

# Practicing what we preach: Reflections on the pros and cons of transdisciplinary research in Erongarícuaro, Mexico

## Practicando lo que predicamos: Reflexiones sobre los pros y los contras de la investigación transdisciplinaria en Erongarícuaro, México

ERIN C. PISCHKE<sup>a</sup>, LUCÍA PÉREZ VOLKOW<sup>b</sup>, MAYRA FRAGOSO-MEDINA<sup>b</sup>, LAURA AGUIRRE FRANCO<sup>b</sup>

<sup>a</sup> Postdoctoral researcher, Environmental and Energy Policy, Michigan Technological University, 1400 Townsend Drive, 209 Academic Office Building, Houghton, MI 49931 USA, epischke@mtu.edu

<sup>b</sup> Master's students, Biological Sciences, National Autonomous University of Mexico (UNAM), University City, Mexico City, CDMX, Mexico

### ABSTRACT:

In November 2016, a group of students from the Americas participated in an Inter-American Institute for Global Change Research-funded two-week course organized by professors from the National Autonomous University of Mexico. The aim was to teach students and young researchers how to collaborate with non-scientists to conduct socioecological systems research in a transdisciplinary manner. This article will review the benefits as well as the challenges to doing so. It concludes with recommendations that other research teams can follow when conducting similar research that crosses disciplinary and international borders.

### KEYWORDS:

Transdisciplinarity; Latin America; Mexico; water conservation; socioecological systems

### RESUMEN:

En noviembre 2016, un grupo de estudiantes de las Américas participó en un curso de dos semanas financiado por el Instituto Interamericano para la Investigación del Cambio Global y organizado por profesores de la Universidad Nacional Autónoma de México. El objetivo era enseñar a los estudiantes y jóvenes investigadores cómo colaborar con no-científicos para llevar a cabo investigación de sistemas socioecológicos de forma transdisciplinaria. El presente artículo revisará los beneficios y los desafíos para hacerlo. Concluye con recomendaciones que otros equipos de investigación pueden seguir al realizar investigación similar que cruza fronteras disciplinarias y geográficas.

### PALABRAS CLAVE:

Transdisciplinaria, América Latina, México, conservación de agua, sistemas socioecológicos.

Transdisciplinary Research in Erongarícuaro, Mexico

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Recent trends suggest that conducting transdisciplinary research in which academics from different disciplines and non-academics collaborate on a problem-centered research project (Jahn et al., 2012)—has several benefits. These benefits include the ability to approach problems using multiple methods and analytical frameworks (Kirk-Lawlor & Allred, 2017), the integration of diverse and local perspectives (Hirsch Hadorn et al., 2006), the capacity to view problems from both the bottom up and top down and the integration of non-academic partners (Wickson et al., 2006). Transdisciplinary approaches often lead to robust project outcomes and direct, context-specific solutions to challenging socio-environmental issues (Schmidt & Pröpper, 2017). For these reasons and more, organizations such as the Inter-American Institute for Global Change Research-IAI (<http://www.iai.int/>) fund researchers and practitioners who are devoted to the use and promotion of transdisciplinary research. Despite these benefits, actually conducting transdisciplinary research is challenging. Working in large, diverse teams—especially those that engage with non-academics—can be more time-consuming and frustrating, particularly when compared to conventional discipline-based projects and courses (Schmidt & Pröpper, 2017). Universities and funding agencies can also be hesitant to support these projects and courses due to their relative nascence (De Torres, 2013; Dieguez et al., 2015). It is critical, then, for scholars to share experiences so we can collectively work towards improved processes and outcomes (Jahn et al., 2012).

In this spirit we seek to share the challenges and benefits from our experience as master's and doctoral students participating in a two-week transdisciplinary short course on conceptualizing the management of socio-ecological water systems in Michoacán, Mexico. The course was funded by the IAI, designed and taught by Patricia Balvanera, Tuyeni Heita Mwampamba, Manuel Maas and Elena Lazos Chavero of The Institute for Ecosystems and Sustainability Research (IIES) at the

National Autonomous University of Mexico (UNAM) and Tamara Ortiz Ávila from the community where fieldwork for the course was conducted. The course was carried out on the UNAM campus in the city of Morelia and fieldwork was conducted in Erongarícuaro (hereafter Eronga) in November 2016.

The course involved 17 biological science, agroecology, civil engineering, economics and policy science students from across the Americas and five faculty working with five enthusiastic Eronga community members in charge of forming a Municipal Council for Sustainable Development citizen organization. The emerging non-governmental organization (NGO) had identified problems managing the municipal water system and were eager to come up with solutions. The course provided an excellent opportunity to work with a rural Mexican town and to learn about water management challenges. The students were tasked with answering: *What are the risk perceptions surrounding the hydro-social cycle of the María Valdez spring (main potable water source of Eronga), as well as the vulnerabilities and threats surrounding its use?* A critical course outcome was for students to understand the value of conducting transdisciplinary research as well as produce solutions for the emerging citizen organization.

Putting aside the brief timeframe, we came up against several design and implementation challenges that are worth sharing. First, it was important to the professors that course participants develop and maintain an interest in multiple scientific disciplines. There were four course modules (socioecological systems; managing actors and their actions; vulnerability, poverty and governance; and inter- and transdisciplinary research tools) which the students were exposed to. Each of these covered disciplinary perspectives within the topic and the ways in which the disciplines interact and are intertwined. Professors discussed the same topics in the field and led students in exercises

designed to facilitate hands-on learning about other disciplines' methods and collaboration among diverse groups of students. Despite this, interest was difficult to sustain over two weeks. The majority of the 17 students were from the natural sciences and many were reluctant to break from the methods in which they were familiar. Moreover, citizens who were formerly or currently affiliated with academia comprised the citizen organization's membership. These factors—students unwilling to wholeheartedly collaborate across disciplines and a lack of engagement with the broader public—made it difficult to create a truly transdisciplinary research design for the class project. Having a more balanced number of students from various disciplines may have encouraged students to entertain and use a wider array of methods, while engagement with several different local NGOs and community organizations could have increased the diversity of perspectives involved in the project.

An additional challenge was around engagement with diverse perspectives. Students were encouraged to interact with community members during the course, but despite collaborating with a community organization to outline goals and gain access to the community, outreach in Eronga and true collaboration was limited to a few staff of the citizen organization. Therefore, community members who were experiencing water management issues were not wholly invested in our research because the request for help from UNAM had come from a small group of people from the citizen organization.

Finally, Eronga has an indigenous Purépecha population that has its own unique practices, symbolic values and environmental beliefs that were unfamiliar to the students and faculty. Most of the citizen organization staff were non-Purépecha, which further highlighted a disconnection between the small organization's interests and those of the indigenous community members.

While we had many challenges in reconciling indigenous vs. local non-indigenous vs. academic interests on the ground while working Eronga, it was a stimulating and worthwhile experience. Students learned from people in disciplines other than their own and got hands-on experience while working with the citizen organization. As a group, we collaborated with a diverse group of people to approach a problem and collectively design a research strategy that went beyond a purely academic exercise. Applying theoretical concepts in Eronga allowed students to learn (via trial and error) how to conduct transdisciplinary research by seeing a problem from a community organization's perspective and working with them to begin to solve it.

The successes and challenges of such a course provide opportunities to make recommendations for others who wish to conduct transdisciplinary research and teaching projects. Although there are no silver bullets, we feel similar endeavors should pay close attention to:

- The facilitation of knowledge-sharing between disciplines in the classroom as well as in the field. In our case, students only realized the utility of the course design after having to listen to themed lectures, reflect on them, write about them in assignments and then meditate on them in the field. The application of the material in the field helped the students to make concrete connections between theory and practice.
- Consensus among all groups involved (students, professors, community members) during the research design phase, particularly regarding communication skills. Collaborators should seek to present group work to all involved audiences to build a coherent body of collective knowledge. A project can sustain continuity better if everyone can anticipate what to expect as the project moves along.

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- The amount of time actually needed for data collection and analysis. Conducting transdisciplinary research is often more time-consuming than other types of research. Faculty, students and citizen organization staff members worked daily to design our methodology, meet with community members and collect data. After students dispersed once the course ended, it became more difficult to interact with community members from Eronga and find common meeting times when small groups could work on writing the final report to present to the citizen organization.

Several months after the course ended, students delivered a 98-page report to the professors and citizen organization which outlined their findings about the perceived threats to the María Valdez spring's hydro-social cycle. The report covers the social organization of Eronga and surrounding communities, management of the environment, including a focus on water management, as well as a review of the cultural makeup of the study location. It offers recommendations to the community and citizen organization for how to bolster integrated management of the local hydro-social cycle. In addition to the written report, a small group of students and one professor returned to Eronga to present findings to the general public and field questions. Some students and professors continue to collaborate while others have kept in touch with the citizen organization.

In conclusion, international problems like climate change have no one cause and no single solution. Solutions must come from many angles, sources and perspectives. Our experience with an academic course that joined engineering, natural and social sciences with a citizen organization to transdisciplinarily study the hydro-social cycle in a rural Mexican community is one example of such an approach to a local community problem. Successful interdisciplinary and transdisciplinary teamwork is, however, in and of itself also a wicked problem (Norris

et al., 2016). Identifying and understanding the challenges that transdisciplinary research teams face when conducting research abroad can suggest ways to overcome such barriers. A multi-pronged approach tackles problems from various angles to, in a sense, make the problem smaller and inform future research.

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**AUTHOR BIOGRAPHIES:**



**Erin C. Pischke** is a post-doctoral researcher in the Environmental and Energy Policy program at Michigan Technological University. She conducts energy-related research in Mexico and collaborates with others on large international Inter-American Institute for Global Change Research projects.



**Lucía Pérez Volkow** is a biology student from the National Autonomous University of Mexico (UNAM). Her research focuses on studying traditional management of charcoal in Mexican oak forests from a socioecological perspective.



**Mayra Fragoso-Medina** is a master's student in biological sciences at UNAM and Sevilla University (US) in Spain. Her research focuses on ecology and restoration of fields invaded by *Pteridium* sp. in the Lacandon tropical forest.



**Laura Aguirre Franco** is a biologist for the National University of Colombia and master's student in biological sciences at UNAM. Her research focuses on the ecology, management and restoration of tropical wetlands. She is interested in using inter- and transdisciplinarity as conceptual and methodological frameworks in her work.



Students, faculty and community members in Erongarícuaro, Mexico (Credit: Dr. Manuel Maass, UNAM)



Students and faculty discuss a concept map of the socioecological system in Eronga (Credit: Erin C. Pischke)