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**Economics of Land Degradation and Improvement - A Global Assessment for Sustainable Development** - Ephraim Nkonya  
2016-08-23

This volume deals with land degradation, which

is occurring in almost all terrestrial biomes and agro-ecologies, in both low and high income countries and is stretching to about 30% of the total global land area. About three billion people reside in these degraded lands. However, the

impact of land degradation is especially severe on livelihoods of the poor who heavily depend on natural resources. The annual global cost of land degradation due to land use and cover change (LUCC) and lower cropland and rangeland productivity is estimated to be about 300 billion USD. Sub-Saharan Africa (SSA) accounts for the largest share (22%) of the total global cost of land degradation. Only about 38% of the cost of land degradation due to LUCC - which accounts for 78% of the US\$300 billion loss - is borne by land users and the remaining share (62%) is borne by consumers of ecosystem services off the farm. The results in this volume indicate that reversing land degradation trends makes both economic sense, and has multiple social and environmental benefits. On average, one US dollar investment into restoration of degraded land returns five US dollars. The findings of the country case studies call for increased investments into the rehabilitation and restoration of degraded lands, including through

such institutional and policy measures as strengthening community participation for sustainable land management, enhancing government effectiveness and rule of law, improving access to markets and rural services, and securing land tenure. The assessment in this volume has been conducted at a time when there is an elevated interest in private land investments and when global efforts to achieve sustainable development objectives have intensified. In this regard, the results of this volume can contribute significantly to the ongoing policy debate and efforts to design strategies for achieving sustainable development goals and related efforts to address land degradation and halt biodiversity loss.

*Soil Carbon Sequestration and the Greenhouse Effect* - R. Lal 2009

This book is about the concept of the Greenhouse Effect is more than a century old, but today the observed and predicted climate changes. This second edition of Soil Carbon

Sequestration and the Greenhouse Effect is essential reading for understanding the processes, properties, and practices affecting the soil carbon pool and its dynamics.

*International Seminar on Coal Science & Technology* - 2005

**Traditional Forest-Related Knowledge** - John A. Parrotta 2011-10-14

Exploring a topic of vital and ongoing importance, *Traditional Forest Knowledge* examines the history, current status and trends in the development and application of traditional forest knowledge by local and indigenous communities worldwide. It considers the interplay between traditional beliefs and practices and formal forest science and interrogates the often uneasy relationship between these different knowledge systems. The contents also highlight efforts to conserve and promote traditional forest management practices that balance the environmental,

economic and social objectives of forest management. It places these efforts in the context of recent trends towards the devolution of forest management authority in many parts of the world. The book includes regional chapters covering North America, South America, Africa, Europe, Asia and the Australia-Pacific region. As well as relating the general factors mentioned above to these specific areas, these chapters cover issues of special regional significance, such as the importance of traditional knowledge and practices for food security, economic development and cultural identity. Other chapters examine topics ranging from key policy issues to the significant programs of regional and international organisations, and from research ethics and best practices for scientific study of traditional knowledge to the adaptation of traditional forest knowledge to climate change and globalisation.

**Chemistry of Phytopotentials: Health, Energy and Environmental Perspectives** - LD

Khemani 2011-12-02

Since the beginning of human civilization, plants have been our true companions. Plants contribute not only to our existence but also serve us through discovery, design and the treatment of various diseases where there is no satisfactory cure in modern medicine. This has focused Natural Product Chemists to unravel plants therapeutic potential in the light of modern analytical and pharmacological understandings. Presence of multiple active phytochemicals in medicinal plants offers exciting opportunity for the development of novel therapeutics, providing scientific justification for their use in traditional medicines. Non-food plants have been recognized as biofactories for the production of eco-friendly value added materials including agricultural, food products, enzymes, nutraceuticals etc. They have also been widely explored for personal care, industrial products and sources of energy generation. The proven

efficacy of botanicals has been appreciated by the scientific community and strengthened plant-human relationship. The synergism in the Phytoproducts, the result of the interaction of two or more moieties, is not simply additive but multiplicative. Recent acceptance of the Food and Drug Administration (US) for herbal-medicine based preparation has renewed interest in Natural Product Research. The year 2011 is declared as the International Year of Chemistry (IYC 2011) by the United Nations Assembly. On this occasion, the present conference CPHEE 2011 aims to offer chemists from diverse areas to come to a common platform to share the knowledge and unveil the chemistry and magic potentials of phytoproducts for the mankind.

**Land Restoration** - Ilan Chabay 2015-10-08  
Land Restoration: Reclaiming Landscapes for a Sustainable Future provides a holistic overview of land degradation and restoration in that it addresses the issue of land restoration from the

scientific and practical development points of view. Furthermore, the breadth of chapter topics and contributors cover the topic and a wealth of connected issues, such as security, development, and environmental issues. The use of graphics and extensive references to case studies also make the work accessible and encourage it to be used for reference, but also in active field-work planning. Land Restoration: Reclaiming Landscapes for a Sustainable Future brings together practitioners from NGOs, academia, governments, and the United Nations Convention to Combat Desertification (UNCCD) to exchange lessons to enrich the academic understanding of these issues and the solution sets available. Provides accessible information about the science behind land degradation and restoration for those who do not directly engage with the science allowing full access to the issue at hand. Includes practical on-the-ground examples garnered from diverse areas, such as the Sahel, Southeast Asia, and the U.S.A.

Provides practical tools for designing and implementing restoration/re-greening processes. Diversification of Arid Farming Systems - P. Narain 2009-04-01

Over the years, economic considerations have overtaken the sustainability issue. Low and erratic rainfall, frequent droughts, the increasing costs of cultivation, lower compensation of labour and inputs have made farming in the arid regions a challenging enterprise. Employment opportunities in sectors other than agriculture have enticed many to cross the floor. The largest segment of the farming community, however, is constrained to make a living from farm related activities. With the opening of markets for international trade in farm commodities, the competition has toughened for the resource-constrained farmers of the arid regions of the country. On the other hand, useful technologies have been generated by researchers on many alternative systems, which could be adopted. In this scenario, the

farmers could benefit greatly by inducing diversification in the farming systems and by strengthening the traditional systems. With this backdrop, a National Symposium on Livelihood Security and Diversified Farming Systems in Arid Region was organized by the Arid Zone Research Association of India at the Central Arid Zone Research Institute, Jodhpur, from January 14-16, 2006. Selected papers presented at the symposium and invited articles have been included in this compendium and are grouped in sections on Diversification, Strengthening the Traditional Farming Systems, Enhancing Resource Use Efficiency, Livestock-based Farming Systems, Value Addition, Socio-economic Issues and Transfer of Technology. Currently, food, water and energy crises are of global concern. The challenge ahead is to strike a balance between basic needs of a large population and to maintain the pace of development. Diversification of farming systems may contribute towards achieving this goal to

some extent. It is hoped that the book will provide options for diversification of the existing farming systems and benefit there from.

**Garhwal Himalaya** - G. S. Rajwar 1993

Rehabilitation and Restoration of Degraded Forests - Dr. David Lamb 2003-01-01

Large areas of the world's forests have been lost or degraded and landscapes everywhere are being simplified by current land-use practices. In this publication, Lamb and Gilmour present approaches to restoring and rehabilitating the vast areas of degraded, fragmented and modified forests which cover much of the world. They argue that by applying best practice at the site level it is possible to enhance socio-economic and ecological gains at the landscape level. This book provides an important contribution towards the objectives of the Forest Landscape Restoration approach and is essential reading for practitioners and decision makers involved in forest restoration.

*Restoration Priorities and Strategies* - Dagmar Hagen 2016

**Environmental Biotechnology** - C. S. K. Mishra 2007

*Elements of Biotechnology* - P. K. Gupta 1994

**Ecological Restoration Strategies for Mining Areas of Gujarat** - 1997

*Ecology, Environmental Science & Conservation* - Singh J.S., Singh S.P. & Gupta S.R. 2014

Over the years, the scope of our scientific understanding and technical skills in ecology and environmental science have widened significantly, with increasingly greater emphasis on societal issues. In this book, an attempt has been made to give basic concepts of ecology, environmental science and various aspects of natural resource conservation. The topics covered primarily deal with environmental

factors affecting organisms, adaptations, biogeography, ecology of species populations and species interactions, biotic communities and ecosystems, environmental pollution, stresses caused by toxics, global environmental change, exotic species invasion, conservation of biodiversity, ecological restoration, impact assessment, application of remote sensing and geographical information system for analysis and management of natural resources, and approaches of ecological economics. The main issues have been discussed within the framework of sustainability, considering humans as part of ecosystems, and recognising that sustainable development requires integration of ecology with social sciences for policy formulation and implementation.

**Environment at Crossroads Challenges and Green Solutions** - Arun Arya 2020-07-17

The global environment has significantly changed due to a number of factors such as industrial pollution, expansion of agricultural

land way beyond the fringe forest zones, destruction of virgin forests, loss of quality agricultural lands due to soil erosion, loss of global wildlife and biodiversity, climate change, global warming, devastating forest fires, floods, draughts, melting of glaciers to mention a few. Human or anthropogenic impacts are in turn devastating the planet with our attention being shifted only to the shining aspect of our civilizations. The most alarming fact about this hidden factor is that they are all directly or indirectly impacted by human activities in some way or other. The present work, *Environment at Crossroads* deals with various environmental problems like climate change, global warming, food security, bioremediation of waste, oil spills, and problems of heavy metal toxicity, control strategies like use of gene therapy, conservation of mangroves, revival of river Vishwamitri and role of plant and animals in biodiversity conservation is discussed.

Tropical Ecology - 2006

*Recent Technologies for Disaster Management and Risk Reduction* - Praveen Kumar Rai  
2021-08-21

This book explains to governments, decision makers and disaster professionals the potential uses of recent technologies for disaster monitoring and risk reduction based on the knowledge and experience of prominent experts/researchers in the relevant fields. It discusses the application of recent technological developments for emerging disaster risks in today's societies and deliberates on the various aspects of disaster risk reduction strategies, especially through sustainable community resilience and responses. This book consists of selected invited papers on disaster management, which focus on community resilience and responses towards disaster risk reduction based on experiences, and closely examines the coordinated research activities involving all stakeholders, especially the communities at risk. Many regions of the world and aspects of

disaster risk and its management are covered. It is described how recent technologies will support better understanding and action to reduce the number and impact of disasters in future. The principal audience for this book is researchers, urban planners, policy makers, as well as students.

Soils and Landscape Restoration - John A. Stanturf 2020-10-24

Soils and Landscape Restoration provides a multidisciplinary synthesis on the sustainable management and restoration of soils in various landscapes. The book presents applicable knowledge of above- and below-ground interactions and biome specific realizations along with in-depth investigations of particular soil degradation pathways. It focuses on severely degraded soils (e.g., eroded, salinized, mined) as well as the restoration of wetlands, grasslands and forests. The book addresses the need to bring together current perspectives on land degradation and restoration in soil science and

restoration ecology to better incorporate soil-based information when restoration plans are formulated. Includes a chapter on climate change and novel ecosystems, thus collating the perspective of soil scientists and ecologists on this consequential and controversial topic Connects science to international policy and practice Includes summaries at the end of each chapter to elucidate principles and key points

**Environmental Stress: Indication, Mitigation and Eco-conservation** -

Mohammad Yunus 2013-03-09

In the present scenario, stresses induced due to global environmental change have indeed become a focal point of researches and study programmes worldwide. Stress caused to plant life has an important consequence to both, vegetation as such and all other global cycles which sustain this 'living earth'. Unlike other already existing works this volume elucidates the plant-pollutant relationship in a manner that defines not only the drastic effects of pollutants

on plants but concomitantly highlights the hitherto less focused areas namely phytoindication, phytoremediation and stress tolerant bioaesthetic development, thus concentrating more on plant than pollutant. The book would help understand the magnitude of environmental stress in the coming years and may play a formative role in defining future research and policy areas along with providing impetus to development of newer eco-technologies. The book shall interest both students and researchers of environmental sciences, ecology, forestry and related disciplines as well as persons and organisations engaged in environmental management and eco-conservation.

**Global Guidelines for the Restoration of Degraded Forests and Landscapes in Drylands** - Food and Agriculture Organization  
2017-02-17

These guidelines target two main groups - policymakers and other decision-makers, and

practitioners - because both have the power to bring about positive change.

Research Handbook on Fundamental Concepts of Environmental Law - Douglas Fisher  
2022-11-25

This expanded and updated Research Handbook delivers an authoritative and in-depth guide to the conceptual foundations of environmental law. It offers a nuanced reflection on the underlying principles by exploring issues such as human rights, constitutional rights, sustainable development and environmental impact assessment within the context of environmental law.

*Livestock in a Changing Landscape, Volume 1* - Henning Steinfeld 2013-03-06

The rapidly changing nature of animal production systems, especially increasing intensification and globalization, is playing out in complex ways around the world. Over the last century, livestock keeping evolved from a means of harnessing marginal resources to produce

items for local consumption to a key component of global food chains. *Livestock in a Changing Landscape* offers a comprehensive examination of these important and far-reaching trends. The books are an outgrowth of a collaborative effort involving international nongovernmental organizations including the United Nations Food and Agriculture Organization (UN FAO), the International Livestock Research Institute (ILRI), the Swiss College of Agriculture (SHL), the French Agricultural Research Centre for International Development (CIRAD), and the Scientific Committee for Problems of the Environment (SCOPE). Volume 1 examines the forces shaping change in livestock production and management; the resulting impacts on landscapes, land use, and social systems; and potential policy and management responses. Volume 2 explores needs and draws experience from region-specific contexts and detailed case studies. The case studies describe how drivers and consequences of change play out in specific

geographical areas, and how public and private responses are shaped and implemented. Together, the volumes present new, sustainable approaches to the challenges created by fundamental shifts in livestock management and production, and represent an essential resource for policy makers, industry managers, and academics involved with this issue.

*Advances in Growth Curve and Structural Equation Modeling* - Ratan Dasgupta 2018-09-19

This book describes recent trends in growth curve modelling research in various subject areas, both theoretical and applied. It explains and explores the growth curve model as a valuable tool for gaining insights into several research topics of interest to academics and practitioners alike. The book's primary goal is to disseminate applications of the growth curve model to real-world problems, and to address related theoretical issues. The book will be of interest to a broad readership: for applied statisticians, it illustrates the importance of

growth curve modelling as applied to actual field data; for more theoretically inclined statisticians, it highlights a number of theoretical issues that warrant further investigation.

### **Resource Conservation and Food Security -**

Tapeshwar Singh 2004

Papers presented at the International Symposium on Land Degradation: New Trends towards Sustainable Agriculture and the Commonwealth Geographical Bureau Food Security Workshop organized by Dept. of Geography, M.M.H. College, Ghaziabad, India, on 7-12 April, 2002.

Land Reclamation and Restoration Strategies for Sustainable Development - Gouri Sankar Bhunia  
2021-11-17

Land Reclamation and Restoration Strategies for Sustainable Development: Geospatial Technology Based Approach, Volume Ten covers spatial mapping, modeling and risk assessment in land hazards issues and sustainable

management. Each section in the book explores state-of-art techniques using commercial, open source and statistical software for mapping and modeling, along with case studies that illustrate modern image processing techniques and computational algorithms. A special focus is given on recent trends in data mining techniques. This book will be of particular interest to students, researchers and professionals in the fields of earth science, applied geography, and those in the environmental sciences. Demonstrates a geoinformatics approach to data mining techniques, data analysis, modeling, risk assessment, visualization, and management strategies in different aspects of land use, hazards and reclamation Covers land contamination problems, including effects on agriculture, forestry, and coastal and wetland areas Suggests specific techniques of remediation Explores state-of-art techniques based on commercial, open source, and

statistical software for mapping and modeling using modern image processing techniques and computational algorithm

*Forest Landscape Restoration* - John Stanturf  
2012-11-28

Restoration ecology, as a scientific discipline, developed from practitioners' efforts to restore degraded land, with interest also coming from applied ecologists attracted by the potential for restoration projects to apply and/or test developing theories on ecosystem development. Since then, forest landscape restoration (FLR) has emerged as a practical approach to forest restoration particularly in developing countries, where an approach which is both large-scale and focuses on meeting human needs is required. Yet despite increased investigation into both the biological and social aspects of FLR, there has so far been little success in systematically integrating these two complementary strands. Bringing experts in landscape studies, natural resource management and forest restoration,

together with those experienced in conflict management, environmental economics and urban studies, this book bridges that gap to define the nature and potential of FLR as a truly multidisciplinary approach to a global environmental problem. The book will provide a valuable reference to graduate students and researchers interested in ecological restoration, forest ecology and management, as well as to professionals in environmental restoration, natural resource management, conservation, and environmental policy.

*Agroforestry and Climate Change* - Manoj Kumar Jhariya  
2019-07-05

This volume provides an abundance of valuable information on emerging eco-friendly technology and its potential role in combating climate change via agroforestry. The volume begins by describing the recent understanding of the scenario of climate change and its issues and challenges and provides an in-depth analysis of the potential of agroforestry toward climate

change mitigation and adaptation. Chapters address a wide range of techniques and methods for mitigating the negative aspects of climate change through agroforestry, such as vermicomposting, carbon sequestration, horticulture techniques, nutrient sequestration and soil sustainability, conservation of medicinal plant resources, silvipastoral systems, phytoremediation techniques, and more. The book also looks at livelihood security and the role of agroforestry. Key features: Provides updated information and recent developments in the field of climate change and agroforestry Looks at a variety of eco-friendly methods being employed to help mitigate climate change through agroforestry Provides recommendations and suggestions to build harmony between agroforestry and climate change Discusses new insights on the role of agroforestry toward combating climate change as well as maintaining the sustainability of ecosystems

### **Case Study on the Economic Valuation of**

**the Salinization and Waterlogging as a Result of Inappropriate Irrigation in Pakistan** - A. R. Kemal 1995

**Reclamation of Mine-impacted Land for Ecosystem Recovery** - Nimisha Tripathi 2016-04-18

Mining activities significantly impact the environment; they generate huge quantities of spoil, promote deforestation and the loss of agricultural production, as well as releasing contaminants that result in the loss of valuable soil resources. These negative impacts are now being recognized and this book shows how corrective action can be taken. The introduction of sustainable mining requires mitigation strategies that start during the mine planning stage and extend to after mineral extraction has ceased, and post-closure activities are being executed. Reclamation of Mine-impacted Land for Ecosystem Recovery covers: methods of rejuvenation of mine wasteland including

different practices of physical, chemical and ecological engineering methods; benefits of rejuvenation: stabilization of land surfaces; pollution control; aesthetic improvement; general amenity; plant productivity; and carbon sequestration as well as restoring biodiversity and ecosystem function; best management practices and feasible solutions to the impacts of mining which will reduce the pollution load by reducing the discharge rate and the pollutant concentration; reduce erosion and sedimentation problems, and result in improved abandoned mine lands; and ecosystem development. The authors explain how mining impacts on soil properties and how soil carbon reserves/soil fertility can be restored when mining has ceased. Restoration involves a coordinated approach that recognizes the importance of key soil properties to enable re-vegetation to take place rapidly and ecosystems to be established in a low cost and sustainable way. This book's unique combination of the methods for

reclamation technologies with policies and best practice worldwide will provide the background and the guidance needed by scientists, researchers and engineers engaged in land reclamation, as well as by industry managers.

**Wasteland Management and Environment** - Satyendra Kumar Varma 2001

Proceedings of the National Symposium on Management of Wasteland to Protect Environment : Retrospect and Prospect, held at Bhagalpur during 24-25 April 1998.

Land Restoration for Achieving the Sustainable Development Goals - United Nations 2020-09-17  
Land restoration has tremendous potential to help the world limit climate change and achieve its aims for sustainable development. In its latest study, the International Resource Panel finds positive spin-offs to support all 17 Sustainable Development Goals agreed to by the world's nations as part of the 2030 Agenda for Sustainable Development.

The Environment Encyclopedia and Directory

2001 - Europa Publications 2001

Charts the emerging world awareness of environmental issues. Provides an A-Z glossary of key terms, a comprehensive directory, an extensive bibliography, detailed maps and a Who's Who.

**Rewilding European Landscapes** - Henrique M. Pereira 2015-05-04

Some European lands have been progressively alleviated of human pressures, particularly traditional agriculture in remote areas. This book proposes that this land abandonment can be seen as an opportunity to restore natural ecosystems via rewilding. We define rewilding as the passive management of ecological successions having in mind the long-term goal of restoring natural ecosystem processes. The book aims at introducing the concept of rewilding to scientists, students and practitioners. The first part presents the theory of rewilding in the European context. The second part of the book directly addresses the link between rewilding,

biodiversity, and habitats. The third and last part is dedicated to practical aspects of the implementation of rewilding as a land management option. We believe that this book will both set the basis for future research on rewilding and help practitioners think about how rewilding can take place in areas under their management.

*Forest Resources Resilience and Conflicts* - Pravat Kumar Shit 2021-06-24

Forest Resources Resilience and Conflicts presents modern remote sensing and GIS techniques for Sustainable Livelihood. It provides an up-to-date critical analysis of the discourse surrounding forest resources and society, illustrating the relationship between forest resources and the livelihood of local people. The book is organized into four parts consisting of 31 chapters. Each chapter then reviews current understanding, present research, and future implications. Utilizing case studies and novel advances in geospatial

technologies, Forest Resources Resilience and Conflicts provides a timely synthesis of a rapidly growing field and stimulates ideas for future work, especially considering sustainable development goals. In addition, the book presents the effective contribution of the forestry sector to populations' livelihoods through improved collection of forestry statistics that foster the understanding and integration of the forestry sector in poverty reduction processes and the national economy to enhance its integration in national planning. It is a valuable resource for researchers and students in environmental science, especially those interested in forestry, geography, and remote sensing.

- Demonstrates tools and techniques for measurement, monitoring, mapping, and modeling of forest resources
- Explores state-of-the-art techniques using open source software, statistical programming, and GIS, focusing on recent trends in data mining and machine learning
- Addresses a wide range of issues with

both environmental and societal implications

- Provides a global review of the multiple roles of forest resources utilizing case studies to illustrate management strategies and techniques

**Land Utilization in the Central Himalaya** - Kireet Kumar 1996

Riparian Areas - National Research Council 2002-10-10

The Clean Water Act (CWA) requires that wetlands be protected from degradation because of their important ecological functions including maintenance of high water quality and provision of fish and wildlife habitat. However, this protection generally does not encompass riparian areas—the lands bordering rivers and lakes—even though they often provide the same functions as wetlands. Growing recognition of the similarities in wetland and riparian area functioning and the differences in their legal protection led the NRC in 1999 to undertake a study of riparian areas, which has

culminated in Riparian Areas: Functioning and Strategies for Management. The report is intended to heighten awareness of riparian areas commensurate with their ecological and societal values. The primary conclusion is that, because riparian areas perform a disproportionate number of biological and physical functions on a unit area basis, restoration of riparian functions along America's waterbodies should be a national goal.

**A Manual for Dryland Afforestation and Management** - G. Singh 2017-01-01

Community-oriented conservation of natural resources and promotion and protection of trees in drylands are examples to deal with climatic adversities. This book provides knowledge on climatic, ecological, social and economic condition of dry areas and lay out approaches and strategies to restore degraded lands. There are 15 chapters and first five deals with physiography of Rajasthan, drylands ecology, problems of land degradation, its economic

evaluation and the approaches and strategies of restoration and rehabilitation. Next two chapters describe the problems of sand drift, salinity, water logging and effluent inflicted areas and strategies to control them. Chapters 8-10 deal with seed production, quality planting materials, genetic improvement, propagation and planting techniques. Chapters 11-12 describe methods of rain water harvesting and irrigation, and resources conservation for seed sowing and favouring regeneration and successions. Effective management of pests/diseases in nurseries and plantation, growth and yield prediction equations and models, and people's perception and participation in managing forest resources have been described in last 3 chapters. Purpose of this publication is to strengthen the forest functionaries and readers with wide ranging knowledge on land degradation, desertification and eco-biology of drylands; and methods to restore and rehabilitate degrading forest (lands) to increase

forest cover, enhance resilience and people livelihoods and improve environmental conditions. Academician, researchers, forest managers, non-government organizations, extension agents and environmentalists can use it in developing, conserving and managing drylands ecosystems for its long lasting beneficial effects. This book is also useful to policy makers in effective planning of restoring, protecting and conserving dryland's ecological and socioeconomic services.

**Principles and practice of forest landscape restoration : case studies from the drylands of Latin America** - Adrian C. Newton 2011

Modern Trends in Applied Aquatic Ecology - R.S. Ambasht 2012-12-06

Organisms and environment have evolved through modifying each other over millions of years. Humans appeared very late in this evolutionary time scale. With their superior brain attributes, humans emerged as the most

dominating influence on the earth. Over the millennia, from simple hunter-food gatherers, humans developed the art of agriculture, domestication of animals, identification of medicinal plants, devising hunting and fishing techniques, house building, and making clothes. All these have been for better adjustment, growth, and survival in otherwise harsh and hostile surroundings and climate cycles of winter and summer, and dry and wet seasons. So humankind started experimenting and acting on ecological lines much before the art of reading, writing, or arithmetic had developed. Application of ecological knowledge led to development of agriculture, animal husbandry, medicines, fisheries, and so on. Modern ecology is a relatively young science and, unfortunately, there are so few books on applied ecology. The purpose of ecology is to discover the principles that govern relationships among plants, animals, microbes, and their total living and nonliving environmental components. Ecology, however,

had remained mainly rooted in botany and zoology. It did not permeate hard sciences, engineering, or industrial technologies leading to widespread environmental degradation,

pollution, and frequent episodes leading to mass deaths and diseases.

**Ecological Restoration of Mining Sites of GMDC. - 1997**