

**Book Outline:** 'Contextualizing & Situating Openness: Understanding the Diversity and Contexts of Open Science in Development'

Section	Authors	Key Words	Chapter Details
<b>Theme 1: Defining OS in Development</b>	Josique Lorenzo, John Mario Rodriguez and Viviana Benavides	participatory action research, citizen science, Model Forests, Costa Rica, Colombia, human capabilities, adaptive capacity, sustainable development, biodiversity	<p><b>Title:</b> On Openness and Motivation: Insights from a pilot project in Latin America Model</p> <p><b>Abstract:</b> Forests (MFs) are social platforms through which diverse groups of stakeholders work voluntarily in partnership toward a common vision of the sustainable development of a given territory or landscape. This project aimed to combine the Model Forest approach in Costa Rica and Colombia with principles of open 'citizen science,' environmental conservation and participatory action research. By bringing community members and academic researchers into spaces of collaboration, the project investigated, among other things, varying levels of motivation towards open science for both parties. As a result of various workshops, seven locally-driven community initiatives were devised around the theme of local climate change adaptation.</p>
	Denisa Kera, Hermes Huang	open science hardware (OSH), transnational networks, little science, citizen science, do it yourself (DIY), Indonesia, Thailand, Nepal, tools, participation, tinkering, Right to Science	<p><b>Title:</b> Open Science Hardware (OSH) for Development: Transnational Networks and Local Tinkering in Southeast Asia</p> <p><b>Abstract:</b> Through hosting a variety of open science hardware (OSH) workshops throughout Thailand, Nepal and Indonesia, this project highlights a distinct difference between well-documented understandings of "citizen science," and what project researchers refer to as "little science." While objectives of citizen science tend to cater towards larger, institutional or development objectives, "little science," affords the opportunity for participants to engage in tacit reflection, exchange and "tinkering," without a firm objective or scientific agenda. In the latter case, the researchers argue that OSH has the opportunity to promote science within "everyday" activities, that are more likely to reflect local realities, as opposed to replicating western constructs of science.</p>
	Salma N. Talhouk, Rima Baalbaki, Serine Haydar, Wassim Kays, Sammy Kayed, Mahmoud Al Hindi and Najat A. Saliba.	Citizen science, participatory research, community-based environmental management, water quality, empowering conservation, bottom-up policy making	<p><b>Title:</b> Contextualizing Openness: A Case Study In Water Quality Testing In Lebanon</p> <p><b>Abstract:</b> Using participatory research methods, this Lebanon-based project engaged citizen scientist volunteers (predominantly women) to explore whether open and collaborative science could be used as an opportunity for environmental management and local development. Using data from a participatory mapping activity, 50 villages were selected that had identified "water quality" as a key area of concern. Local citizen scientists were then trained by the research team to conduct water-quality testing. After rounds of collecting water sampling and analysis, researchers found that volunteers were more informed about local water issues, more likely to voice their concerns to political representatives, and hence take increased ownership over their community's health and well-being.</p>

Theme 2: Governing Open Science	Dora Ann Lange Canhos, Sidnei de Souza, Vanderlei Perez Canhos, Leonor Costa Maia	Brazil, virtual herbarium, botany, interdisciplinary collaboration, e-database, open science infrastructure	<p><b>Title:</b> Brazil's Virtual Herbarium, an infrastructure for e-Science</p> <p><b>Abstract:</b> Currently, a large e-infrastructure project known as the Virtual Herbarium allows for small and large biological collections to compile and share data for increased academic and public access to Brazilian botany records. This project sought to understand who is using this data and for what purposes; as well as to understand the institutional benefits of data sharing. The project reveals many of the benefits and complexities of scientific collaboration across institutions and between disciplines, while revealing the importance of building open science infrastructures in participatory ways.</p>
	Maurice Bolo, Victor Awino, Dorine Odongo	Kenya, IP laws, open science, universities, private sector, collaboration, research partnerships, commercialisation	<p><b>Title:</b> Harmonization Of Open Science And Commercialization In Research Partnerships In Kenya</p> <p><b>Abstract:</b> When public universities partner with commercial industries for research purposes, there is the potential for great synergies but also for ideological conflict. In recent years, Kenyan universities and research institutions have seen the simultaneous growth in both pro-open science policies, as well as an increased pursuit of knowledge patents. This project sought to assess the national and institutional policy context for the potential of open science, and what this shift could entail for partnerships between public and private entities. Through an assessment of three case studies, the project concludes that while the country has strong policy guidance around the importance of open science and access, the nitty-gritty details of "who owns what" remain an obstacle for true collaboration between institutions and across sectors.</p>
	Maurice McNaughton & Lila Rao-Graham	Disaster recovery plans, Small Island Developing States, Design Science, regional collaboration, knowledge broker artifact	<p><b>Title:</b> Collaborative Development of an Open Knowledge Broker for Disaster Recovery Planning</p> <p><b>Abstract:</b> Disaster Recovery Plans (DRPs) are costly but necessary for Small Island Developing States (SIDS) that are frequently affected by hurricanes and earthquakes. Using a 'Design Science' approach, this project has sought to develop an Open Source Artifact that will streamline disjointed vocabulary and processes for disaster management between countries and across diverse stakeholders in the region. While revealing the complexities of creating open and enabling infrastructures, this project highlights that the social dimensions of building such tools are key to their long-term success. In that way, the successes of "open" infrastructure should not be based on their design, but on the longer-term outcomes that they facilitate.</p>
	Valeria Arza and Mariano Fressoli	open science, Argentina, negotiating openness, opening process, boundary objects	<p><b>Title:</b> Negotiating Openness in Science Projects: Case studies from Argentina</p> <p><b>Abstract:</b> While open science promises to revolutionize the scientific model of knowledge production, most policies are limited to the institutional level. Particularly in the Global South, there are virtually no models that inform how to build good practices of openness at the laboratory level. This study analyzes four cases of open science in Argentina, characterizing what is being opened, how, and who participates in these practices. This chapter suggests that as scientists progressively open more stages of their research, they enter into a social terrain that challenges their formal scientific norms and ways of working. These moments are studied through the notion of 'boundary objects' to understand how scientists negotiate meanings, tools and several forms of communication with actors from outside the laboratory. The chapter concludes by suggesting there is a need to identify and build exemplary cases of open science that allow for the construction of good practices.</p>

<b>Theme 3: Negotiating Open Science</b>	Cath Traynor, Laura Foster & Tobias Schonwetter	South Africa, indigenous knowledge, climate change, intellectual property rights, research contract, decolonising research methodologies, terra nullius, situated openness	<p><b>Title:</b> Fieldnotes on Tensions Related to Openness in Researching Indigenous Peoples Knowledge Systems and Intellectual Property Rights</p> <p><b>Abstract:</b> This chapter explores issues of boundaries in practices of open science regarding research involving indigenous peoples in South Africa. We start considering colonial notions of 'science' and 'openness', and how historical injustices and lack of redress influence the context in which our current research is situated. Our research broadly aimed to develop a political, ecological approach to understanding the relationship between climate change, intellectual property, and indigenous peoples. Our approach was influenced by 'decolonizing methodologies' and feminist perspectives and we employed participatory action research methodologies to guide not just the substantive but also procedural elements of the research. We discuss our experience with developing 'community-researcher contracts' in an attempt to make ourselves as researchers more accountable to Indigenous Nama and Griqua communities and to adequately protect their indigenous knowledge. The challenges of negotiating the contracts is described and how we conceptualized the concept of a "situated openness" - a way of doing research that assumes knowledge production and dissemination is situated within particular historical, political, socio-cultural and legal relations.</p>
	Hugo Ferpozzi, Juan Layna, Emiliano Martín Valdez, Leandro Rodríguez Medina, and Pablo Kreimer	Latin America, openness, non-hegemonic countries, social problems, collaborative science	<p><b>Title:</b> Co-production of knowledge, degrees of openness and utility of science in non-hegemonic countries</p> <p><b>Abstract:</b> Collaboration in scientific knowledge production has been historically dominated and driven by hegemonic (northern) countries, while non-hegemonic countries tend to take-on secondary roles. The growing discourse on open science provides the opportunity to look critically at the roles and outcomes of collaborative knowledge creation. Drawing on four diverse case studies throughout Latin America, this project has sought to assess the ways that diverse actors, processes and sectors converge to collaborate (willingly or not) towards resolving social issues. Using open science as a theoretical framework, the chapter concludes with a summary of how different "types" of challenges may be more or less amenable to collaborative practices of open science.</p>
<b>Theme 4: Expanding Open Science for Social Transformation</b>	Aline Rosset , Aliya Ibraimova, Aikena Orolbaeva, Altyn Kapalova, Bilimbek Azhibekov	Kyrgyzstan, rural communities, citizen science, sustainable management of natural resources, water monitoring, participatory action research, open science motivation, teachers and students	<p><b>Title:</b> Experimenting with Openness as a seed for social transformation: Linking environmental education and citizen science in remote mountain villages of Kyrgyzstan</p> <p><b>Abstract:</b> In Post-Soviet Kyrgyzstan, 'science' is understood by most citizens to consist of highly technical and expensive activities, to be performed by scientific 'experts.' The Kyrgyz Mountains Environmental Education and Citizen Science (KMEECS) project has sought to challenge these widely held assumptions by engaging rurally located school children and their teachers in biological, chemical and physical analyses of water quality, as well as water flow measurement and mapping of locally relevant water resources. Using a participatory action research approach, this project looks at the transformatory potential of citizen science initiatives for environmental monitoring and education, while also providing insight on the motivational factors for citizen science on the local level and the complexities of collaboration and support between community and governmental institutions in a post-soviet state.</p>

	<p>Sarita Albagli, Henrique Parra, Felipe Fonseca and Maria Lucia Maciel</p>	<p>Ubatuba, social change, sustainable development, potential of open science, participatory action research, diverse actors</p>	<p><b>Title:</b> Open Science and social change: a case study in Brazil</p> <p><b>Abstract:</b> The community of Ubatuba, in Sao Paolo, Brazil is a dense rainforest region, with a diverse mix of indigenous communities, researchers, activists and policymakers interested in the area. Thus, it makes a compelling case study for examining the potential of OCS from a sustainable development perspective. This project draws on a reflective, action research approach to understand the institutional, cultural and political challenges involved in the adoption of an OCS approach for development in Ubatuba, Brazil by interacting with a variety of different actors. The authors conclude that, on the one hand, open and collaborative science does create new spaces and methods for traditionally marginalised groups to engage in scientific discussions and local problem-solving, mainly in controversial and conflict situations and as a condition for resilience and political struggle for alternative paths of development. On the other, the very idea of openness is under dispute: what (open) science and for whom? The idea of science itself is under dispute, and this dispute lies at the core of democracy building nowadays.</p>
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