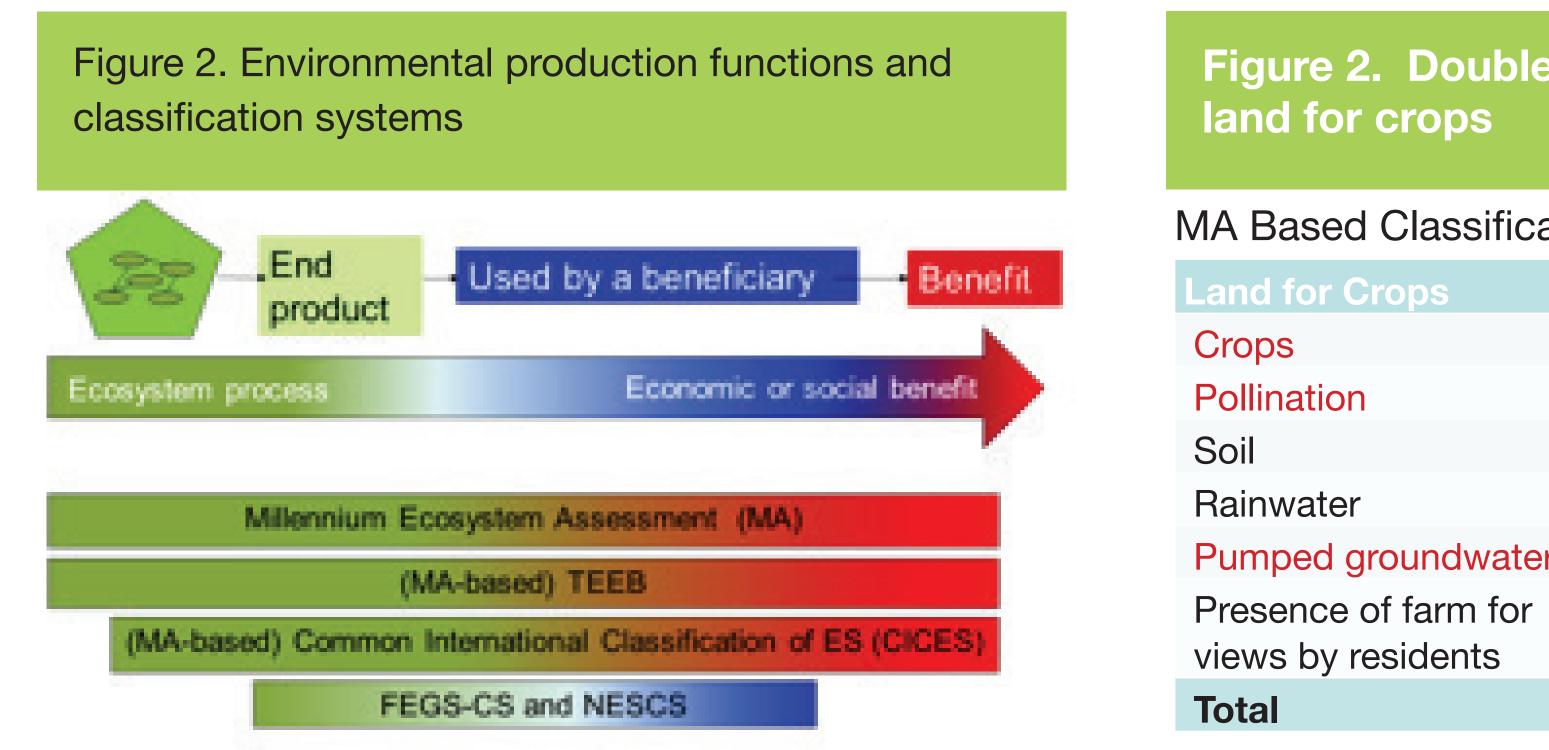
II. APPLYING THE FES PERSPECTIVE

Desk and field applications highlight the advantages and challenges for managers adopting the FES perspective.

NATURAL CAPITAL ACCOUNTING

Papers on natural capital accounting mention final ecosystem services, noting the advantages of avoiding double counting and identifying beneficiaries.[10,11] One example from these papers values food, recreation, and climate regulation services from a site. FEGS-CS would eliminate carbon sequestration from the list of FES—moving it to the environmental accounts. It would also remove the capital and labor associated with food production, favoring measures of soil, water and air ecosystem services directly used by the farmer.

REPORTING

Some experts caution that the FES perspective could increase reporting requirements.[11] However, applied properly, it should reduce burdens.

Figure 2. Environmental production functions and classification systems

Figure 2. Double counting, value of ecosystem services on land for crops

MA Based Classification System		FES Based Classification System	
Land for Crops		**Land for Crops**	
Crops	$120	–	–
Pollination	$20	Non hired pollination	$5
Soil	$30	Soil for farming	$30
Rainwater	$15	Rainwater for farming	$15
Pumped groundwater	$20	–	–
Presence of farm for views by residents	$50	Presence of farm for views by residents	$50
Total	**$255**	**Total**	**$100**

Natural capital reporting could be reorganized into three groups. The first would use the mitigation hierarchy as a basis for defining and disclosing material impacts on species and ecosystems.[8] The second group would report on benefits from FES. The third group would disclose the implications of natural capital impacts and dependencies on "ecosystem resiliency," capacity of an ecosystem to tolerate disturbance.[13] Managers already do this with the FES of water, where the water's resiliency is akin to water stress.[14]

For example, a real estate firm could report how their assets are protected from natural disasters. A component of this protection would come from the resilience of the FES "regulation of extreme events" that reduces natural disaster impacts. This green infrastructure may contain species of concern not associated with "natural disaster reduction" production functions and therefore need to be disclosed separately.

CERTIFICATION

Most product certification systems measure both intermediate and final ecosystem services without distinction.[15] Generally, they refer to ecosystem services that are used by communities. However, FEGS-CS and NESCS would not classify many of these as FES. Making the FES approach standard could sharpen definitions within certification systems, providing clearer guidelines to farmers, for example, on what they need to do on their farm to increase community benefits.
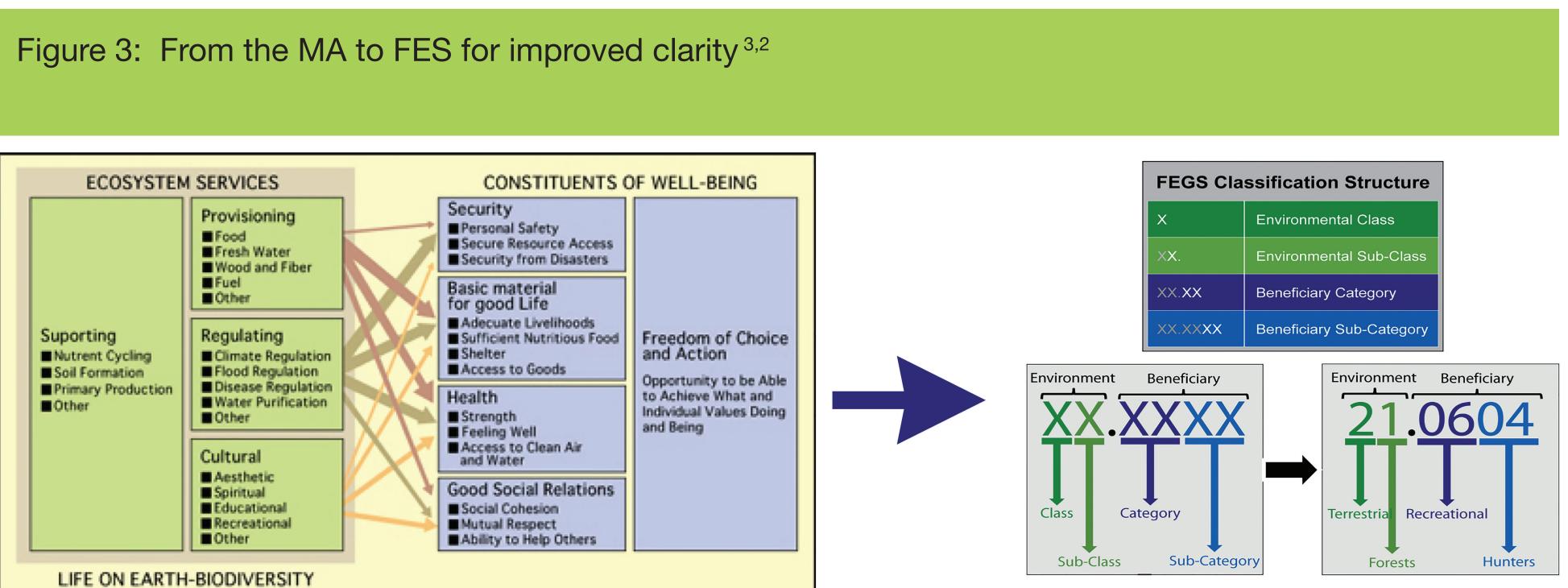
For example, the ecosystem services of non-timber forest products (NTFPs), water, soil carbon and cultural values would be simplified into the FES of NTFPs, water purification and cultural values. Soil carbon (sequestration) would be classified as an ecosystem function related to soil management.

IMPACT ASSESSMENTS AND OFFSETS

Impact assessments use the mitigation hierarchy to help manage biodiversity and ecosystem service risks.[8] Similar to certification, the FES perspective would bring clarity, distinguishing between threatened species, ecosystems, and the services they provide. This would:

- *Largely eliminate the supporting and regulating ecosystem services,* clarifying that FES must connect ecosystems to humans
- *Make beneficiaries a larger part of assessments* earlier in the process

Grupo Argos used FEGS-CS to help organize a sites' existing biological research. It yielded clear, compelling risks to the firm.[16] ERM, the consultancy, developed an ecosystem services decision tool in Maine, finding the FEGS-CS call for a focus on beneficiaries helpful.[12]

CONCLUSION

FES-based classification systems will likely prove easier to integrate into existing business processes than the alternatives. FEGS-CS and NESCS are less confusing than alternatives (Figure 3).[12] For example, the FES perspective:

- *Fits better into business processes* – regulatory compliance processes typically measure pollutants and FES focus on how pollutants affect well-being
- *Is similar to aspects used in strategic planning and reporting* (e.g. water used by the company), easing integration of environmental data into planning and communication
- *Is easier to understand than MA-based systems*[12]
- *Focuses valuation efforts,* reducing uncertainty and creating greater consistency between corporate and public ecosystem services accounting

Figure 3: From the MA to FES for improved clarity[3,2]

There are challenges with FES. Any system must prove relevant to managers and a flexible approach is encouraged. This will allow learning to occur over time.[17] Like other ES assessment tools and approaches, the FES perspective requires large quantities of quality data and complex ecological modeling that are as yet in short supply.

The FES perspective embodied in FEGS-CS and NESCS likely provides corporate managers an improved system for mainstreaming ecosystem services into decision making. One, it helps reduce overlap of ecological and economic production functions in analysis. Second, it identifies beneficiaries early in analysis, emphasizing the value to humans of benefits from the environment. However, data and modeling challenges will remain, calling for a measured transition to the FES perspective.

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