Master in Political Ecology  
Academic year 2019-2020

Analyzing Society's Metabolism

INSTRUCTORS

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OBJECTIVES

After having completed this course, students will be able to appraise social metabolism as a concept and will be equipped to apply the concept empirically. In order to reach this objective, they will learn to describe and discuss the applications and interpretations of commodity flow analysis (CFA), economy-wide material flow accounting (MFA), and Multi-Scale Integrated Analysis of Societal and Ecosystem Metabolism (MuSIASEM). They will be able to – with their peers or independently – execute these approaches using existing data sets and spreadsheet software (e.g., in OpenOffice, LibreOffice, Microsoft Office). On this basis, they can knowledgeablely interpret existing resource flow data and conduct their own estimates where necessary. Upon completing the course, students will better understand the challenges of achieving sustainability transformations from the local to the global level.

OVERALL COURSE STRUCTURE

The course will be held in two parts:

During the first part, the students will be introduced to the concept of social metabolism and to the tools of commodity flow analysis and material flow accounting. Instructive discourse will be used to introduce the concept and its applications. On the basis of this shared understanding, the students will engage in critical discussions of the concept and tools and their applicability to sustainability issues. The core of the learning in this part will take place during periods of individual and group work as well as peer presentations and discussions. The students will be guided in organizing, executing, and interpreting the results of their own small data project. As a group, we will work at
the national level, covering 10 countries (Cambodia, China, Ghana, India, Laos, the Netherlands, Nigeria, Peru, Spain, and Ukraine) and focus on 5 biomass commodities (avocado, cassava, rice, soy, and timber). These projects (calculation spreadsheets and presentation) form the basis for the evaluation of the first part of the course. The first part consists of four classes with a duration of 2-3 hours each, held within the third week of April (14-17). The instructors are Anke Schaffartzik and Arnim Scheidel.

During the second part, the students will be introduced to the basic rationale of Multi-Scale Integrated Analysis of Societal and Ecosystem Metabolism (MuSIASEM) and its applications to different sectors, such as food system analysis and others. This second part consists of five 2-hour classes held every Wednesday from April 22 to May 20, 2020. The second part follows a lecture-style format, that is, a presentation from the instructors, followed by discussions and/or minor group work by the students. The instructors of this part are Raúl Velasco-Fernández, Gonzalo Gamboa, and Arnim Scheidel.

**EVALUATION**

Part I: We will evaluate the students’ demonstrated ability to apply the tools covered in class and to interpret the results in light of the information provided on the concept of social metabolism.

You may choose to complete a data project based on this class for your evaluation in the Methods Module of the course. Please contact us if you are interested!

Part II: Evaluation is based on group work conducted in class consisting in the elaboration of and extended outline of a research paper. Instructions to develop the extended outline will be provided during the course.

**COURSE OUTLINE**

**Part I:**

1. Class (2h): Course overview, introduction to social metabolism and related methods (instructive discourse and critical consideration and discussion)
   14.4.2020, 11h-13h.

2. Class (2h): How to conduct a commodity flow analysis (CFA) with spreadsheet software (theoretical and practical work)
   15.4.2020, 11h-13h.

3. Class (3h): Introduction to material flow accounting (MFA) and hands-on calculation of a material flow account for a case-study country (instructive discourse, group and individual work)
   16.4.2020, 11h-14h.

4. Class (3h): Finishing practical work (1h). Presentation of results and plenary debate (2h)
   17.4.2020, 11h-14h.

**Part II:**

1. Class (2h): Introduction to the Multi-Scale Integrated Analysis of Societal and Ecosystem Metabolism (MuSIASEM), concepts and rationale. (theoretical)
   22.4.2020, 10h-12h.

Multi-Scale Integrated Analysis of Societal and Ecosystem Metabolism (MuSIASEM) is a methodological framework used to analyze socio-ecological systems. It builds on bioeconomics of Georgescu-Roegen and complex systems theory. In the class you will learn about the theoretical
concepts and basic rationale of MuSIASEM in relation to ecological economics and degrowth debates.

2. Class (2h): Land Time Budget Analysis.  
29.4.2020, 10h-12h.  
Land Time Budget Analysis (LTBA) is a precursor of the MuSIASEM approach and remains at the heart of socio-metabolic analyses applied to rural areas at a local scale (such as household or village analyses). In this class you will learn about the ideas underlying LTBA as well as how it can be used to study multidimensional sustainability challenges in the countryside.

3. Class (2h): Energy metabolic pattern at country level (examples of MuSIASEM application).  
6.5.2020, 15h-17h.  
Energy use and human activity are key indicators when analyzing societal metabolism. In this class you will learn from practical applications of MuSIASEM when applied to characterize the energy metabolic pattern of countries.

4. Class (2h): Food system analysis.  
13.5.2020, 11h-14h.  
In this class we will analyze the Spanish food system metabolism, from production to consumption. This includes the analysis of the food production systems at multiple scales and the analysis of consumption of nutrients in different household typologies.

29.5.2020, 11h-14h.

Readings Part I:

Required:
The following articles must be read before class 1:

Recommended:
The following reading is not required but recommended and can be read anytime during (or before or after) the course:


Readings Part II:

Required:
The following texts must be read before class 1:


Recommended:


More about MuSIASEM: https://www.coursera.org/learn/sustainability-social-ecological-systems

Preparation Part I:
- PLEASE BRING YOUR LAPTOPS WITH SPREADSHEET SOFTWARE INSTALLED! You may use MS Excel (we do) but we also encourage you to use free, open-source software such as OpenOffice or LibreOffice. The software commands differ across languages, you may wish to bookmark a translation site (e.g., http://dolf.trieschnigg.nl/excel/index.php).