

## **sDiv working group meeting report**

### **sIntESE - Integrating ecosystem services into economic models**

#### ***Aims of the meeting***

The second working group meeting of sIntESE took place between 4<sup>th</sup> and 8<sup>th</sup> March 2024. The goals of this meeting were: 1) to work together to finalize the perspective paper where we synthesize the state of the art regarding the integration of ecosystem services and economic models and identify ways forward, and 2) to share the progress made, in between working group meetings, on scoping the pilot study and identify next steps.

#### ***Meeting set-up and structure***

The meeting was hybrid with 8 participants at iDiv in Leipzig and 2 participants online. On the first meeting day, the team worked on the perspective paper by identifying which elements were missing and still required discussion amongst the working group members. This set the starting point for the work. The following meeting days consisted of a mix of presentations (summarized below), plenary discussions and break-out group work (a.o. writing and figure design). Online participants joined most of the plenary discussions and break-out groups.

#### ***Presentations***

Various members of the working group presented recent research relevant to sIntESE:

##### **Alessandra La Notte | Bridging Ecosystem Services to economic modeling through accounting. The key concepts underlying Natural Capital Accounts**

Alessandra introduced some key concepts in Natural Capital Accounting that can be of support and/or controversial when dealing with conventional macroeconomic approaches. First, the difference between natural resources and ecosystem “assets” followed by the different roles that ecosystem services can play in addition to ecological input provision; finally a few operational issues concerning approaches and methodologies when assessing the actual data to compile accounting modules in physical and monetary terms.

##### **Tobias Heimann | Environmental and socio-economic effects of profit-driven cropland expansion and conservation policies**

Tobias presented an integrated analysis of the potential impacts on agricultural markets, biodiversity and CO<sub>2</sub> emissions of a 3.6% cropland expansion until 2030. This analysis was performed by linking a biophysical and CGE model. Moreover, the study assessed how global conservation policies could shift expansion pressure and alter the resulting environmental and socio-economic effects. The results showed that conservation policies could reduce environmental impacts of cropland expansion by one quarter without compromising global agricultural productivity.

**Willem-Jan van Zeist | It's the economy (and ecosystems), stupid!**

Willem-Jan presented a summary of two approaches for connecting nature to the computable general equilibrium model MAGNET. The first was through a set of 'biodiversity collapse' scenarios (loss of pollinators, removal of environmentally harmful subsidies, deforestation protective policies, and protecting 50% of global land area) that were analysed through welfare decomposition and sectoral GDP changes; a deep dive into the transmission channels of the scenario shocks through the economy was also presented. The second approach was through MAGNET's Gross Ecosystem Product (GEP) module, which collects and updates data on ecosystem services accounts to generate a forward looking GEP.

**Nynke Schulp | The role of Nature's Contributions to People in sustaining international trade of agricultural products**

Nynke presented the work of another sDiv working group, sTradES. sTradES explores the dependency of internationally traded goods on nature's contributions to people (NCP). Based on a review, the working group identified multiple ways in which trade depends on material, regulating, and non-material NCP, and identified knowledge gaps and ways forward. Similar as for sIntESE, a lack of spatial and process detail in NCP mapping and its contribution to agricultural production is one of the limitations.

**Justin Johnson | Recursive Reformulation of GTAP-InVEST: Preliminary Results for the Changing Wealth of Nations**

Justin presented the work of the GTAP-InVEST team at the University of Minnesota, focusing on recent results from the new recursive-dynamic variant of the model that has been produced. This model enables analysis of policy implementation with specific timing and considers dynamic elements of biophysical processes. Justin presented preliminary results from a forthcoming World Bank technical report to augment their Changing Wealth of Nations flagship report. Justin also discussed next steps on how to integrate the newest version of the model with country-specific submodels to extend policy relevance.

***Progress made and next steps***

During the meeting the group made significant progress on the perspective paper. In plenary the working group discussed and agreed on the key messages stemming from the synthesis work on how economic and ecosystem services models have been linked as well as the ways forward for better integrating ecological and economic models. This allowed designing a main figure for the perspective paper showing the links between the main variables in each type of models. In breakout groups significant progress was made on writing the remaining sections of the perspective paper, namely the key messages and way forward sections. The working group also discussed the pilot study focusing on linking carbon sequestration and an economic model. The work done in between workshops was presented and the main challenges identified. The main novelty of this pilot was to have a dynamic carbon price that responds to the amount of carbon emissions left to sequester. The working group discussed to what extent such dynamics have been captured already in the realm of Integrated Assessment Models (IAM) and the novelty of such exercise. The group agreed on possible ways forward regarding the pilot study based on available capacity within each working group member. Finally, and taking into account that this was the last meeting of the working

group, the group brainstormed about possible avenues to keep progressing and working on this topic together.

### ***Working atmosphere***

In this second workshop it was evident that the group benefited from the bonds previously created. The working atmosphere was sharp, constructive, productive and supportive. The social moments enabled by iDiv (dinners and a visit to the Botanical Garden) allowed the group to have a good balance between productive and casual exchanges, which benefitted the scientific creative process and supported highly productive and intense working days. We want to express our gratitude to iDiv for supporting this interdisciplinary working group and a special thanks to the sDiv team, for such great organization and support (also during Germany-wide rail and airport strikes!).