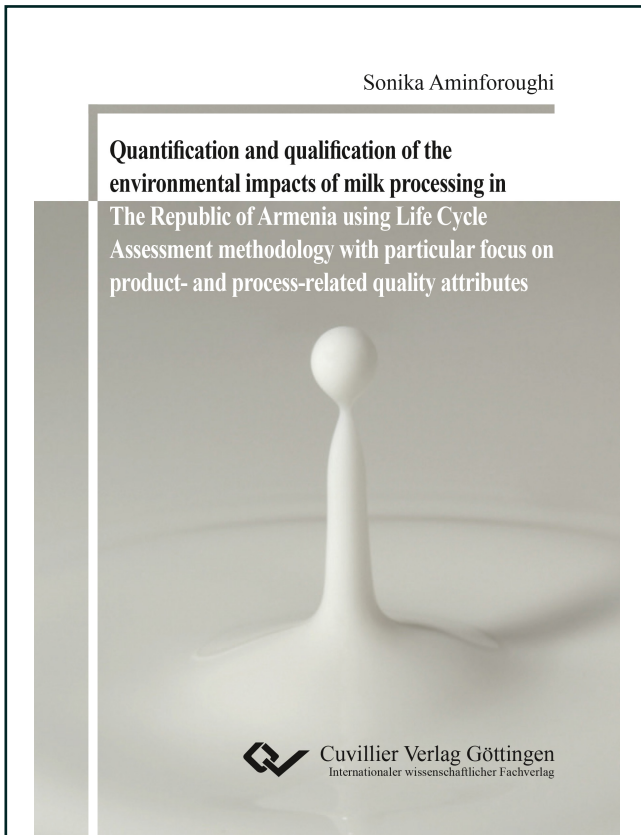




Sonika Aminforoughi (Autor)

Quantification and qualification of the environmental impacts of milk processing in The Republic of Armenia using Life Cycle Assessment methodology with particular focus on product- and process-related quality attributes



<https://cuvillier.de/de/shop/publications/6914>

Copyright:

Cuvillier Verlag, Inhaberin Annette Jentzsch-Cuvillier, Nonnenstieg 8, 37075 Göttingen, Germany

Telefon: +49 (0)551 54724-0, E-Mail: info@cuvillier.de, Website: <https://cuvillier.de>

Contents

Acknowledgements	VII
Foreword	IX
Contents	XI
List of Tables	XIV
List of Figures	XV
List of Appendices	XVI
Abbreviations and acronyms	XVII
Executive summary	XX
Kurzfassung	XXI
1 Introduction	1
1.1 Statement of the problem	2
1.1.1 General introduction to global climate change	2
1.1.2 Armenia: national, political, and environmental situation	4
1.2 Aim, purpose, and motivation	9
2 Basics	11
2.1 The concept of Life Cycle Assessment according to ISO	11
2.1.1 Background	11
2.1.2 Life Cycle Thinking	11
2.1.3 General introduction and principles of Life Cycle Assessment	12
2.1.3.1 Unit process, product system and product life cycle	13
2.2 Goal and scope definition	14
2.2.1 Goal of a Life Cycle Assessment	14
2.2.2 Scope of a Life Cycle Assessment	15
2.2.2.1 The product system and its function	15
2.2.2.2 System boundary	15
2.2.2.2.1 General	15
2.2.2.2.2 Technological system boundaries	17
2.2.2.2.3 Geographical system boundaries	18
2.2.2.2.4 Temporal system boundaries	19
2.2.2.3 Functional unit	19
2.2.2.4 Impact categories and methodology of LCIA	20
2.2.2.5 Data requirements	20



2.3	Life Cycle Inventory.....	20
2.3.1	General.....	20
2.3.2	Process flow diagram.....	21
2.3.3	Data collection.....	22
2.3.3.1	Primary, foreground, or non-generic data	23
2.3.3.2	Secondary, background, or generic data.....	23
2.3.3.3	Estimated data	23
2.3.4	Allocation procedure	23
2.3.5	Allocation procedure for occurrence of co-products	24
2.3.6	Allocation procedure for waste recycling systems	25
2.3.6.1	Allocation procedure for closed-loop recycling systems	25
2.3.6.2	Allocation procedure for open-loop recycling systems.....	25
2.3.7	Allocation procedure for waste disposal systems.....	26
2.4	Life Cycle Impact Assessment	27
2.4.1	General.....	27
2.4.2	Mandatory elements of the Life Cycle Impact Assessment	28
2.4.2.1	Selection of impact categories and category indicators.....	28
2.4.2.2	Classification	29
2.4.2.3	Characterization.....	29
2.4.3	Optional elements of the Life Cycle Impact Assessment.....	29
2.4.3.1	Normalization	29
2.4.3.2	Grouping.....	30
2.4.3.3	Weighting	30
2.4.3.4	Data quality analysis.....	31
2.4.3.4.1	Gravity analysis	31
2.4.3.4.2	Uncertainty analysis	31
2.4.3.4.3	Sensitivity analysis	31
2.5	Life cycle interpretation	32
2.5.1	General.....	32
2.5.2	Completeness check	32
2.5.3	Sensitivity check.....	32
2.5.4	Consistency check	33
2.5.5	Contribution analysis.....	33
2.5.6	Perturbation analysis.....	34
2.5.7	Uncertainty analysis	34

2.5.8 Comparative analysis.....	34
2.5.9 Discernibility analysis	34
2.6 Critical Review	35
2.7 State of the scientific knowledge and Literature frameworks	36
3 Research material and methodologies	39
3.1 Research site	39
3.2 Definition of the goal and scope of the study	41
3.2.1 Goal of the study.....	41
3.2.2 Scope of the study.....	41
3.2.2.1 Characteristics of the system under assessment	42
3.2.2.2 Products under assessment and their functional units	44
3.2.2.3 Data collection.....	45
3.2.2.4 Limitations and assumptions	45
3.2.2.4.1 Limitations.....	45
3.2.2.4.2 Assumptions	46
3.3 Life Cycle Inventory.....	46
3.3.1 Activity process flow diagram.....	51
3.3.2 Technical process flow diagram.....	58
3.3.3 Allocation procedure	61
3.4 Methodology of the Life Cycle Impact Assessment	62
4 Results.....	65
4.1 Inventory results	65
4.2 Characterization results	71
4.3 Normalization results.....	81
4.4 Results of the contribution analysis.....	85
4.5 Results of the sensitivity analysis.....	94
5 Discussions.....	99
6 Conclusions	113
References	117
Appendices	131