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# sDiv working group meeting report

# ”sMoste”

The sMoste working group is dedicated to advancing theoretical frameworks that integrate Nature’s Contributions to People (NCPs) with ecological networks. We specifically aim to optimize these applications for high-biodiversity regions that are often understudied, yet where NCPs are vital for local communities. During this second iteration of our working group, we expanded our team by welcoming iDiv PhD student Wentao Yu, whose research interests and expertise are a perfect fit. Our primary focus for this gathering was to drive our two ongoing manuscripts to completion; we are pleased to report that one has now been submitted, while the second is fully prepared for submission.

## General atmosphere and sDiv support

The meeting consisted of a balanced mix of five in-person participants and one remote participant. The atmosphere was highly engaging, supportive, and productive. Regular check-ins and updates were conducted as the online participant rejoined the meeting, ensuring our thoughts and discussions were regularly summarized and synthesized. Speaking time was evenly distributed among participants. The exceptional support from sDiv enabled the seamless execution of the hybrid meeting.

To kick off the workshop, leaders of projects arising from our first workshop presented a brief presentation on the progress and status of each project. Based on these presentations and ensuing discussions, we structured a to-do list for the workshop, especially focusing on finishing two manuscripts which we thought were the closest to completion. An overview of the state of each project is as follows:

## Project 1: Collection and analysis of food webs from India

General aim: To compile food webs for ecosystems from India, a highly diverse and understudied region. This will be valuable in and of itself, but will also underpin the application of the theory developed in Project 1.

Progress: We have been working with researchers in India to compile seasonal food web data (with NCPs). Specifically, the food web from the Tampara Lake has been completed and is the focus of the first manuscript. The constructed food web is very diverse and well-resolved with 135 species and 1924 links (in the metaweb) over the three seasons. Each species has been annotated with natural history traits and NCPs associated with it.

We have now submitted the resulting manuscript, titled “How a Tropical Food Web Weathers the Monsoon and What It Means for the People”. In this work, we address how ecosystems maintain function and stability in the face of environmental forcing. We introduce and provide empirical evidence for a mechanism we term 'dynamic stability', showing that ecosystem resilience is achieved not through complete turnover or stasis, but through a conserved macro- and meso-scale network architecture that facilitates

plasticity in species-level functional roles. Our analysis reveals that NCPs are consistently more robust to species loss than the food web itself, a direct consequence of the functional redundancy in NCP provisioning we observe.

Balance between activities: 10% presentation by Anshuman, 30% discussion about analysis and structure, 60% writing.

Next steps: The manuscript has been submitted and is currently under consideration.

**Project 2: Integrating NCPs into foodwebs - concepts and methods**

General aim: Develop a conceptual framework (beyond the current traditional one used in Project 1) and a how-to guide for integrating NCPs into food webs more holistically for deciphering feedbacks and dynamics.

Progress: During the first meeting, we recognized that before trying to put NCPs in food webs and study their motifs, we needed to more fully explore the ways that NCPs can and have been integrated into food webs. Thus, we decided to write a synthesis article that brings together two bodies of literature: 1) that of NCP modeling, and 2) that of ecological network modeling.

This manuscript, titled "From Provision to Co-production: Modeling People's Contributions to Nature", is now ready for submission. It argues for the need to explicitly consider and model both an ecosystem's ability to provide NCP and the impact of NCP on ecosystems. We propose a framework that integrates both the provision and use of NCP and their feedbacks within a single dynamic model, reframing human actions as an internal variable rather than an external disturbance. The paper defines eight fundamental interaction types (analogous to classic species interactions) and outlines a pathway toward dynamic, predictive models.

Balance between activities: 20% presentation by Cian, 30% brainstorming, 20% figure development, 30% writing.

Next steps: The manuscript is prepared, and we are proceeding with the submission process (a pre-submission inquiry has been submitted).