Matthias Finkbeiner *Editor*

Towards Life Cycle Sustainability Management

Springer

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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 Scandelius 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 Chomkhamsri, 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. Oyebode, 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, Gabriella M. Mellano, Gabriele L. Beccaro and Giancarlo Bounous

34. The Effect of CO_2 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
Evelyne 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, Yannos Wikström and Saemundur Weaving

Index 587

Preface

Towards Life Cycle Sustainability Management

The global society has undergone a paradigm shift from environmental protection towards sustainability. Sustainability does not only focus on the environmental impact, it rather consists of the three dimensions “environment”, “economy” and “social well-being”, for which society needs to find a balance or even an optimum. Sustainability has become mainstream these days. It is accepted by all stakeholders - be it multinational companies, governments or NGOs. Unfortunately, this common understanding merely relates to the general concept rather than actions. But lip service is not enough to achieve a sustainable development of our societies. If we want to make sustainability happen as concrete reality in both public policy making and corporate strategies, sustainability cannot please everybody. To make it happen, we have to be able to discern good and evil. This requires that we are able to address the question, how sustainability performance can be measured, especially for companies, products and processes. We have to be smart enough to be able to measure it or the real and substantial implementation of the sustainability concept will remain just wishful thinking.

In order to achieve reliable and robust sustainability assessment results it is inevitable that the principles of comprehensiveness and life cycle perspective are applied. The life cycle perspective considers for products all life cycle stages and for organisations the complete supply or value chains, from raw material extraction and acquisition, through energy and material production and manufacturing, to use and end of life treatment and final disposal. Through such a systematic overview and perspective, the unintentional shifting of environmental burdens, economic benefits and social well-being between life cycle stages or individual processes can be identified and possibly avoided. Another important principle is comprehensiveness, because it considers “all” attributes or aspects of environmental, economic and social performance and interventions. By considering all attributes and aspects within one assessment in a cross-media and multidimensional perspective, potential trade-offs can be identified and assessed.

This is where life cycle assessment (LCA) and life cycle management (LCM) come into play. LCA is the internationally accepted method for measuring environmental performance and LCM is in a nutshell about the application of LCA or rather life cycle thinking (LCT). It is still a relatively young concept in the environmental community with pioneering work done by a Working Group of the Society of Environmental Toxicology and Chemistry (SETAC) at the end of the last century. At that time, my definition of LCM was “a comprehensive approach towards product and organisation related environmental management tools that follow a life cycle perspective." The United Nations Environment Programme (UNEP) and SETAC later launched the Life Cycle Initiative to enable users around the world to put life cycle thinking into effective practice and introduced LCM as one of their areas of work.

While the measurement of the environmental dimension of sustainability with LCA is well established, similar approaches were developed more recently for the economic (life cycle costing – LCC) and the social (social LCA – SLCA) dimensions of sustainability. This development is crucial, because it fosters the opportunity for life cycle based sustainability assessments. Walter Klöpffer put this idea into the conceptual formula:

LCSA = LCA + LCC + SLCA
LCSA = Life Cycle Sustainability Assessment
LCA = Environmental Life Cycle Assessment
LCC = Life Cycle Costing
SLCA = Social Life Cycle Assessment

Even though there is definitely still room to improve and expand the implementation of LCA as part of an environmental LCM approach, I believe the time has come to expand the concept to include the other pillars of sustainability in a more explicit way. This is reflected in our choice of the title of this book "Towards Life Cycle Sustainability Management". Life Cycle Sustainability Management or LCSM is the implementation of life cycle based sustainability assessment or LCSA into real world decision making processes, be it on the product, process or organisation level. In a nutshell, LCSM aims at maximising the triple bottom line (3BL) and is based on LCSA as one key element of a broader toolbox:

$$\text{LCSM} = f(\text{LCSA}) = \max(3\text{BL})$$

This book is a selection of the most relevant contributions to the LCM 2011 conference in Berlin. The Life Cycle Management conference series is established as one of the leading events worldwide in the field of environmental, economic and social sustainability. The unique feature of LCM is practical solutions for the implementation of life cycle approaches into strategic and operational decision-making. The 2011 conference motto "Towards Life Cycle Sustainability Management" was chosen to address and to focus on the implementation challenge of sustainability as outlined above. In total, 414 abstracts representing more than 1100 authors from 47 countries were submitted.

Because of the excellent overall quality of the contributions it was quite a challenge to select the 56 papers for this book. They are structured in nine Parts. The first four Parts focus on the more general, methodological topics. Part I addresses general LCSM approaches that go beyond the more traditional LCM methods and tools which are covered in Part II. Part III deals with water footprinting as specific and emerging topic. LCM applications for processes and organisations are the content of Part IV. The remaining five Parts deal with the implementation of LCM approaches in relevant industrial sectors, namely the agriculture and food sectors (Part V), the packaging sector (Part VI), the energy sector (Part VII), the electronics and ICT sectors (Part VIII) and the mobility sector (Part IX).

The authors of this volume come from 29 countries including Africa, Asia, Europe and the Americas. They represent the developed and the developing world as well as a variety of stakeholders from multinational companies, academia, NGOs to public policy. I am very grateful for their excellent and timely contributions.

In addition to the core contribution of the authors this book was only possible due to the efforts of many colleagues and friends. I am very grateful for the support of the co-chair of the LCM 2011 conference, Stephan Krinke, and all members of the scientific committee: Carina Alles, Emmanuelle Aoustin, Pankaj Bhatia, Clare Broadbent, Andrea Brown Smatlan, Maurizio Cellura, Roland Clift, Mary Ann Curran, Ichiro Daigo, James Fava, Jeppe Frydendal, Pere Fullana, Gerard Gaillard, Mark Goedkoop, Minako Hara, Michael Hauschild, Jens Hesselbach, Arpad Horvath, Atsushi Inaba, Allan Astrup Jensen, Anne Johnson, Juha Kaila, Gregory Keoleian, Henry King, Walter Klöpffer, Annette Koehler, Paolo Masoni, Yasunari Matsuno, Llorenc Mila i Canals, Nils Nissen, Philippa Notten, Erwin Ostermann, Rana Pant, Claus Stig Pedersen, Gerald Rebitzer, Helmut Rechberger, Klaus Ruhland, Günther Seliger, Guido Sonnemann, Nydia Suppen, Ladji Tikana, Sonia Valdivia, Paul Vaughan and Harro von Blottnitz. Their efforts in soliciting and selecting the right mix of contributions were extremely valuable.

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Last, but not least, sincere thanks to my family for their courtesy and patience.

Berlin
Prof. Dr. Matthias Finkbeiner

List of Figures

Chapter 2

Fig. 1: Framework for sustainability stakeholder management in a LCSM context 23

Chapter 3

Fig. 1: Example of a post-it used for the inventory of decision contexts. 29

Chapter 4

Fig. 1: Example assessment questionnaire for LCM capability 39

Chapter 5

Fig. 1: Component relationships and their users 47
Fig. 2: How sustainability performance drivers (SPDs) and indicators create product specific declarations 48

Chapter 8

Fig. 1: Flow chart for the decision maker analysis of an SKF roller bearing 75
Fig. 2: Environmental impacts related to different actors 76
Fig. 3: To left: Distribution of CO_2e emissions for production of one bearing unit (reformulated dominance analysis) - To right: Distribution of CO_2e emissions for manufacturing of one bearing unit at SKF (dominance analysis from the perspective of manufacturing actors at SKF) 77
Fig. 4: System boundaries when relating environmental consequences to an actor's manufacturing processes. 78
Fig. 5: The household's environmental improvement potential to reduce waste, increase transport efficiency, save energy, and buy organic products, in relation to today's environmental life cycle contributions of milk, cheese, and yogurt. 79
Fig. 6: Environmental impacts of actors in the buildings chain depending on their choice. 81

Chapter 9

Fig. 1: Representation of land use impacts due to transformation and Occupation processes 87

Chapter 10

Fig. 1: Material flow cost accounting software prototype 102
Fig. 2: Visualisation of life cycle phases within the flow chart editor 103
Fig. 3: Charts and tables as flow chart editor elements 103

Chapter 11

Fig. 1: Life cycle thinking and assessment - coherence and quality-assurance support for EU SCP/SIP policies 108
Fig. 2: ILCD handbook guidance documents 109
Fig. 3: Scoring system for eligible reviewers/review teams and for qualification as a potential member of a review team 113
Fig. 4: LCA reviewer self-registry application. 114

Chapter 12

Fig. 1: Main steps of the introduction of time in the LCI 124
Fig. 2: Overview of the system of biodiesel production from rapeseed. For the sake of clarity agricultural machines are not described. An example is given for the tractor 126
Fig. 3: Selection of the couples {process, emission} 127

Chapter 13

Fig. 1: Comparison of the cumulative energy requirements for various carbon nanoparticle manufacturing processes [MJ-equivalents/kg material] 136
Fig. 2: Comparison of the cumulative energy requirements for the production of various conventional and nanoscaled materials and components [MJ- equivalents/kg product] 137
Fig. 3: Comparison of the global warming potential for the production of various conventional and nanoscaled materials [CO_2e/kg product] ... 137

Chapter 14

Fig. 1: Life cycle phases of a building 145

Chapter 15

Fig. 1: The WF for iron and steel industry in Japan, China and the U.S. 158
Fig. 2: The WF for a passenger car in Japan, China and the U.S. 158

Chapter 18

Fig. 1: Distribution of global freshwater withdrawals by local water stress index (WSI) 185
Fig. 2: Comparison of water use inventory (L) and water use impact (L H_2O-e) results 185
Fig. 3: Example of farm water balance model 190
Fig. 4: Proposed impact pathway relating land use to human health 190

Chapter 19

Fig. 1: Impact assessment of water use - for midpoint level and endpoint level ... 195
Fig. 2: Process and water use impacts from compensation and on human health from deprivation for the production of 1 ton of corrugated board in the region of Cape Town in South Africa. ... 202

Chapter 20

Fig. 1: The main pillars and structure of the Unilever Sustainable Living Plan ... 208
Fig. 2: Schematic flow showing the step of greenhouse gas baseline measurement process ... 211
Fig. 3: Example of schematic outline of system boundaries for the food Model ... 211
Fig. 4: Greenhouse gas footprint breakdown according to life cycle stages for the Unilever portfolio for 2008 measured in 14 countries, based on approximately 1,600 representative products ... 212
Fig. 5: Greenhouse gas footprint breakdown according to product category for the Unilever portfolio for 2008 measured in 14 countries, based on approximately 1,600 representative products ... 212

Chapter 21

Fig. 1: Proposed sequence of key questions and actions representing best practice for systematic supply chain improvement, classified as prerequisites or one of two strategies ... 225
Fig. 2: Retailer control points (R) for hotspots within the value chain of cotton textiles ... 227

Chapter 22

Fig. 1: Conceptual process map for evaluating and implementing sustainable design solutions (SDS) within WDPR ... 235

Chapter 23

Fig. 1: Number and type of one-day events held at ESCi during the academic years 2008–2009, 2009–2010 and 2010–2011 ... 242
Fig. 2: Waste generation by person and event type ... 243

Chapter 24

Fig. 1: The Hoboken metal refinery system ... 249
Fig. 2: Schematic view on one sub-process ... 253
Fig. 3: Results for material flow data from 2009. ... 255

Chapter 26

Fig. 1: Present waste flow in the study area 269
Fig. 2: Fluctuation of waste quantities in Delhi 270
Fig. 3: System boundary for the present study 273

Chapter 27

Fig. 1: Global warming potential behaviour based on RWH 282
Fig. 2: Relationship between storage volume and RWH. 283
Fig. 3: Proportion of total environmental impacts and contribution of the systems urban for $15m^3 \cdot built^{-1}$ storage volume and 11,856 $m^3 \cdot year^{-1}$ of RWH potential 284
Fig. 4: Proportion of total environmental impacts and contribution of the systems urban for $85m^3 \cdot built^{-1}$ storage volume and 3,806 $m^3 \cdot year^{-1}$ of RWH potential 285
Fig. 5: Relationship between storage volume and GWP (100a) of household water consumption 286

Chapter 28

Fig. 1: Energy demand per ha UAA (utilised agricultural area) for different farm types 295
Fig. 2: Environmental profiles for the 3 functions land management, productive function and financial function for different farm types 297

Chapter 29

Fig. 1: Nitrogen losses and associated environmental impacts (plain lines: direct emissions, dashed lines: indirect emissions) 302
Fig. 2: Distribution of NH_3 and N_2O emissions expressed as relative factors of band spreading emissions 304
Fig. 3: Architecture of the simulation model OSEEP 305
Fig. 4: Distribution of NH_3 emissions for the slurry application techniques 306
Fig. 5: Simulated density functions and ranges of relative factors calculated from the literature review for NH_3 and N_2O 306

Chapter 30

Fig. 1: Worldwide means of the global warming potential per ha and growing season of 27 crops weighted by production volumes, showing the season of 27 crops weighted by production volumes, showing the contribution of the modules and the potential effects of deforestation. 312
Fig. 2: Worldwide means of the global warming potential per kg product of 27 crops weighted by production volumes, showing the contribution of the modules and the potential effects of deforestation. 313

Fig. 3: Worldwide means of GWPs of 27 crops per ha weighted by production volumes and per kg as a function of the yield. 314
Fig. 4: Global warming potential of wheat per ha and per kg as a function of the yield for all producing countries with a share >0.1% of the worldwide production volume. 315
Fig. 5: Global warming potential of pea per ha and per kg as a function of the yield for all producing countries with a share >0.1% of the worldwide production volume. 316

Chapter 31

Fig. 1: Nitrogen demand from the Catalan horticulture sector 323
Fig. 2: Nitrogen offer from the two wastes. (a) Potential nitrogen available the first year from OFMSW composted. (b) Potential nitrogen available from ground water irrigation 324
Fig. 3: Balance of nitrogen for the eco-synergy scenario 325
Fig. 4: Contribution of the three sources of nutrients to the total demand of nutrients of Catalan horticulture sector in the eco-synergy scenario 326
Fig. 5: Global warming savings for the eco-synergy scenario 327

Chapter 32

Fig. 1: Difference in mean CO_2 emissions between direct seeding and transplanting 337

Chapter 33

Fig. 1: System boundary and modelling of the apple production phase. Dotted box refers to processes that differ according to the three scenarios 343
Fig. 2: Schematic description of transport channels for the considered supply chains 344
Fig. 3: Hotspot analysis for the three supply chains 345
Fig. 4: Normalised impact assessment for 1 kg of Golden Delicious produced in Piedmont, at the end of three main supply chain scenarios 346
Fig. 5: Weighted results (EDIP method 1997) presented as the sum of the weighted personal equivalent (PE) for each investigated supply chain A, B and C 346

Chapter 34

Fig. 1: Exemplary questionnaire sheet 351
Fig. 2: Point-of-purchase (POP) advertising tool 353
Fig. 3: Willingness to pay for the pork produced with feed made from food residuals 355

Chapter 35

Fig. 1: The carbon footprint of ham system divided in four phases: Waste management, packaging production, production chain of ham and unnecessary production of ham due household waste 364
Fig. 2: The share of package production, production chain of product loss and waste management of the carbon footprint of dark bread packaging system, other parts of production chain of bread excluded. 366
Fig. 3: The share of package production, production chain of product loss and waste management of the carbon footprint of ham packaging system, other parts of production chain of ham excluded 366
Fig. 4: The product loss, package production chain and waste management in different waste management scenarios in soygurt-case 367

Chapter 36

Fig. 1: Energy usage required in the manufacture of 16oz. hot cups 375
Fig. 2: Air emissions generated in the manufacture of 16oz. hot cups 375
Fig. 3: Waterborne emissions generated in the manufacture of 16oz. hot cups 376
Fig. 4: Greenhouse gas emissions generated in the manufacture of 16oz. hot cups 377
Fig. 5: Solid waste (by weight) for 16oz. hot cups 377
Fig. 6: Solid waste (by volume) for 16oz. hot cups 378

Chapter 37

Fig. 1: System boundary for the beverage packaging 383
Fig. 2: Carbon footprint of milk packaging 386
Fig. 3: Carbon footprint of juice packaging 387
Fig. 4: Carbon footprint of water packaging 388
Fig. 5: Carbon footprint of beer and wine packaging 388

Chapter 38

Fig. 1: EU 27 recycling rates in 2008 for different packaging materials 393
Fig. 2: Evolution of EU 27 recycling rates and equivalent reduction in indice of CO_2 emissions (from 1991 to 2008) 394
Fig. 3: Development of weights of some standard steel packing in Europe 395
Fig. 4: Development of CO_2 emissions of some standard steel packing in Europe 395

Chapter 39

Fig. 1: Schematic diagram of assessment flow on human health damage due to domestic water scarcity 401
Fig. 2: Schematic diagram of assessment flow on human health damage due to agricultural water scarcity 402

Fig. 3: Distribution map of integrated damage factors of each country 404
Fig. 4: The rate of damage on each endpoint for countries with the high-ranking rate of human health damage due to domestic water scarcity ... 404
Fig. 5: The rate of damage on each endpoint for countries with the high-ranking rate of social asset damage due to agricultural water scarcity ... 405
Fig. 6: System boundary of the assessment 406
Fig. 7: The input amount of freshwater in each life stage 407
Fig. 8: The amount of consumptive water in each stage of both systems with advanced and conventional filling technologies 407
Fig. 9: The contribution rates of each category to total environmental impact related to PET bottle production system with advanced filling technology in representative countries 408
Fig. 10: Distribution map of the contribution rate of freshwater savings by introducing advanced technology to the total environmental impact in each country 409

Chapter 40

Fig. 1: Location of four pilot studies with different feedstocks for biomass energy 419

Chapter 42

Fig. 1: Diagram of the production of biodiesel from *Nannochloropsis gaditana*.... 439
Fig. 2: GHG emissions of processes for biodiesel production from Microalgae 440
Fig. 3: Energy consumption and NER values of processes for biodiesel production from microalgae 441

Chapter 43

Fig. 1: Comparison of MAEs for different estimators 447

Chapter 44

Fig. 1: Forest sector mitigation strategies need to be assessed with regard to their impacts on carbon storage in forest ecosystems on sustainable harvest rates and on net GHG emissions across all sectors 454
Fig. 2: Life-cycle greenhouse gas emission of wooden and concrete house 456

Chapter 45

Fig. 1: Cost of electricity generation for energy resources per 1 kWh 462
Fig. 2: GHG emission of electricity generation for energy resources per 1 k Wh .. 462
Fig. 3: GHG emissions, cost, error bar of electricity generation for energy resources and correlation between GHG emissions and cost 464

Chapter 46

Fig. 1: System limits of Coal-to-MeOH route 474
Fig. 2: GHG emissions for 5 CTY products 476
Fig. 3: Methanol from coal vs. conventional fuels 478

Chapter 47

Fig. 1: Standardised result for ICT Equipment: laptops 489
Fig. 2: Standardised result for ICT networks: FTTH 490
Fig. 3: Standardised result for ICT Services: Video conferences 491

Chapter 48

Fig. 1: Dell OptiPlex 780 desktops; Mini Tower is at far left 496
Fig. 2: Total product carbon footprint [kg CO_2e] of the OptiPlex 780 Mini Tower in the US, Europe and Australia 498

Chapter 49

Fig. 1: Global warming potential (GWP) of laptops in the manufacturing stage 502

Chapter 50

Fig. 1: Comparison of LCA/LCC results for different variants of the analysed refrigerator 521

Chapter 51

Fig. 1: Comparative environmental impact assessment between R-404a and CO_2-based ice-cream machines 529

Chapter 52

Fig. 1: Global warming potential of the production and use of EVs and CVs ... 538
Fig. 2: Acidification potential of the production and use of EVs and CVs 539
Fig. 3: GWP of the production and use of EVs and CVs (scenario 2020) 541
Fig. 4: AP of the production and use of EVs and CVs (scenario 2020) 541
Fig. 5: GWP of a mini-class BEV in city use, low mileage 543
Fig. 6: GWP of a mini-class BEV in city use, high mileage 543

Chapter 53

Fig. 1: Mapping of countries according to the HDI and EPI (ecosystem vitality) indexes 549
Fig. 2: LCA communication strategy wheel for each “eco-maturity” level 554

Chapter 54

Fig. 1: Process design for environment and brochure environmental certificate 558
Fig. 2: Comparison of carbon dioxide emissions - S 400 HYBRID vs. S 350 [t/car] 560
Fig. 3: Comparison of selected parameters for the S 400 HYBRID and S 350 561
Fig. 4: Comparison of selected material and energy sources [unit/car] 562
Fig. 5: Recycling concept of the S 400 HYBRID 563
Fig. 6: Use of recycled materials in the S-Class 564
Fig. 7: Use of renewable raw materials in the S-Class 565

Chapter 55

Fig. 1: Environmental strategy Volkswagen Group 569
Fig. 2: Environmental management at Volkswagen 570
Fig. 3: Lightweight design and environmental break-even 574
Fig. 4: Environmentally friendly lightweight design, aspects and measures 575
Fig. 5: Well-to-Wheel analysis of power trains and fuel options 576

Chapter 56

Fig. 1: Material composition of the studied train based on production and maintenance 582
Fig. 2: Comparison of emissions of CO_2e for different modes of transport 585
Fig. 3: Contribution of life cycle phases to POCP for the studied train 585

List of Tables

Chapter 1

Tab. 1: Social sustainability indicators used in the case application and final scores. 8

Chapter 3

Tab. 1: Participants of stakeholder consultation process on the AoP resource 28
Tab. 2: Results of decision contexts 29

Chapter 4

Tab. 1: Results for literature search on key words (number of citations) 36
Tab. 2: LCM capability maturity model 37

Chapter 6

Tab. 1: Top ten sectors by worker hours (WH) for total, skilled, and unskilled workforce for the production of orange juice (OJ) in the United States (XAC = South Central Africa Region) 58
Tab. 2: Highest exporting countries for the materials used in orange juice production 59
Tab. 3: Country-specific sectors (CSS) most at risk for social hotspots to be present based on the supply chain of orange juice 60

Chapter 7

Tab. 1: Original political targets and the comparable targets after adjustment 67
Tab. 2: Primary dataset of three processes and data sources 68
Tab. 3: LCI/LCIA results and ECER score 69
Tab. 4: Contribution analysis of three processes in terms of ECER score 69
Tab. 5: Normalised weighting factors of the three methods for Chinese ECER targets 71

Chapter 9

Tab. 1: Impacts of marine activities on marine ecosystem layers 92

Chapter 10

Tab. 1: Dictionary within the meta data repository 101

Chapter 11

Tab. 1: Example for minimum review requirements of each LCA work for ILCD system based on stakeholder involvement, and technical knowledge of the audience 111
Tab. 2: Draft overview of methods used for review 115

Chapter 12

Tab. 1: Time scales associated with the impacts 123
Tab. 2: Materials fluxes required to construct the agricultural machines 125
Tab. 3: Results 128

Chapter 13

Tab. 1: Overview of studies of published LCAs of the manufacture of nanoparticles and nanocomponents 133

Chapter 15

Tab. 1: Comparison of data sources and estimation methods in the three countries 157
Tab. 2: The WF for crude steel and the amount of crude steel production in Japan and China 159
Tab. 3: Total amount of water withdrawal for upstream life cycle until producing crude steel in Japan and China 159

Chapter 16

Tab. 1: Water footprint of irrigated wheat in Mexico (period: 2004–2009) 166
Tab. 2: Studies on water footprint of wheat in Mexico 167

Chapter 17

Tab. 1: Water footprint in Lagos and Ilesa breweries 175
Tab. 2: Water footprint in Ama and Ibadan Plants of Nigeria Breweries Plc 175
Tab. 3: Beer losses during production in Lagos NB Plc and Ilesa Breweries Plc 176
Tab. 4: Beer losses during production in Ama and Ibadan NB Breweries Plc 177
Tab. 5: Potential economic savings at Lagos and Ilesa breweries 177
Tab. 6: Potential economic savings at Ama and Ibadan breweries 177
Tab. 7: The average water, electricity and black oil consumption in the breweries 179

Chapter 18

Tab. 1: Water balance (kg per day) for a 1 year-old steer in Bathurst (33°25’ S, 149°34’ E) in July (winter) compared to Walgett (30°1’ S, 148°7’ E) in January (summer) 187
Tab. 2: Variation in area of rice and cotton under irrigation in Australia (‘000 ha) 188

Chapter 19

Tab. 1: Water category sample 195
Tab. 2: Midpoint indexes (m^3-eq./m^3 water withdrawn/released) and resulting water stress indicators (WSI, in m^3-eq) for a process withdrawing 100 m^3 of water type S2a and releasing 80m^3 of water S3, in different regions 201

Chapter 21

Tab. 1: Proposed classification of widely recognised third party environment-related standards commonly applied to products 220
Tab. 2: Front-runner retailer performance across priority food product groups 222
Tab. 3: Front-runner retailer performance across priority non-food product groups 224

Chapter 23

Tab. 1: Assumptions and empirical data collected per event type 242

Chapter 24

Tab. 1: Metals processed at Hoboken and grade of the product leaving the plant 250

Chapter 25

Tab. 1: Main chemical loads associated to BK cellulose production in Chile 264
Tab. 2: Main environmental loads of BK cellulose production in Chile 265

Chapter 26

Tab. 1: Source wise generation of the MSW (tonnes/day) in Delhi 270
Tab. 2: Solid waste composition of Delhi (in %) 270
Tab. 3: Details of existing composting plants in Delhi 271
Tab. 4: Emissions for ISWM 274

Chapter 27

Tab. 1: Population, domestic water consumption and general climatic data for the selected urban areas 279
Tab. 2: Estimated parameters of exponential model for each urban area 282
Tab. 3: Potential environmental impacts of the RWH system in each urban area and storage volume of 85m^3 284
Tab. 4: Tap water potential environmental impacts avoid 284

Chapter 28

Tab. 1: Overview of the input groups and the emissions related to them. 293
Tab. 2: Identified spheres of action for the different farm types 298

Chapter 30

Tab. 1: Overview of the modules of MEXALCA 311

Chapter 32

Tab. 1: Example sources of uncertainty in the simplified LCA of rice 334
Tab. 2: Correlation coefficients between production size and environmental impacts 335
Tab. 3: Differences between direct seeding and transplanting 336
Tab. 4: Percentage of CO_2 emissions from foreground and background processes 337

Chapter 34

Tab. 1: Attributes and standards of conjoint analysis 352
Tab. 2: Estimation result of conjoint analysis 354

Chapter 35

Tab. 1: The packaging alternatives of the case studies 362
Tab. 2: Waste management scenarios of the project 363
Tab. 3: The contribution of packaging production, waste management and product loss off the investigated products for the carbon footprint of system (incl. variation between different WM scenarios). 365

Chapter 36

Tab. 1: Summary comparison of environmental effects of 16oz. hot cups 378

Chapter 37

Tab. 1: Characteristics of milk packaging 384
Tab. 2: Characteristics of juice packaging 384
Tab. 3: Characteristics of water packaging 384
Tab. 4: Characteristics of beer and wine packaging 385

Chapter 38

Tab. 1: EU 27 recycling rates 394

Chapter 40

Tab. 1: Calculation of HDI 419

Chapter 41

Tab. 1: Main environmental aspects of the life-cycle inventory for the production of physic nut grains – inputs 433
Tab. 2: Main environmental aspects of the life-cycle inventory for the production of physic nut grains – outputs 435

Chapter 43

Tab. 1: System characteristics ... 445
Tab. 2: Properties of the kriging estimator ... 445

Chapter 45

Tab. 1: Summary of life cycle GHG emissions (g CO_2e/kWh) for electricity generation for energy resources ... 463
Tab. 2: Summary of life cycle cost (US cent/kWh) for electricity generation for energy resources ... 463

Chapter 46

Tab. 1: CTY products, LHVs and main applications ... 473
Tab. 2: Fresh water and primary energy consumption for 5 CTY products ... 477
Tab. 3: Preliminary ranking system ... 477

Chapter 47

Tab. 1: Example of LCA results for two laptops ... 486
Tab. 2: Example of LCA results for two FTTH networks ... 487
Tab. 3: Example of LCA results for three video conference LCAs ... 488

Chapter 49

Tab. 1: Silicon wafer, front-end and back-end production per region ... 504
Tab. 2: Direct energy and material inputs and output of front-end process referring to 1 cm^2 good die out ... 506
Tab. 3: Overview on the energy demand of back-end process in different sources ... 507
Tab. 4: Advantage and disadvantage of different reference units ... 509

Chapter 50

Tab. 1: LCM results presentation matrix ... 517
Tab. 2: LCA results of analysed refrigerator variants ... 519
Tab. 3: LCC results of analysed refrigerator variants ... 519
Tab. 4: Life cycle analysis results for variant 2 ... 519

Tab. 5: Life cycle analysis results for variant 3 ... 520
Tab. 6: Life cycle analysis results for variant 4 ... 520

Chapter 51

Tab. 1: Global warming potential and ozone depletion potential of main refrigerants ... 524
Tab. 2: Applicability of natural refrigerants to refrigerating and freezing equipments. ... 526