

Table of Contents

Preface xi

List of Figures xv

List of Tables..... xxv

List of Contributors..... xxxi

PART I: LCSM Approaches

1. Integrating Sustainability Considerations into Product Development:
A Practical Tool for Prioritising Social Sustainability Indicators
and Experiences from Real Case Application..... 3
Gustav Sandin, Greg Peters, Annica Pilgård, Magdalena
Svanström and Mats Westin

2. A Life Cycle Stakeholder Management Framework for Enhanced
Collaboration Between Stakeholders with Competing Interests 15
Christina Scandeliuss and Geraldine Cohen

3. Stakeholder Consultation: What do Decision Makers in Public Policy
and Industry Want to Know Regarding Abiotic Resource Use? 27
Marisa Vieira, Per Storm and Mark Goedkoop

4. Life Cycle Management Capability: An Alternative Approach
to Sustainability Assessment 35
Thomas Swarr, James Fava, Allan Astrup Jensen, Sonia Valdivia
and Bruce Vigon

5. The Sustainability Consortium: A Stakeholder Approach to Improve
Consumer Product Sustainability 43
Kevin Dooley, Joby Carlson, Georg Schöner, Vairavan
Subramanian and Cameron Childs

6. A Social Hotspot Database for Acquiring Greater Visibility in Product
Supply Chains: Overview and Application to Orange Juice 53
Catherine Benoît Norris, Deana Aulisio, Gregory A. Norris,
Caroline Hallisey-Kepka, Susan Overakker and Gina Vickery Niederman

PART II: LCM Methods and Tools

7. A Novel Weighting Method in LCIA and its Application in Chinese Policy Context..... 65
Hongtao Wang, Ping Hou, Hao Zhang and Duan Weng

8. The Usefulness of an Actor’s Perspective in LCA 73
Henrikke Baumann, Johanna Berlin, Birgit Brunklaus,
Mathias Lindkvist, Birger Löfgren, and Anne-Marie Tillman

9. Review on Land Use Considerations in Life Cycle Assessment:
Methodological Perspectives for Marine Ecosystems..... 85
Juliette Langlois, Arnaud Hélias, Jean-Philippe Delgenès
and Jean-Philippe Steyer

10. Visual Accounting..... 97
Andreas Moeller and Martina Prox

11. International Reference Life Cycle Data System (ILCD) Handbook:
Review Schemes for Life Cycle Assessment..... 107
Kirana Chomkham Sri, Marc-Andree Wolf and Rana Pant

12. Time and Life Cycle Assessment: How to Take Time into Account
in the Inventory Step? 119
Pierre Collet, Arnaud Hélias, Laurent Lardon and Jean-Philippe Steyer

13. A Method of Prospective Technological Assessment of Nanotechnological
Techniques 131
Michael Steinfeldt

14. State of the Art Study - How is Environmental Performance Measured
for Buildings/Constructions? 141
Anne Rønning and Kari-Anne Lyng

PART III: Water Footprint

15. Comparison of Water Footprint for Industrial Products in Japan, China
and USA 155
Sadataka Horie, Ichiro Daigo, Yasunari Matsuno and Yoshihiro Adachi

16. Assessment of the Water Footprint of Wheat in Mexico..... 161
Carole Farell, Sylvie Turpin and Nydia Suppen

17. Water Footprints in Four Selected Breweries in Nigeria..... 171
Ife K. Adewumi, Oludare J. Oyeboode, Kingsley C. Igbokwe
and Olutobi G. Aluko

18. Development and Application of a Water Footprint Metric
for Agricultural Products and the Food Industry 183
Bradley Ridoutt
19. LCA Characterisation of Freshwater Use on Human Health
and Through Compensation 193
Anne-Marie Boulay, Cecile Bulle, Louise Deschênes
and Manuele Margni

PART IV: LCM of Processes and Organisations

20. How to Measure and Manage the Life Cycle Greenhouse Gas Impact
of a Global Multinational Company 207
Nicole Unger, Henry King and Siri Calvert
21. Best Practice Application of LCM by Retailers to Improve Product
Supply Chain Sustainability 217
David Styles, Harald Schoenberger and José Luis Galvez-Martos
22. Life Cycle Management Approach to the Design of Large-Scale Resorts 229
Kristin Lee Brown, Daniel Clayton Greer and Ben Schwegler
23. Greening Events: Waste Reduction Through the Integration of Life
Cycle Management into Event Organisation at ESCi 239
Marta Anglada Roig, Sonia Bautista Ortiz and Pere Fullana i Palmer
24. Challenges for LCAs of Complex Systems: The Case of a Large-Scale
Precious Metal Refinery Plant 247
Anna Stamp, Christina E.M. Meskers, Markus Reimer,
Patrick Wäger, Hans-Jörg Althaus and Roland W. Scholz
25. Life Cycle Inventory of Pine and Eucalyptus Cellulose Production
in Chile: Effect of Process Modifications 259
Patricia González, Mabel Vega and Claudio Zaror
26. Life Cycle Assessment of Integrated Solid Waste Management System
of Delhi 267
Amitabh Kumar Srivastava and Arvind Kumar Nema
27. LCM of Rainwater Harvesting Systems in Emerging Neighbourhoods
in Colombia 277
Tito Morales-Pinzón, Sara Angrill, Joan Rieradevall,
Xavier Gabarrell, Carles M. Gasol and Alejandro Josa

PART V: LCM in the Agriculture and Food Sectors

28. Environmental Profiles of Farm Types in Switzerland Based on LCA..... 291
Daniel U. Baumgartner, Johanna Mieleitner, Martina Alig
and Gérard Gaillard
29. The Use of Models to Account for the Variability of Agricultural Data..... 301
Brigitte Langevin, Laurent Lardon and Claudine Basset-Mens
30. Modular Extrapolation Approach for Crop LCA MEXALCA: Global
Warming Potential of Different Crops and its Relationship
to the Yield..... 309
Thomas Nemecek, Karin Weiler, Katharina Plassmann,
Julian Schnetzer, Gérard Gaillard, Donna Jefferies,
Tirma García-Suárez, Henry King and Llorenç Milà i Canals
31. Regional Assessment of Waste Flow Eco-Synergy in Food Production:
Using Compost and Polluted Ground Water in Mediterranean
Horticulture Crops..... 319
Julia Martínez-Blanco, Pere Muñoz, Joan Rieradevall,
Juan I Montero and Assumpció Antón
32. Assessing Management Influence on Environmental Impacts Under
Uncertainty: A Case Study of Paddy Rice Production in Japan 331
Kiyotada Hayashi
33. Assessing Environmental Sustainability of Different Apple Supply
Chains in Northern Italy..... 341
Alessandro K. Cerutti, Daniela Galizia, Sander Bruun,
Gabiella M. Mellano, Gabriele L. Beccaro and Giancarlo Bounous
34. The Effect of CO₂ Information Labelling for the Pork Produced
with Feed Made from Food Residuals 349
Hideaki Kurishima, Tatsuo Hishinuma and Yutaka Genchi

PART VI: LCM in the Packaging Sector

35. Role of Packaging in LCA of Food Products 359
Frans Silvenius, Juha-Matti Katajajuuri, Kaisa Grönman,
Risto Soukka Heta-Kaisa Koivupuro and Yrjö Virtanen
36. Packaging Legislation and Unintended Consequences: A Case Study
on the Necessity of Life Cycle Management 371
James Michael Martinez

37. Carbon Footprint of Beverage Packaging in the United Kingdom.....	381
Haruna Gujba and Adisa Azapagic	
38. Enhanced Resource Efficiency with Packaging Steel.....	391
Evelyn Frauman and Norbert Hatscher	
39. Damage Assessment Model for Freshwater Consumption and a Case Study on PET Bottle Production Applied New Technology for Water Footprint Reduction	399
Masaharu Motoshita, Norihiro Itsubo, Kiyotaka Tahara and Atsushi Inaba	

PART VII: LCM in the Energy Sector

40. Sustainability Assessment of Biomass Utilisation in East Asian Countries	413
Yuki Kudoh, Masayuki Sagisaka, Sau Soon Chen, Jessie C. Elauria, Shabbir H. Gheewala, Udin Hasanudin, Hsien Hui Khoo, Tomoko Konishi, Jane Romero, Yucho Sadamichi, Xunpeng Shi and Vinod K. Sharma	
41. Life Cycle Inventory of Physic Nut Biodiesel: Comparison Between the Manual and Mechanised Agricultural Production Systems Practiced in Brazil	425
Marília Folegatti Matsuura, Gil Anderi da Silva, Luiz Alexandre Kulay and Bruno Galvêas Laviola	
42. Life Cycle Assessment of Biodiesel Production from Microalgae Oil: Effect of Algae Species and Cultivation System	437
Javier Dufour, Jovita Moreno and Rosalía Rodríguez	
43. Modelling the Inventory of Hydropower Plants	443
Vincent Moreau, Gontran Bage, Denis Marcotte and Réjean Samson	
44. Life Cycle Carbon Dioxide Emission and Stock of Domestic Wood Resources using Material Flow Analysis and Life Cycle Assessment	451
Junhee Cha, Youn Yeo-Chang and Jong-Hak Lee	
45. Analysis on Correlation Relationship Between Life Cycle Greenhouse Gas Emission and Life Cycle Cost of Electricity Generation System for Energy Resources	459
Heetae Kim and Tae Kyu Ahn	
46. Development and Application of a LCA Model for Coal Conversion Products (Coal to Y).....	469
Christian Nissing, Loïc Coënt and Nathalie Girault	

PART VIII: LCM in the Electronics and ICT Sectors

47. European LCA Standardisation of ICT: Equipment, Networks,
and Services..... 483
Anders S.G. Andrae

48. Product Carbon Footprint (PCF) Assessment of a Dell OptiPlex 780
Desktop – Results and Recommendations 495
Markus Stutz

49. State of the Art in Life Cycle Assessment of Laptops and Remaining
Challenges on the Component Level: The Case of Integrated Circuits..... 501
Ran Liu, Siddharth Prakash, Karsten Schischke, Lutz Stobbe

50. The Concept of Monitoring of LCM Results Based on Refrigerators
Case Study..... 513
Przemyslaw Kurczewski and Krzysztof Koper

51. Life Cycle Management of F-Gas-Free Refrigeration Technology:
The Case of F-Gases-Free Frozen Dessert Equipment 523
Francesca Cappellaro, Grazia Barberio and Paolo Masoni

PART IX: LCM in the Mobility Sector

52. Assessment of the Environmental Impacts of Electric Vehicle Concepts..... 535
Michael Held and Michael Baumann

53. A Consistency Analysis of LCA Based Communication and Stakeholders
Needs to Improve the Dialogue on New Electric Vehicle..... 547
Stephane Morel, Tatiana Reyes and Adeline Darmon

54. Design for Environment and Environmental Certificate at Mercedes-Benz
Cars..... 557
Klaus Ruhland, Rüdiger Hoffmann, Halil Cetiner and Bruno Stark

55. Implementing Life Cycle Engineering Efficiently into Automotive
Industry Processes 567
Stephan Krinke

56. Environmental Product Declaration of a Commuter Train..... 579
Kathy Reimann, Sara Paulsson, Yannis Wikström
and Saemundur Weaving

Index 587