



Table of contents

Table of contents.....	vii
Acknowledgements	xi
List of abbreviations	xv
Summary.....	xix
Zusammenfassung.....	xxi
Chapter 1 General introduction	1
1.1 Urbanization and urban and peri-urban agriculture.....	2
1.2 Urbanization, urban and peri-urban agriculture: Indian scenarios	3
1.3 Urbanization in Mumbai Metropolitan Region	5
1.4 Urban and peri-urban agriculture in Mumbai Metropolitan Region.....	6
1.5 Urban and peri-urban soils	6
1.6 Research objectives and hypotheses	7
1.7 References	8
Chapter 2 Urban and peri-urban agricultural production in the Mumbai Metropolitan Region (MMR): recent trends and opportunities.....	17
Abstract	18
2.1 Introduction	19
2.2 Materials and Methods	20
2.2.1 Study area.....	20
2.2.2 Climatic conditions	20
2.2.3 Soil and land use.....	20
2.2.4 Survey design and data collection.....	22
2.2.5 Statistical analysis.....	24
2.3 Results.....	24
2.3.1 UPA production systems.....	24
2.3.2 Household classification, structure and level of education	24
2.3.3 Migration pattern and UPA production experience.....	32
2.3.4 Income sources.....	32



2.3.5 Land tenure	32
2.3.6 Livestock	33
2.3.7 Pesticide and fertilizer usage	33
2.3.8 Labor patterns and investments in UPA production	35
2.3.9 Marketing channels and problems in UPA production.....	37
2.3.10 Water usage.....	37
2.4 Discussion	37
2.5 Conclusions	40
2.6 References	40
Chapter 3 Heavy metal signatures in urban and peri-urban agricultural production: comparison between railway gardens and farms across the Mumbai Metropolitan Region, India	45
Abstract	46
3.1 Introduction	47
3.2 Materials and Methods	48
3.2.1 Study area.....	48
3.2.2 Site description, soil profile sampling and characterization	49
3.2.3 Data analyses	56
3.2.4 Statistical analysis.....	58
3.3 Results.....	58
3.3.1 General soil properties	58
3.3.2 Elemental and heavy metal signatures	58
3.4 Discussion	71
3.5 Conclusions	74
3.6 References	74
Chapter 4 General discussion and conclusions	83
4.1. General overview of the study approach	84
4.2. Characterization of the UPA systems in MMR.....	84
4.3. Heavy metal signatures in UPA soils of MMR	85
4.4. Health risks associated with heavy metals	86
4.5. Good practices in urban and peri-urban agriculture.....	87
4.6. General conclusions	88



4.7. References	89
Curriculum Vitae.....	95
Affidavit	98