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## **Figuring rural development : concepts and cases of land use, sustainability and integrative indicators**

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# Figuring Rural Development



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# Figuring Rural Development

Concepts and cases of land use, sustainability and  
integrative indicators

PROEFSCHRIFT

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Prof. dr. R. Schefold

*To the memory of my father*



## Preface

The journey that ended in this dissertation started in April 2001 when I received a research position at the Institute of Environmental Sciences (CML) in Leiden, for the project 'South-East Asia in Transition' (SEAtans). This was one of the first projects where two departments within CML, Environment & Development and Industrial Ecology, closely worked together. SEAtans was an initiative of the Institute of Social Ecology (IFF), in Vienna, with partners from Italy, Spain, the Netherlands, Laos, Thailand, Vietnam and the Philippines, and funded by the EU. The general objective of the project was to explore the sustainability of the modernization of South-East Asian societies, by studying the flows of materials and energy on the national and the village levels. In the selected villages, the focus was on flows of biomass products (corn, rice, logs, etc.) and the explanation of why farmers chose for these livelihood activities. CML led the local work in Vietnam and in the Philippines, collaborating with researchers from the Center for Natural Resources and Environmental Studies, Hanoi (CRES) and Isabela State University, the Philippines. Aside from traveling for project meetings, I spent about 5 months in the Philippines and about 2 months in Vietnam for organizing and implementing the village-level field research.

In 2004, we were invited to join the project titled 'Technology of water for irrigation and potable use' (TIPOT), funded by the Asia Pro Eco Programme of the EU. The project concerned the development of a low-cost technology for subterranean treatment of groundwater to combat the arsenic pollution of drinking water in the Bengal region. CML's main task was to formulate guidelines for the embedding of the technology in the local communities in West Bengal and society as a whole (the 'delivery system'). It was initiated by Queen's University Belfast, with partners from Germany, Spain, the Netherlands and India. Thanks to this project I had a job and a full-time Indian assistant-researcher who also gathered an ocean of data on social, economic, agricultural and nutritional issues of the TIPOT case study village, specifically for my PhD. When this project ended, the database was by far from complete, and the depth of the idea of what I actually wanted to do with this database was not fathomed yet. I received one extra year (two years half-time) from CML to devote entirely on my PhD. Parallel to the ongoing data gathering process I developed the indicators described in Chapter 5 and 6. The results of the SEAtans project can be found in Chapters 2, 3, and 4.



In scientific terms, the process underlying the thesis can be described as a rise of methods over substance.

Chapter 2 started out as a first attempt to connect the methodological framework of Material Flow Accounting (MFA) to agricultural transition theory and 'Action-in-Context' (AiC) as a research tool. It was to be a real interdisciplinary methodological and substantive undertaking, with MFA representing the natural science side of the story, AiC representing the social part and the combination of those showing a surplus value. The first anonymous reviews were dreadful, criticizing especially the "unworkable" and "ponderous" methodology. As a result, I changed the paper into a relatively traditional social-ethnographic case study with an almost fully substantive focus, only based, almost implicitly, on the MFA and AiC methodological foundations.

Chapter 3 reports on the second try to apply the same frameworks (AiC and MFA), but now "emerged" as the explicit topic of a methodological paper, illustrated with a case study of an indigenous people village in the uplands of Vietnam. This attempt was greatly helped by that it could be presented as a member of the "socially extended" MFA family, by which also publication in the *Journal of Industrial Ecology* came within reach. The substantive story is well represented, but the actual focus is on the methodological elements. The chapter is especially interesting for the MFA world. Socially extended MFA should find its value at levels where MFA has already proven its utility, which is for broad questions at large, e.g. national, scales. Socially extended or not, MFA does not link up broadly, i.e. theoretically, with issues of local-level rural development. With that, it does not form a deep key to figuring rural development. How should I continue? Here is where the next quest came into being, which was the construction of a new form of MFA that does contain links to theory on important rural issues in the developing world.

Chapter 4 is the result. It develops my own 'rural MFA'. Material flows are conceptually linked to phenomena in rural societies, such as to the transition from extensive to intensive and industrial agriculture through indicators of material productivity and material intensity, to globalization through two indicators of market incorporation, and to food security by way of five synthetic indicators expressing present and future food security. The system is certainly quite "ponderous", as my previous anonymous reviewer would have put it. It results in indicators, however, that are not to be found with the same clarity using any other method. The rural MFA framework is applied on three case study villages in Vietnam, Thailand and the Philippines. The indicators give a quantita-

tive comparison between villages in terms of the indicators, displaying their quite different characteristics on a truly comparative scale.

On this newly acquired footing and confidence, Chapter 5 is an example of the environmental methodologist reaching out into the heart of rural development, i.e. development and poverty. It develops 'freely disposable time' (FDT) as a logically coherent indicator of wealth and poverty. FDT is the time that actors have left after satisfaction of their households' basic needs, and with that captures much of what has been called 'freedoms' by Sen and the capacity that people have to invest in the future, e.g. through schooling or investments in sustainable agriculture.

Chapter 6 was primarily meant as the concluding chapter of the volume. It could not be stopped developing, however, and now discusses land use themes, methodology for theory building and an elaboration of the FDT concept of Chapter 5 into an indicator of community development. Chapter 7 now presents the actual conclusions of the dissertation.

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This journey would not have been possible without many people from CML, the SEAtans and TIPOT projects. In the SEAtans project, I worked together with René Kleijn. Thanks for being the exemplary colleague. I would like to thank the Vietnamese researchers Phan Thi Anh Dao, Le Thi Thu Thanh, and Trinh Khanh Chi for their hard work and dedication in the SEAtans project part of the data I used for this thesis. The director of CRES, Le Trong Cuc, helped in logistical support. The Dutch team consisted of the students Serge Stalpers, Patrick Heezen and Jiska Kooijman. You were a great team with a strong drive through the sometimes grueling circumstances. The Vietnamese case study was a story on its own and a big learning process for me, but we finally succeeded in building a coherent team and get some good data out. I am grateful to all the respondents in Tat hamlet for their hospitality and the valuable time they gave to co-operate with the research. In the Philippines, I would like to thank the CVPED staff members at that time, especially the coordinators Andy Masipiqueña and Jan van der Ploeg for their scientific and logistic assistance, and the office workers Madel and Eso for their practical help. I appreciate the SEAtans fieldworkers Orlando Balderama, Liesbeth Denis and Sietske Veenman and their field assistants Sammy, Leonardo and Jane for all their work. I had the honor to have Arnold Macadangdang as my private research assistant, interpreter, guide and companion in the field. I am most grateful to our to all our respondents in Dy Abra, Masipi East, and Puerta, who gave us so much of their time to learn about their way of living, carefully looked after us and made us feel at home. Especially Dar and Rose in Masipi East made a home for me every time I returned to the field. I would like to thank Marina Fischer-Kowalski, Heinz Schandl and Clemens Grünbühel (IFF) who initiated and organized the SEAtans project that laid the foundation of this dissertation. Besides that, Clemens shared his data with me on the Nalang case study that became a central village for my rural MFA. I acknowledge Bhaskar Sengupta who contacted me to ask if CML would be interested in participating in the TIPOT project on a low-cost in-situ arsenic removal technology. In Angel Carbonell we found a great colleague to participate in the project just by picking the right person from the internet. Sukanya Sarkhel was chosen to be my Indian partner in the project and work for me. Your hard work, dedication and persistence has been essential to finish the work. You made me feel very welcome and at home when visiting your place. While working for all these projects, I spent most of the time at the office of the former Department of Environment and Development of the Institute of Environmental Sciences (CML), Leiden University. With the fi-

nancial help from the institute I could finish this dissertation. I would like to thank all my colleagues and ex-colleagues at CML for their support, and specifically Reimar Schefold for stepping in at a crucial moment and Marco Huigen for nudging me into full-fledged database work. My family and friends have always encouraged me, with special thanks to my mother for her confidence in me. During the process of delivering this thesis, I delivered three wonderful children. With them and a dissertation as basic need, there was hardly freely disposable time left, but enough destinations. Dimple helped us out during the last year. Wouter was my supervisor in the SEAtans project. Together we enrolled in the TIPOT project and a happy marriage

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Measuring for the MFA in Tat