

Integrative Science and Society

*Navigating Uncertainty through Inclusive
Co-production*

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SPOTLIGHT Talk series

Context

- Data glut amidst -
 - increasing complexity and uncertainty (-declining predictability)
- Lack of integrative frameworks – conceptual and cultural
 - Complex Adaptive Systems approach vs scales – a stasis
 - Lack of shared narratives
 - Models- navigating tools mistaken as reality itself
- Science-
 - Diminishing role as provider of certainty
 - Towards collective practice of navigating uncertainty
- Society
 - Prefer '*noble lies to toxic truths*'

Science and Society - State support

1. Government Initiatives (DST)

- **SEED (Science for Equity Empowerment and Development):** creating scalable livelihood opportunities for marginalized communities and rural populations through targeted technological interventions
- **NCSTC (National Council for Science & Technology Communication):** Drives nationwide campaigns to popularize science, disseminate educational knowledge, and encourage evidence-based thinking during events like **National Science Day**.
- **SYST (Scheme for Young Scientists and Technologists):** Supports young Ph.D./MD holders in researching affordable, adaptable solutions for socio-economic challenges

2. Student & Education Programs

- **INSEF (Indian Science & Engineering Fair):** Hosted by **Science Society of India (SSI)**- hosts regional and national science fairs to foster hands-on, project-based learning and sends winners to international events like Genius Olympiad.
- **Engage with Science Programme:** DST initiative designed to boost

Emerging thrust on integration in state support to TD

- **STRIDE (Scheme for Trans-disciplinary Research for India's Developing Economy):** Launched by the **University Grants Commission (UGC)**, this national scheme funds high-impact research projects focused on humanities, arts, and human sciences. Brings together intellectual frameworks and stakeholders outside academia to foster socially relevant, practical solutions.
https://www.ugc.gov.in/pdfnews/2089255_STRIDE_FINAL_BOOK.pdf
- **Transdisciplinary Research Cluster on Sustainability Studies (TRCSS)** at JNU examines ecological security and social equity. It hosts major initiatives like the South Asia Sustainability Hub & Knowledge Network to tackle globalization and urbanization issues.

Sprouting integration – examples at the grassroots

- ASAR – Adaptive Skilling through Action Research (Azim Premji University and PRADAN)
- ASPIRE – Agasthyamalai Sustainability Project for Integrated Restoration of Ecosystems (ATREE, ACCC)
- CFRM – Community Forest Resource Management (ATREE, FES, WWF and other voluntary agencies in different states)
 - Integrate restoration, reliable livelihoods and associated socio-cultural institutions

Teaching ITD courses on Development

(Experience from two Masters programs)

- Carried on by A 'with' B than by A 'about' / 'for' B
- Centred on lived experiences of students & teachers, particularly those from marginalized communities
- Engaged pedagogy encourages faculty to be not patronising or authoritative to create a democratic & inclusive learning environment
- Collective/ collaborative & shared learning
- Hope, pleasure, creativity and spirituality in the learning process – critical consciousness and collective liberation
- Inter-connected courses, leading to rigorous trans-disciplinary learning
- Experiential Learning - Field education for Practical Solutions
 - Multiple Pedagogic Innovations of Reflective Practice
- University – Living lab of knowledge for collective navigation of uncertainties

Center for TDR at MIT-WPU Goa

Academic Model: 4-Year Curriculum Structure

Students progress from shared foundations to increasingly specialized learning across four years.

Year 1 / Semester 1

Foundational TDR courses

The core academic foundation for all students.

Year 1 / Semester 2+

Domain-foundational courses

Build on TDR concepts and prepare students for deeper study.

Years 2-4

Academic program-specific courses

Discipline-specific learning that develops throughout the degree.

Center for TDR at MIT-WPU Goa

Foundation Course: TDR Introduction

This foundational course introduces students to the principles and practice of Transdisciplinary Research (TDR), equipping them with the skills to address complex societal problems effectively.

1

COURSE COMPONENTS

The course combines diverse learning methods:

- Core lectures on TDR principles
- Interactive workgroups for collaborative problem-solving
- Case examples from expert practitioners (organized by MIT WPU Goa)
- A practice-based assignment linked to a real-world problem, commissioned by a real societal actor (company, NGO, government body, etc).

2

LEARNING OBJECTIVES

Students will gain practical skills and a deep understanding of:

- The nature of complex societal problems
- Principles of transdisciplinary research (TDR)
- Problem structuring and visioning exercises
- Stakeholder and power analyses
- Iterative research cycles (plan-act-do-reflect)
- Integrating different forms of knowledge
- Basic qualitative research methods
- Effective communication of research findings

Enabling and disabling factors for collaborative integration

Collaboration among Researchers (across regions and disciplines)

- What worked: open minded dialogues – resulted in better field work in different contexts and notable joint publications with interdisciplinary approaches (LUFs, FoPIA)
- What didn't: making a particular context (say researchers in developing economies) into just field data collection/collectors – mediocre outputs or even far-from-reality publications

Collaboration between academics, practitioners and communities

- What worked: inclusive approaches from the beginning – from framing the questions to exploring the responses to findings from different constituencies – resulted in replicable model of grassroots action research
- What didn't work: ad-hoc institutional support – opaque academic governance lacking dialogues and conversations

Designing faculty training (collaboration across regions, academics and international agencies)

- What worked: regular well structured meetings (mostly online and two in person sittings for 2/3 days – 3 meetings in 1.5 years) and follow up by people in bridging roles
- What was challenging – localising or configuring the global curriculum in different regions – ensuring each module was configured well for the context (lack of conversations for regional adaptations of the course)

TD in Higher Education

What works:

- Careful recruitment of faculty and students with inclusive committees and processes
- Flexible academic governance
- Support for field education

What may not:

- Numbers – more than 20 in a class makes each student's integrative take-home shallow
- Being too ambitious – in providing all possible exposures - makes student's take-home shallow
- Translation of reading materials - vernacular

Caveats

- Integration may not be inclusive co-production reflecting epistemic diversity (Gurlhosur and Mawroh 2023)
 - Critical coproduction of integrative knowledge can reframe marginalised lands and social scape (Mehta et al 2026)
 - Most importantly, such knowledge generation needs longterm efforts and support
 - continued dynamic coproduction itself as an expected outcome
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- [Gurlhosur](#), G and [Mawroh](#), B. 2023. Co-Production over Integration of Knowledge systems. Heinrich Boll Stiftung Foundation
 - Mehta, L., Movik, S., & Srivastava, S. (2026). Transformative environments: climate change uncertainties, marginality and locally driven transformative change in India and Bangladesh. *Global Social Challenges Journal*, 5(1), 3-10. Retrieved Jul 8, 2026, from <https://doi.org/10.1233/27523340Y2026D0000000085>

Over to You

... for questions and reflections