

# • Understand, co-construct, transform: a triptych in need of social sciences?

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## Background

Sustainability science (SS), still to be accepted into mainstream science, is the source of many questions in the scientific community. And for good reason. The term itself only appeared in international literature in 2001, which is only yesterday in terms of the history of the construction and dissemination of knowledge. Given this context, it seems only natural that we – scientists rooted in one, sometimes two, disciplines – should question our position with regard to SS. To look further than an instinctive response to this question, we sought to gain a better understanding of the scientific landscape of SS, which is still under construction.

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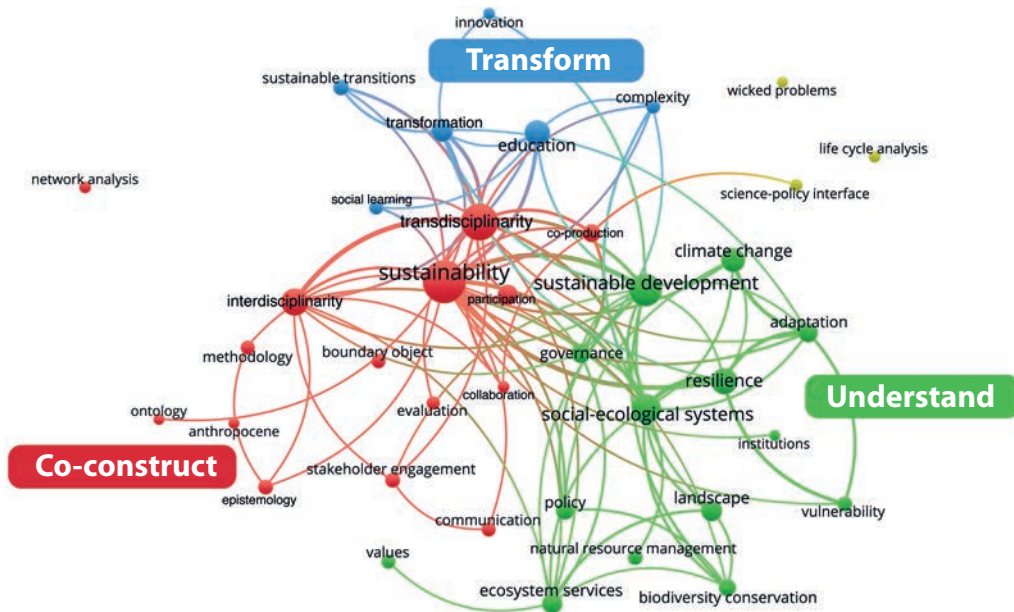
### Further reading

SÖRLIN S., 2012 – Environmental Humanities: Why Should Biologists Interested in the Environment Take the Humanities Seriously? *BioScience*, 62 (9) : 788-789.

## Knowing and re-assessing your niche: a common theme for scientists

“How does my scientific work contribute to my discipline, to my working group, to society?” This is a question that all scientists ask themselves many times throughout their career, in a constantly changing scientific landscape, requiring them to continuously re-assess their “scientific niche” – their field of expertise – and to be on the constant lookout for emerging concepts, paradigm shifts, new approaches and the latest tools. It was with this in mind

that we sought to gain a better understanding of SS, to identify what it encompasses, to position it in relation to our individual and collective “scientific niche” and to find out how we contribute to it, if indeed we do. To do this, we conducted a semi-quantitative analysis of the publications on the Web of Science claiming to be in the field of Sustainability Science (1,129 publications). Here, we present the three main findings from that analysis.



Network of the 39 most frequently used keywords in sustainability science publications.

### The triptych of sustainability science: understand, co-construct, transform

Through the keywords used by the authors and their co-occurrences, we identified three foundational pillars of SS, all of which the available studies cover to different degrees while maintaining a close relationship between them:

#### Understand:

This pillar focuses on the analysis of socio-ecosystems and how they behave (in terms of resilience, adaptation and vulnerability) when faced with contemporary environmental issues (climate change, protection of biodiversity and natural resources). Although less prominent, issues related to the governance of socio-ecosystems (institutions, policies) are also addressed;

#### Co-construct:

This pillar focuses on engaging stakeholders in interdisciplinary or transdisciplinary research, with the aim of stimulating the co-production of knowledge. This aim is associated with major methodological challenges, linked in particular to fostering dialogue between disciplines and between stakeholders, and with the inclusion of various epistemologies and ontologies, both scientific and lay;

#### Transform:

This pillar of SS reflects its commitment to the transformation of the relationship between humans and their environment. To do this, SS draws on innovation, education and social learning, themes that are closely connected with co-construction.

### Sustainability science, a new arena for discussion, a potential source of innovation

Understanding socio-ecosystems, working on interdisciplinary studies, creating partnerships and finding solutions to (sustainable) development problems are all issues that pre-date SS. They reflect not only disciplines and theories that are already well established, but also IRD's traditional missions. While these issues are then by no means new, it seems to us that SS provides fertile ground in three respects. Firstly, environmental issues are not confined to traditional disciplines (such as ecology and geography), but also extend into a variety of disciplines, as evidenced by the many fields dedicated to them within generalist disciplines (environmental psychology, conservation biology, ecological economics, etc.). However, since these disciplines vary in their understanding of each other, SS encourages them to (re-) recognise that they are working on a common issue – sustainability – and, in so doing, to exchange their perspectives more often. Secondly, the emergence of an “undisciplined” field of research, focused on one issue, is not new, as agronomy and forestry illustrate. Both these fields are understood less by the disciplines they draw on than by the research objects and societal issues they address. Understood as an attempt at de-sectoralisation, SS may certainly look more closely at how the sustainable development goals are interconnected, whereas to date these have only been considered in isolation. In conclusion, rather than a completely

new science, SS seems to offer a new arena for researchers from different backgrounds, working on different objects, but feeding into a common reflection about sustainability. At the centre of this arena, sustainability becomes a “boundary object” that connects those producing knowledge about sustainability (understand, co-construct) and those working for sustainability (transform), with the expectation that this will lead to much sought-after theoretical and applied innovations.

### Social sciences and humanities neither visible nor sufficiently involved?

If interdisciplinarity is at the heart of SS’s “project”, we note that social sciences and humanities (SSH) are difficult to situate in the current landscape. The overwhelming majority of the 1,129 publications analysed are related to environmental sciences and ecology (798 publications) and technological sciences (463).

Geography (51), education sciences (36), various social sciences (23) and sociology (17) are only marginally represented. These figures are all the more problematic given that, in parallel with SS, the environmental humanities movement is expanding, aiming to bring together all the SSH that focus on the environment. This trend shares the same initial observation as SS (i.e. the cross-sectoriality of environmental issues), but this does not necessarily mean that it defines its objectives in the same way. With environmental humanities, are we not therefore reproducing, or maintaining, the separation between “hard” and “soft” sciences, from which SS aims to free itself? Or are environmental humanities and SS bound to enter into close dialogue while maintaining their own specific characteristics? In light of these unresolved questions, it seems crucial that SS does not take interdisciplinarity for granted, but instead see it as a research front that will undoubtedly require innovations both in “our sciences” and in our ways of doing and evaluating science.

### KEY POINTS

**Various disciplinary and interdisciplinary movements contribute to sustainability science (SS) as building blocks for a broader project aimed at understanding and transforming the relationship between humans and their environment. If interdisciplinarity is at the heart of this project, it seems crucial that, beyond mere words, SS develops the means to really implement it.**

# SUSTAINABILITY SCIENCE

**UNDERSTAND, CO-CONSTRUCT, TRANSFORM**

Collective thinking coordinated  
by Olivier Dangles and Claire Fréour

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