

INTRODUCTION

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Planet Earth is like an island floating in space. An island inhabited by life. An island that is only habitable for everyone if its natural resources – rivers, soils, oceans and forests – are used sustainably. However, since the Industrial Revolution, humankind has accelerated its impact on these resources at an unprecedented rate through the exponential growth in its activities. Even if the Earth still appears as a blue island from space, the changes that have transformed it are now so profound that they threaten the very functioning of the biosphere and put the future of humanity at risk.

What is scientific research doing to address this global sustainability challenge? For the past 20 years, it has been developing concepts and methods that can be used to devise sustainable solutions for creating and preserving an environmentally safe and socially just space on the planet.¹ A whole new field of research has emerged: sustainability science. It looks at the complex interconnections between natural, social and technical systems, and how these interactions affect, over time and space, the planet's life support systems, socioeconomic development and human well-being. This approach gives researchers a better overall understanding of the main sustainability issues facing our societies, with the goal of providing answers to the 169 targets of the Sustainable Development Goals. Sustainability science is an umbrella term that covers activities as diverse as acquiring new fundamental knowledge, researching technological applications, engaging in sociocultural innovation and defining new social, political and economic models. It also involves the way in which knowledge is produced, harnessed and applied, thereby improving the link between the academic world and the problems confronting our societies.

1 • RAWORTH K., 2012 – *A safe and just space for humanity: can we live within the doughnut?* Oxfam Discussion publications.

However, many questions remain open about what sustainability science really encompasses. Knowledge is plural, interdisciplinary and even transdisciplinary; it must be discussed and debated and can therefore only emerge through an integrated, collegial and participatory approach. This is why, in spring 2021, IRD decided to publish a series of “sustainability science” reference articles. Their aim is to provide a channel for all IRD staff and partners to express their views on the many facets of sustainability science. These articles have been published on a regular basis since April 2021 (<https://www.ird.fr/la-science-de-la-durabilite-en-action>) and have now been compiled into this booklet. It contains contributions from more than 70 authors from the IRD Planet – scientists, directors and heads of departments, mission managers and members of civil society – who all share their knowledge and expertise on research for sustainable development. The thirty-four articles that make up this booklet have been grouped around the foundational triptych of sustainability science – “Understand”, “Co-construct”, “Transform” – following the analytical framework proposed by Julien Blanco and Clémence Moreau (see p. 20). However, this triptych is amorphous since, according to the two authors, sustainability can be perceived as “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”.

Throughout these pages and through the comparative views of the various contributors, you are encouraged to build an interdisciplinary and cross-sectoral vision of sustainability science, which will stimulate your reflexivity on this emerging approach. You may choose to read this booklet in the sequence presented: 1) Understand, 2) Co-construct, 3) Transform. Alternatively, you may wish to jump from one article to another depending on what you find interesting or are curious about. An index is provided at the end of the book to facilitate more selective reading based on the topics and concepts you wish to explore in

more detail. This booklet provides an insight into sustainability science that can be seen as an opportunity to take a step back, take a critical look at our practices and rethink what research for sustainable development means today.

In the words of the philosopher Edgar Morin, in these times of crisis, should we not have the courage to “see the greatness of contemporary science along with its shortcomings?” To stay connected with the times, to be heard and play a determining role in major future strategic directions, stakeholders in the world of research and development wish to question their subjects, their tools and also their research practices, turning their attention to “sustainability science”. Rethinking research by combining disciplines around societal challenges, co-constructing solutions with society, integrating various forms of knowledge, taking into account the different levels at which solutions may be provided to drive societal transformation: these are the challenges of the 21st-century citizen researcher, a researcher who must also train future generations in research committed to tackling major challenges, and raise their awareness of a science that is fundamentally open to others. This is how the academic world will “do its part” to ensure that planet Earth remains environmentally safe and socially just for future generations.

SUSTAINABILITY SCIENCE

UNDERSTAND, CO-CONSTRUCT, TRANSFORM

Collective thinking coordinated
by Olivier Dangles and Claire Fréour

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