

Contents

Preface — VII

Aknowledgments — IX

Albert Kobina Mensah

Chapter 1

Evolution of land reclamation practices and introducing mine land degradation and revegetation in Ghana — 1

Albert Kobina Mensah

Chapter 2

Methods used in soil and human health risk assessment — 29

Albert Kobina Mensah

Chapter 3

Identifying risks using sequential extraction analyses, size fractionation, and acid neutralization capacity experiments — 49

Albert Kobina Mensah

Chapter 4

Risk identification using remediation incubation experiments, redox microcosm, geospatial analyses, and synchrotron radiation science — 67

Albert Kobina Mensah

Chapter 5

Impacts of mining on soil quality — 83

Albert Kobina Mensah

Chapter 6

Topsoil and its management during stockpiling — 93

Albert Kobina Mensah

Chapter 7

Effects of mining on the accumulation and pollution with potentially toxic elements — 101

Albert Kobina Mensah, Emmanuel Amoakwah,
and Ephraim Sekyi-Annan

Chapter 8

The power of plants in cleaning and stabilising potentially toxic elements in mine-contaminated soils — 111

Albert Kobina Mensah

Chapter 9

Achieving mining sector sustainability — 143

Albert Kobina Mensah

Chapter 10

Rehabilitation and restoration of degraded mined sites and soils — 159

Reginald Tang Guuroh and Albert Kobina Mensah

Chapter 11

Case studies in mine land revegetation and remediation employing various approaches — 171

Albert Kobina Mensah

Chapter 12

Plant species used in revegetation and their corresponding impacts — 189

Albert Kobina Mensah

Chapter 13

Concurrent rehabilitation/revegetation — 203

Albert Kobina Mensah, Bernd Marschner, Sabry M. Shaheen,
and Joerg Rinklebe

Chapter 14

Arsenic in a highly contaminated gold mine spoil in Ghana: mobilization and potential of soil amendments to reduce the water-soluble arsenic content and improve soil quality — 217

Jewel Andoh and Albert Kobina Mensah

Chapter 15

Significance of revegetation of degraded mining sites — 239

Albert Kobina Mensah

Chapter 16

Measuring and monitoring success of post-reclamation efforts — 259

Prince Addai and Albert Kobina Mensah

Chapter 17

Critical factors for driving successful restoration of degraded mine lands — 273

Emmanuel Dugan and Albert Kobina Mensah

Chapter 18

Management of restored mine sites — 291

Joshua Aggrey and Albert Kobina Mensah

Chapter 19

The challenges and strategies for post-mine land restoration efforts in Ghana — 301

Ferdinand Adu-Baffour, Thomas Daum, Albert Kobina Mensah, Konrad Martin, Akwasi Duah-Gyamfi, Frank Rasche, and Regina Birner

Chapter 20

A best-fit conceptual framework to enhance phytoremediation scaling — 315

Albert Kobina Mensah

Chapter 21

Phytostabilization of Co, Hg, Mo, and Ni by ryegrass with manure and iron oxides reduced environmental concerns — 335

Orlando Boafo and Albert Kobina Mensah

Chapter 22

Identifying research gaps for future reclamation studies — 363

Albert Kobina Mensah

Chapter 23

General conclusions and summaries — 373

References — 385

Index — 447