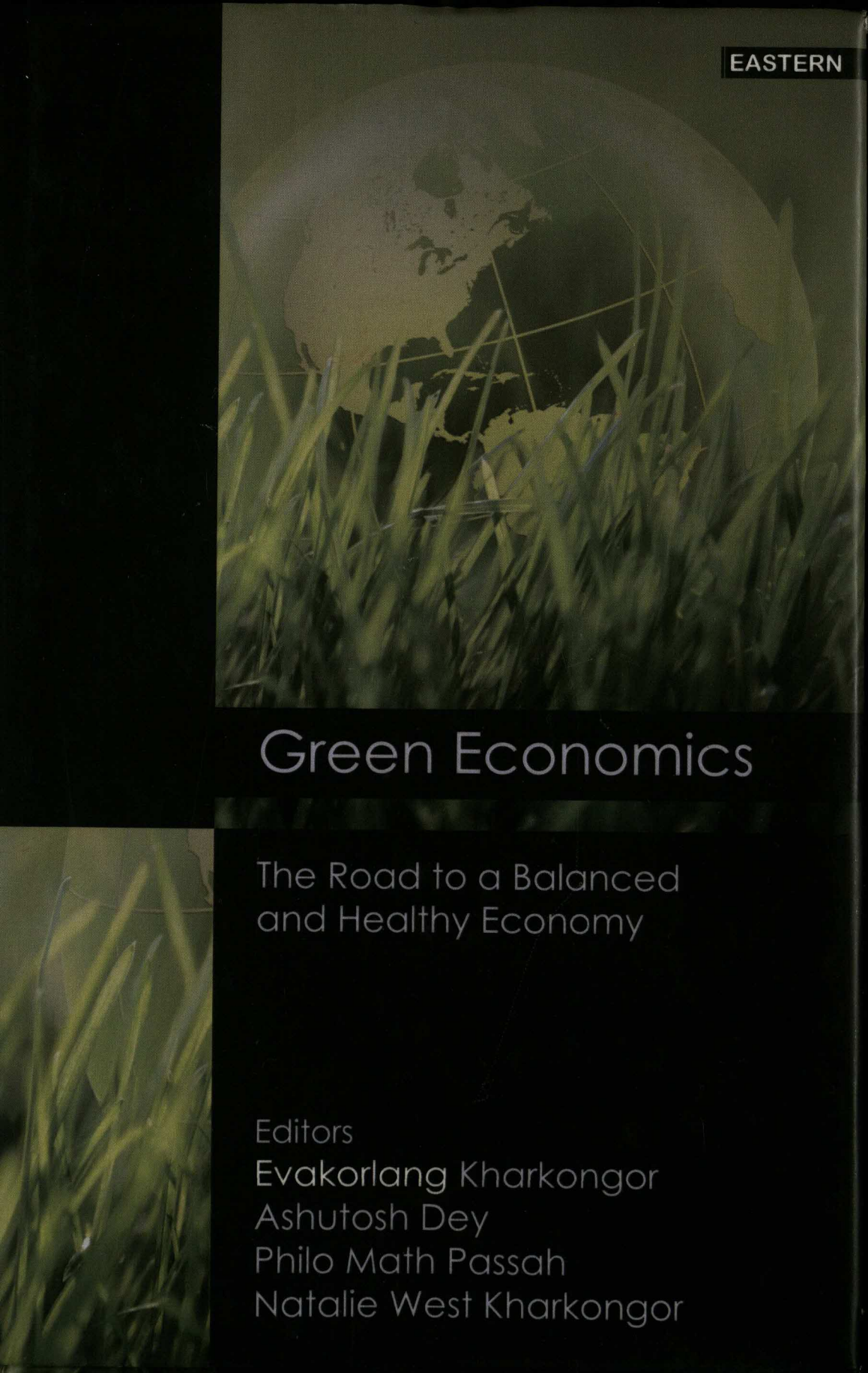

EASTERN
Green Economics
The Road to a Balanced and Healthy Economy
Editors
Evakorlang Kharkongor
Ashutosh Dey
Philo Math Passah
Natalie West Kharkongor

IQAC

Green Economics:
The Road to a Balanced and Healthy Economy

Editors
Dr. E. Kharkongor
Dr. A. Dey
Dr. P. M. Passah
Dr. N.W. Kharkongor

Meghalaya Economic Association, Shillong, Meghalaya

EBH Publishers (India)
Guwahati-1

E. Kharkongor, A. Dey, P. M. Passah, N.W. Kharkongor

Green Economics: The Road to a Balanced and Healthy Economy

ISBN: 978 93 90434 07 7

First Published in 2021 by
EBH Publishers (India)
an imprint of Eastern Book House
136, M.L. Nehru Road, Panbazar
Guwahati-781 001, Assam (India)

Phone : +91 361 2513876, 2519231, 92070 45352
Fax : +91 361 2519231
Email : easternbookhouse@gmail.com.
www.easternbookhouse.in

Printed in India

Preface

This book ***Green Economics: the Road to a Balanced and Healthy Economy*** is the outcome of a Two-day International Seminar organized by the Meghalaya Economic Association in collaboration with Indian Institute of Management (IIM) Shillong held 07th & 08th August, 2014. It contains the edited compilation of research papers presented in the above seminar by academicians, research scholars, government officials, business leaders, sustainability practitioners and also by noted personalities such as Prof. Graciela Chichilnisky the architect of the carbon credit market from Colombia University, and Miriam Kennet, founder of Green Economics Institute, United Kingdom. The papers reflect the diverse issues of the ecological consequences of the development mechanisms adopted over the decades, share experiences and suggests measures for harmonizing resource utilization and maintaining the ecological balance.

The editors duly acknowledged the contributions of the authors from different fields on the various aspects and significance of Green Economics for a Balanced and Healthy Economy. Organizing the seminar and publishing this book would not have been possible without the financial assistance received from District Planning Office, office of the Deputy Commissioner, East Khasi Hills District, Government of Meghalaya, North Eastern Council, Shillong and Meghalaya Biodiversity Board, Department of Forests and Environment, Government of Meghalaya. We also convey our gratitude to EBH Publishers (India) for their professional assistance and for publishing this volume.

The Meghalaya Economic Association (MEA) is a registered body of teachers, research scholars, academicians, administrators and professionals belonging to the field of economics and allied disciplines. It was established on 7th June 2003 with the objective of providing a forum for debates and discussions on the economic problems and issues concerning the state in particular and the country in general. The Association does not restrict itself only to members of the economics fraternity but has within its umbrella members from other disciplines as well as those working in the government and private sector. From a humble beginning with only a few members and limited resources, it has today grown not only in terms of quantity but also in terms of its contribution to the academic life and upliftment of the students' community. The MEA regularly organizes seminars, workshops symposium and lectures by eminent persons of the country and abroad. It has now emerged as a significant force in organizing programs that cover a wide range of topics that are relevant not only for academicians but also for policy decision making.

Editors

Contents

Preface		–	*iii*
List of Figures		–	*vii*
List of Tables		–	*ix–x*
List of Contributors		–	*xi-xii*
Introduction		–	*xiii–xviii*
Message:			
	Prof. Miriam Kennet, Co-founder & Director, Green Economics Institute, United Kingdom	–	*xix–xxiii*
1.	The Kyoto Protocol-Carbon Market: Reflections by its Author – ***Graciela Chichilnisky***	–	1–11
2.	A Solution to Climate Change Business: Carbon Negative Technology Global Policy: The Green Power Fund – ***Graciela Chichilnisky***	–	12–24
3.	Impact of Mining on the Ecology in Parts of Khasi and Jaintia Hills – ***Edmund K. Mawkhiew***	–	25–37
4.	'Rat-Hole' Mining and the 'NGT' Ban: An Analysis of Socio, Economic and Political Impact of Mining Industry in Meghalaya, India – ***Iasuklang Kharumnuid, Krishna Chauhan & Sankar Sarma***	–	38–47
5.	Myntdu Leshka H.E. Project -Experiences in Acid Mine Drainage – ***E. Lyngdoh, K. Tiewsoh & A.K Jain***	–	48–49
6.	Renewable Energy and its Challenges: An Indian Perspective – ***Mohit Gupta, Bikramjit Rattu, Jatin Sethi***	–	50–76
7.	Coal Mining with Reference to Environmental Royalty – ***Dr. Natalie West Kharkongor & Jasiel. H. Massar***	–	77–92
8.	Towards a People Centred Afforestation Programme for North East India – ***Abhijit K. Bezbarua***	–	93–109

9. Sustainable Development through Community Participation: A Case Study of Mawlyngot Village, Meghalaya – ***Dr Evakorlang Kharkongor*** – 110–124

10. Developing an Ecotourism Model for Meghalaya – ***Prachi Agarwal & Ujjawal Kumar*** – 125–130

11. Urbanization and Its Impact on Environment: A Perspective from the State of Meghalaya, India – ***Magdaline Umdor*** – 131–142

12. Eco-Tourism: A Road to Sustainable Social and Economic Development in Meghalaya – ***Ibakitbok Shisha Kharkongor*** – 143–155

13. Unlocking Green Opportunities with Healthy Governance for achieving Sustainable Development – ***Dr. Bremley W. B. Lyngdoh*** – 156–169

14. Teacher and Environment – ***Dr. Rimanbor Judah Cunville*** – 170–176

15. Go- Green: An Approach through Green Banking in Meghalaya with Special Reference to Shillong City – ***Dr (Mrs.) R.Geetha & K. K. Elizabeth*** – 177–183

16. The Role of Media in Environmental Issues: A Case Study of the Role of Vernacular Press on Environment Issues – ***Bobby Majaw*** – 184–190

17. Food Security in India, Challenges and Recommendations – ***Bhupesh Doda & Kishore Kumar*** – 191–214

18. Agricultural Productivity and Poverty Alleviation in North East India -Their Linkages – ***Dr Ashutosh Dey*** – 215–226

19. CSR-A Tool to Create Sustainable Tomorrow – ***A.Jayakumar & K.Geetha*** – 227–235

20. A Conceptual Framework on Consumer Influence towards CSR - Building a Sustainable Society – ***Mrs. Jogita Sorokhaibam Hussain & Mr. Jamal Hussain*** – 236–250

21. A Graphic Representation of Communication, Land Use and Environment in Meghalaya – ***Jennifer Thangkhiew, Buhtimai Lyngdoh, Bulsilian L. Mawphlang & Iahunlin Khyriem*** – 251–259

Index – **261–262**

List of Figures

1.1	:	Global Thermostat Pilot Plant, SRI International – Menlo Park California February 2011	–	8
1.2	:	GT's Air Capture Technology	–	9
1.3	:	Unique Advantages of GT's Technology	–	9
1.4	:	Strategic Partners	–	10
6.1	:	India Growth in Electricity Generation and GDP Growth Rate – A Clear Relationship	–	51
6.2	:	Growth of Installed Capacity of Renewable Energy in India (GW)	–	52
6.3	:	Installed Capacity of Renewable Energy in India	–	53
6.4	:	Region-wise Break up of Identified Potential SHP sites and capacity	–	56
6.5	:	Total Installed Capacity of Wind Power as a Percentage of Total Potential	–	58
17.1	:	Four Pillars of Food Security	–	193
17.2	:	Per Capita availability of Net Cereals per day (grams)	–	196
17.3	:	Per Capita availability of Pulses per day (grams)	–	196
17.4	:	India's Inflation Rate and Food Inflation	–	198
17.5	:	Reported cases of Diarrhoea in 2011 for Indian States	–	202
19.1	:	Dimensions of Sustainable Development	–	228
19.2	:	General Models of CSR and Sustainability	–	232
20.1	:	Stakeholders of a Business Firm	–	238
20.2	:	CSR Orientation Grid	–	241

List of Tables

4.1	:	No. of Reported Death in Coal Mines from different Places and Districts of Meghalaya	–	43
6.1	:	Renewable Energy Actual Installations and Target	–	53
6.2	:	Comparison of Estimated Potential and Installed Capacity of Different Resources	–	55
6.3	:	State-wise Installed SHP Capacities (end of 2012-13)	–	56
6.4	:	State wise Installed Biomass Capacity in Major States	–	57
6.5	:	State-wise Potential Capacity for Bagasse-based Power co-generation in India	–	57
6.6	:	State-wise Wind Power Capacity and Potential	–	58
7.1	:	Top Coal Reserves/Deposits Countries in the World	–	79
7.2	:	The state-wise distribution of coal resources and its categorisation	–	80
7.3	:	Coal Inventory of Northeast India	–	81
7.4	:	Collection of Royalty on Coal during 2011 – 12 to 2015-16	–	84
8.1	:	Outlays & Expenditures on schemes of NAEB, NAP & Green India Mission	–	100
9.1	:	Population Structure in Mawlyngot: 2013	–	114
9.2	:	Occupational Structure of the Labour Force in Mawlyngot: 2013-2014	–	116
9.3	:	Market Rates of Tea – 2013	–	119
11.1	:	Trend of Population 1901-2011 in Meghalaya	–	133
11.2	:	Population and Its Growth Rate (%) in The Major Urban Centres of Meghalaya	–	134
11.3	:	Classification of Towns on the Basis of Population	–	135
11.4	:	All Cities and Towns Trend of Population 1991-2011 in the State of Meghalaya	–	135
11.5	:	Concentration of Metals in Umkhrah Stream, Shillong, Meghalaya	–	138
16.1	:	Showing the Population by Language in Meghalaya	–	189
16.2	:	Showing the Percentage of Literacy by Area	–	189

17.1 :	Global Hunger Index 2013: BRICS Countries	–	191
17.2 :	India State Hunger Index scores with its underlying component for various states	–	192
17.3 :	Growth Rate and yields of Food Grains, Oilseeds and Pulses (Percent per annum)	–	195
17.4 :	Per capita Net availability of Food grains Gin grams (Per Day) in India (1951 to 2010)	–	195
17.5 :	Supply- Demand Gap Projections of major pulses in India (Million tons)	–	197
17.6 :	Per capita Availability and Deficit of Milk and Egg in 2012	–	197
17.7 :	Food Inflation in India	–	197
17.8 :	Growth of Rural Employment	–	198
17.9 :	Growth of Urban Employment	–	199
17.10:	The Share of the PDS in Rice and Wheat Consumption in Different States, 1993-94 to 2009-10	–	200
17.11:	Trends in Child Malnutrition (0-3 years) (%)	–	201
17 .12:	Per Capita Dietary Energy Supply and Prevalence of under-nutrition in Total Population	–	201
17.13:	Sanitation Statistics of India	–	203
17.14:	Category-wise Rainfall Distribution in Subdivisions and Districts and All India Rainfall Departure from normal 2009-14 (cumulative rainfall since 1 June)	–	208
17.15:	Under Nutrition by Wealth Categories: Proportion of Children Undernourished	–	209
18.1 :	Number and Percentage of Population below poverty line by states-2004-05 and 2011-12 (Tendulkar Methodology)	–	220
18.2 :	Share of Agriculture and Allied sector in total GSDP for NE States during 2009-10 to 2011-12 at Current Prices	–	222
18.3 :	GSDP growth and Poverty in NER	–	222
21.1 :	Tele-density	–	254

List of Contributors

1. **Graciela Chichilnisky**, Professor, Columbia University, USA
2. **Edmund K. Mawkhiew**, Assistant Professor, Department of Geology, Kiang Nangbah Government College, Jowai
3. **Iasuklang Kharumnuid**, Assistant Professor, Department of Political Science, St. Mary's College, Shillong
4. **Krishna Chauhan**, Assistant Professor, Department of Economics, B.B.S. College, Shillong
5. **Sankar Sarma**, Associate Professor, Department of Commerce, Shillong College, Shillong
6. **E. Lyngdoh**, Former Director (Generation), Meghalaya Energy Corporation Limited
7. **K. Tiewsoh**, Former Director (Generation), Meghalaya Energy Corporation Limited
8. **A.K Jain**, Former Deputy Director (HRD), Meghalaya Energy Corporation Limited
9. **Mohit Gupta**, Indian Institute of Management, Shillong
10. **Bikramjit Rattu**, Indian Institute of Management, Shillong
11. **Jatin Sethi**, Indian Institute of Management, Shillong
12. **Natalie West Kharkongor**, Associate Professor, Indian Institute of Management, Shillong
13. **Jasiel. H. Massar**, BTech Student, NIT, Chennai
14. **Abhijit K. Bezbarua**, Management Consultant, Guahati
15. **Evakorlang Kharkongor**, Associate Professor, Department of Economics, Shillong College
16. **Prachi Agarwal**, Indian Institute of Management, Shillong
17. **Ujjawal Kumar**, Indian Institute of Management, Shillong
18. **Magdaline Umdor**, Associate Professor, Department of Botany, Sankardev College, Shillong

19. **Ibakitbok Shisha Kharkongor**, Associate Professor, Department of Economics Shillong College, Shillong
20. **Bremley W. B. Lyngdoh**, Founder and CEO, of Worldview Impact, United Kingdom
21. **Rimanbor Judah Cunville**, Assistant Professor, Department of Education, Sankardev College, Shillong
22. **R. Geetha**, Associate Professor, Department of Commerce, V. V. Vanniaperumal College, Virudhunagar, Tamil Nadu
23. **K. K. Elizabeth**, Head, Department of Commerce, St. Edmund's College, Shillong
24. **Bobby Majaw**, Assistant Professor, Department of History, Sankardev College, Shillong
25. **Bhupesh Doda**, Indian Institute of Management, Shillong
26. **Kishore Kumar**, Indian Institute of Management, Shillong
27. **Ashutosh Dey**, Associate Professor, Department of Economics, Ri Bhoi College, Meghalaya
28. **A. Jayakumar**, Professor of Commerce, Periyar University, Salem, Tamil Nadu
29. **K. Geetha**, Ph.D, Research Scholar, Department of Commerce, Periyar University, Salem, Tamil Nadu
30. **Jogita Sorokhaibam Hussain**, Academic Associate, Indian Institute of Management, Ahmedabad
31. **Jamal Hussain**, North Eastern Regional Institute of Science & Technology, Itanagar
32. **Jennifer Thangkhiew**, Assistant Professor, Department of English,Sankardev College, Shillong
33. **Buhtimai Lyngdoh**, Librarian, Sankardev College, Shillong
34. **Iahunlin Khyriem**, Assistant Professor, Department of Philosophy, Sankardev College, Shillong
35. **Bulsilian L. Mawphlang**, Assistant Professor, Department of Khasi, Sankardev College, Shillong

Introduction

"We're now on the threshold of a global transformation- the age of green economics"

Mr. Ban Ki-Moon, Secretary General, United Nations.

The economic growth and development has accelerated manifold since the dawn of the Industrial Revolution in the 18th Century and since then many countries of the world have developed and their respective economies have expanded exponentially. But the process of economic growth and development driven by industrialization and technological innovations have tended to plunder the earth's natural resource base resulting in severe depletion of natural resources and increasing environmental degradation.The short-sighted way in which economic development have been pursued has led to an unequal distribution of the gains of development signifying the existence of a vicious circle of poverty. Many parts of the world are caught in a vicious downward spiral where poor people are forced to overuse natural resources to survive from day to day and their impoverishment of natural resources further impoverishes them making their survival even more difficult and uncertain.

No doubt, there has been a growing awareness of the ramifications of environmental degradation since the 1960s especially in the fast-growing industrialised countries of the world. This awareness was heightened spawning new environmental ideologies and causing economists like Pearce, D.W. and Turner, Kerry R. to look afresh at the central economic idea i.e. of resource scarcity in relation to possible uses. As a result, during the 1970s a number of world views crystallized within environmentalism providing the background for the emerging environmental economics sub-disciplines (Pearce, D.W. and Turner, Kerry R.).

But environmental awareness was initially confined to industrialised countries only. In the developing economies environmental policies were regarded as unaffordable luxuries over and above a concern for basic necessities. It was so, until the 1980s when there was a new reorientation in environmental thinking emphasizing the possibility of interrelationship between economic development and environmental improvement. This new thinking provided the foundation to the concept of sustainable development.

The concept of sustainable development is usually associated with the Bruntland Commission Report – Our Common Future, presented to the United Nations General Assembly in 1987. This Report defined sustainable development as, "meeting the needs of the present generation without compromising the needs of future generation". The Report recognizes the fact that in developing countries there is a greater dependence on natural resources as inputs for production and development. Therefore, it calls for alternative development strategies and technologies based on sustaining and expanding the natural resource base.

Further in 1992 at the Earth Summit organized by the United Nations Commission on Environment and Development at Rio de Janeiro saw a culmination of the growing awareness of environmental degradation. The Earth Summit aims at forging international agreements which respect the interests of all and to protect the integrity of the global environment and developmental system. The Summit also stressed that the right to development must be fulfilled so as to equally meet developmental and environmentally needs of the present and future generations. In the path of development all nations must cooperate in the essential task of eradicating poverty as an indispensable requirement of sustainable development. Disparities in the standards of living should also be reduced to meet the needs of the majority of the people in the world. Henceforth to attain sustainable development, environmental protection should constitute an integral part in the development process and the former cannot be considered in isolation from the latter.

Despite all these reorientations and rethinking towards sustainability in the development process, the 21st century is still witnessing the consequences of unsustainable development paths on the environment and quality of life. Many questions have remained unanswered which needs to be addressed. The main question is: Does the sustainable development concept make societies from developed, developing and undeveloped countries wealthier, happier and healthy when the gap between the 'haves' and the 'have nots' have increased. On the one side, there is poverty (deficit) and on the other side, there is wastage (excess). The global economy is witnessing a high degree of imbalance in terms of extraction and usage of resources. The state of nature and its natural resources like the quality of water and air are on a downward spiral and have reached an alarming point.

In the present-day context, it is imperative to relook and rethink of development paths in terms of Green Economics because securing the environment is critical for the survival of future generations in the whole world. The challenges of switching to Green Economics in India and in the global scenario have been dealt with in the different papers contained in this book. They reveal that it is important to incentivize economic policies that promote measures for food security, energy conservation, soil conservation, afforestation, corporate social responsibility, community participation amongst other things.

The book contains the message from Prof. Miriam Kennet, co-founder and

Director, Green Economics Institute, United Kingdom; two presentation from Prof. Graciela Chichilnisky in chapter 1 and 2 respevtively and 18 papers which provide a deep insight into the complexities, challenges and solutions for sustainable development paths.

The Kyoto Protocol-Carbon Market: Reflections by its Author is the presentation by Prof. Graciela Chichilnisky illustrates the risks that the paths of economic growth have created in terms of climate change, biodiversity extinction, the scarcity of clean water which raises the concerns about human beings going extinct. She emphasized on the need to change economics, to make it sustainable and the need to change International Law to account for the environment. She deliberated on the Carbon Market of the Kyoto Protocol created by her in1997 which became international law in 2005. She emphasized that the changes articulated in the UN Kyoto Protocol is the only document on Climate Change. She highlighted that there is an urgent need to develop New Market Prices that define new values, new costs and new benefits for the environment. She has pointed out that it is the Carbon Market which addresses the issue to provide the prices for a clean atmosphere

The presentation on *A Solution to Climate Change Business: Carbon Negative Technology Global Policy: The Green Power Fund,* by Prof. Graciela Chichilnisky addresses the enormity of the problems of climate change and stated that challenges must be overcome, and a precedent must be set, for governments to reduce co_2 emissions.

The paper, *Impact of Mining on the Ecology* by Edmund K. Mawkhiew observes the importance of mining since it supplied the basic resources needed by modern civilization. However, it points out that as demand grows, mining areas are expanded and mining methods are improved to increase production which has been responsible for more damage to the environment.

The paper on *Rat— Hole Mining and the NGT Ban: An Analysis of Socio-Economic and Political Impacts in Meghalaya, India* by Iasuklang Kharumnuid, Krishna Chauhan and Sankar Sarma highlighted that mining in Meghalaya draws special attention due to its embedded social, political and economic character. In the context of the 'NGT' ban imposed since early 2014 for 'Rat-hole' mining in the State the authors observe that it had given rise to an altogether different dynamics in the mining scenario and its impact on the environment. Although it is a landmark decision in terms of environmental concerns, an analysis of its impact on livelihood, social and political aspects have to be thoroughly analyzed. The authors conclude that a rehabilitation package needs to be immediately implemented and a re-look by NGT into property issues and resource regulation is called for.

E. Lyngdoh, K. Tiewsoh and A.K Jain's paper entitled *Myntdu Leshka H.E. Project –Experiences in Acid Mine Drainage* addresses the problems faced by

this hydro-electric project which is the largest power generating project in the State. The acid mine drainage from coal mines have severely affected the infrastructure and equipment of the plant. It suggests that small affordable easily operable pilot plants should be installed to control the acidic waste through limestone treatment plants.

Renewable Energy and its Challenges: An Indian Perspective by Mohit Gupta, Bikramjit Rattu and Jatin Sethi illustrates that the power sector in India is hugely dependent on coal as its primary energy source. It pointed out that only one per cent of India's renewable energy source is being tapped so far. Analyzing the scenario of renewable energy in various states in India the authors observe the challenges and the significance of this source in the country.

Coal Mining with Reference to Environmental Royalty by Dr. Natalie West Kharkongor & Jasiel. H. Massar presents an analytical study of coal reserves and deposits in the world, and the state – wise distribution in India. The paper which has also dealt in detail with the coal royalty in Meghalaya concludes by overemphasizing the need to utilize the proceeds from coal for ecology value addition and reclaiming the ecological loss.

Abhijit K. Bezbarua's paper entitled *Towards a People Centered Afforestation Programme for North East India* focuses on the National Afforestation Programme and its implementation across the nation. Based on empirical findings the author points out that the NE Region has several distinguishing features that set it apart from most other states of India and these factors have an impact upon the forestry operations that are being carried out. Therefore, the paper suggested for a people centered afforestation approach for hill areas in North East India, wherein the planning and implementation should be led by local communities concerned. The local communities can supplement their existing efforts while keeping the local ground realities in mind and optimizing the utilization of public funds.

Sustainable Development through Community Participation: A Case Study of Mawlyngot Village, Meghalaya by Dr Evakorlang Kharkongor focuses on the significance of community participation in promoting sustainable development with special reference to the economic activities of the Mawlyngot Tea Grower's Society. The findings of the study have revealed the effective strategies that have been adopted based on local needs, which have enabled the community to diversify into rural tourism and link the development process to other villages. The author suggests on the need to promote effective community participation in developmental programs of the State and the country in order to achieve changes that is desirable for enhancing the quality of life.

The paper on *Developing an Ecotourism Model for Meghalaya* by Prachi Agarwal and Ujjawal Kumar explore the possibility of adapting ecotourism models which have been successful in other countries such as Australia and Kenya to the North Eastern Region of the country and Meghalaya in particular.

Magdaline Umdor's paper on *Urbanization and Its Impact on Environment: A Perspective from the State of Meghalaya, India* has analyzed the impact of unplanned and haphazard growth of urban complexes in Shillong and its suburbs. It points to the serious environmental impact of this process which has resulted in the dangers of increasing solid waste, improper garbage disposal and air and water pollution. The author while emphasizing on Government policies and actions also stressed on the need of committed actions and initiatives on the part of Communities and individuals to resolved the problems of urbanization.

Eco-Tourism: A Road to Sustainable Social and Economic Development by Ibakitbok Shisha Kharkongor have shown that Meghalaya with its natural attractions and rich cultural heritage has a potential of ecotourism as a strategy for promoting growth with sustainability. The author have emphasize on the need for intensification of scientific research to evolve environmentally sound, scientific and technological alternatives suited to the common man particularly the poor.

Dr. W. B. Lyngdoh's paper entitled *Unlocking Green Opportunities with Healthy Governance for Achieving Sustainable Development* examines the Clean and Green initiative undertaken by the government of Meghalaya, wherein 56 villages selected fromall 39 Blocks in the State have been awarded with the Clean and Green Village Award and the inception of the Sustainable Village Development Programme. The author points out that this was a unique mechanism in engaging these shortlisted villages to work in collaboration with a Social Enterprise for providing guidance, monitoring and evaluation in sustainable project implementation at the village level. The author recommends on the need of strong institutions at the community and state levels to generate the political will and the practical actions that are required to safeguard local livelihoods and ensure environment sustainability.

Teacher and Environment by Dr. Rimanbor Judah Cunville focuses on the significant role that teachers play in order to create a positive environment between the teachers and the taught for a better future.

Dr (Mrs.) R. Geetha & K. K. Elizabeth paper entitled *"Go- Green" Approach through Green Banking* emphasized on the relevance of Green Banking practice, referred as the "Silent Revolution" for environmental protection. The authors points out that banks can become a channel for environment protection and economic development through Green Banking Technology.

Bobby Majaw's paper on the *Role of Media in Environmental Issues: a Case Study of the Role of Vernacular Press on Environment Issues* traces the history of the vernacular press in the Khasi Hills, Meghalaya. It points out that it started when the Welsh missionaries ventured into publication which also includes journalism. The first Khasi journal "U Nongkit Khubor" was published in 1889 followed by secular journal like "U Khasi Mynta". Since then the vernacular press have made tremendous progress, which included Mawphor, Rupang, U

Nongsain Hima, U Peitngor, Dienjat & Jingshai. The publication of these vernacular dailies is higher than the English dailies published from the state. The author suggests that they can be taken advantage for percolating issues on environment to the masses.

Food Security in India: Challenges and Recommendations by Bhupesh Doda and Kishore Kumar's highlights that India being the second most populous country in the world would face a serious challenge in terms of food security. The paper points out that as per the Global hunger index, which measures the hunger situation of a country, India ranked 63 and is the worst performer among all the BRICS nations. The study has indicated that the status of food security in India is alarming. The authors suggeststhat the agricultural sector should be strengthened to ensure proper availability, accessibility and to alleviate the food insecurity in India.

Agricultural Productivity and Poverty Alleviation in North East India: Their Linkages by Dr Ashutosh Dey analyzes the correlation among rural poverty, access to land, population growth and agricultural growth. The author has pointed out that agriculture is an important sector in the economy of the North Eastern Region and the Region should give high priority for enhancing the productively of the agricultural sector. Rising population, increasing demand for water resources, widespread land degradation and inadequate infrastructure appear to be major concerns of the agriculture sector in the North Eastern Region.

CSR: A Tool to Create Sustainable Tomorrow by A.Jayakumar and K.Geetha discusses the potential contribution of the concept of corporate social responsibility (CSR) to sustainable development since it motivates corporations to act socially responsibly. The emergence of new CSR regulation in India and its relevance for sustainable development have been emphasized for ushering changes in the way business operates in the expanding global context.

Mrs. Jogita Sorokhaibam Hussain and Mr. Jamal Hussain paper on *A Conceptual Framework on Consumer Influence towards CSR: Building A Sustainable Society* examine the factors that make a consumer the main driving force for CSR. In this role the consumer can pressurize business firms to go for more CSR activities that lead to societal growth and development.

The paper entitled *A Graphic Representation of Communication, Land Use and Environment* by Jennifer Thangkhiew, Buhtimai Lyngdoh, Bulsilian L Mawphlang and Iahunlin Khyriem is a visual representation of development parameters in terms of transport, communication, mining and others which have made a deep impact on the environment leading to its degradation and its constant misuse and abuse.

Editors

Message

Prof. Miriam Kennet, Co-founder & Director, Green Economics Institute, United Kingdom

Dear Participant,

I am most Honored to be invited to address the conference and to discuss my ideas and work with you.

I have been extremely fortunate to be able to work with some of you in preparing a book about India and its economic miracle which has taken India from a really challenged environment to one of the worlds very biggest- the third biggest economy in one generation- quite a miracle. As an economist I find this incredibly exciting and also a beacon country which I want to know much more about.

I cannot be with you today due to an inspirational aunt having passed away and who I am honoring at her funeral in Norway. It is significant that she a specialist in archeology and Old Norse helped me understand the longer term perspectives which are now challenging us in regard to resource use and climate change. She helped me see, that it is only when we consider the effect of our lives and activities, not just on next week's bottom line for a company, and annual results reporting, but actually in 5, 10, 100 years and also not just our children and their children's' children but also – the 7th and even the 700th generation of people- that we can fully understand our role in the world and our mission to ensure we change the way we humans operate our economy.

It is only by understanding our effects on each other that we can grow together and our economy can flourish. I created the academic discipline of Green Economics, thinking of how earth sciences and earth systems can be described with social science systems so it's truly looking at both together and also truly

1. Speech read out at the Inaugural Function of the International Seminar on "Green Economics: the Road to a Balanced and Healthy Economy".

multidisciplinary at its core. I also wanted to think about how we could create an economy which benefits all people everywhere including women and minorities of all kinds, and which looked after nature, other species, the planet and its systems for their own sake and also for people. This approach makes economics much broader than it has been certainly for 200 years. The original concept of Economics, from the Greek word "oikonomia" was about management of the household, our home, -perhaps today that "home" is the earth as there is certainly no economy today outside the earth. So all economics depends on the natural world for itsresources and we all depend on each other – trading involves other people. The original word for company- com pane meant to break bread with people- a much more human occupation than today's big multinationals which seem to consider people's needs last. So the work of Green Economics is I think to keep these ideas at the forefront of everything we do when we venture into more complex areas and ideas.

The Green Economy is therefore as broad as it is long term. This means that decisions affecting distribution and equality need to consider how they will play out in future generations. Energy decisions are not just about making a quick profit now but rather the question to ask is- how will this impact other people today- or other people and other species tomorrow and the day after.

Finance is no longer about how to get the biggest bonus but rather how to finance a transition to a more fair and sustainable economy as soon as possible. Energy in this scenario favors renewables. A Holistic approach to decision making means that economists favourite ceteris paribus no longer applies- as the broadest possible considerations need to be made using as much of a realist prospect as possible. Models, mathematics and formulae are servants in this process- not the masters. I foresaw that mathematics and quantitative information are vital in the struggle to conserve biodiversity for us to know how we are doing. Understanding the rate of decline of a rainforest or an endangered species is important. Making up lovely graphs to prove a question not related to reality is less useful so there needs to be shift to more use of mathematics and scientific language where it's needed and less where in the past it has been used to baffle people and keep people from asking too many awkward questions.

I am pleased to say that many countries in the world- in fact nearly all of them are starting to implement a Green Economy, and in many cases this presents a real opportunity to meet the pressing challenges of today headlong. For example a greener economy is much better equipped to address climate change, climate instability and extreme events than a mainstream economy. Firstly, it aims to predict what is coming and accepts and relies on science – not denial. It can predict for sea level rise, CO2 and methane increases and temperature increase and precipitation change and allows for them. It seeks to reverse micro climate changes or to try to halt them or mitigate for their effects. Above all it seeks

alternative to business as usual to get a more beneficial outcome for everyone in the community.

India in particular a country endowed with the most charming and stunning of any natural beauty, and indeed it was a visit to India in my youth which really got me thinking that I could try and make real change in the world and its economy, to make a real difference. I had a sort of epiphany I think it's called - a light bulb moment -where I knew that I wanted to create a completely new way of thinking about the world and its economy, and to create a complete revision of the economics system – to include everyone and that moment happened to me in India when I was a young woman, about 26 years old, exploring the wonders of India- the gorgeous smell of jasmine- (I still have a jasmine bush outside my own front door today)- and the site, sounds and incredible smells and views of huge high mountains, pure air, fabulous food and wonderful people. It has truly abundant resources and many mouths to feed can therefore profit exceptionally from the implementation of a green economy.

Its myriad of businesses can thrive more with more equality and more future thinking. It can avoid the mistakes- and they are serious mistakes of the west – in depleting reserves and in forgetting about equality, fairness and inclusion. India is home to some of the world's most beacon species, and also to a lively climate- hot and with monsoons. This dependence of the worlds civilization and economies on the climate as it has largely been for 10,00 years for this current interglacial period is not necessarily going to remain like this and we need to do everything possible not to aggravate the natural systems -so that we do not end up creating a hostile natural environment.

India also in addition to being the world's third largest economy is also a place where many of the important rivers of Asia rise and provide drinking water for millions of people and has also some of the world's greatest mega cities and natural landscapes and habitats. Therefore India has a unique role to play in conservation and in forward thinking development. India's businesses are some of the most important on the planet, many of the worlds millionaires are Indian, the largest film industry on earth -Bollywood is Indian, many of the world's largest corporations are Indian. It is imperative that we find a modus vivendi for Indian business which is comfortable developing along Greener and more futuristic lines. For make no mistake -greener is also high tech, greener is the future and greener is about all our futures. And this is where – in the largest democracy in the world- it is absolutely vital that India gets on board to the green economy steam ship. Without India participating it is meaningless, China has many green 5-year plans, many other countries are starting to take part -from Malaysia to Brazil to South Africa. Many are beginning to understand their role and also the impact from climate change as the world heats up. Additionally many lands will become uninhabitable and so we are starting to see mass migration of people and geo

political instability. We need India on board to ensure that this change scenario does not create more chaos or resource depletion. We need India's businesses to compete with green as a centre of excellence and India's vibrant democracy to truly represent all its people including women.

There are still some areas of the population who are not quite as well represented and we know that countries who do not educate their women or give them equal opportunities do less well than those that harness the efforts of all their citizens and educate everyone in the same way. A green way is the economics of caring, sharing and supporting each other – equally and for the good of the whole.

So we need a shift in some areas in India but also above all to avoid the nonsensical over consumption we see in the west. Which brings me to the obsession with GDP Growth in the mainstream economy that we must all consume more and more and faster and faster! As the distinguished career of your host Dr Natalie West shows, it's the networking, the long hours in a variety of areas of activity, the caring, sharing and supporting each other in the community-which actually makes a green economist and which enables others to come together to make a real change. It is not about bonuses or greed. In the United Kingdom it is becoming hugely more fashionable to own a bicycle than to own a gas guzzling Rolls Royce Car. It is becoming hugely more fashionable to do charity work than to be seen to be conspicuously consuming expensive commodities, clothes etc. and even the Royalty do not throw their money around -they reuse clothes, the new Princess buys her clothes mostly from high street shops. The Queen is becoming known for her Tupperware Suppers. The world is changing and people respect people who respect for others and who share. In the tense and difficult geo political times in which we liveGreen Economics can go a long way to easing some of those tensions and mitigating some of the worst effects of global environmental change. Building a Green Economy for India based on social and environmental justice for all its citizens, its nature, its other species and also keeping its natural systems in a benevolent mode will help absolutely everyone in India and also quite possibly right around the planet.

So finally, I would like to say that the passage of a Green Economy in India – is really exciting and I can't wait to be able to come out and meet all of you in person. I hugely admire the work you are all doing and doing the India book, hopefully the first of many about India and its opportunities, will really change the face of India in the 21st century. This book was one of the most pleasant we have ever put together. Its emphasis on tourism and the magical places in the district simply have made me and the team want to rush straight over to see them for ourselves. My only regret is that this time I really cannot be with you in person but I have thought about nothing else for several weeks and the same is true for our team.

We have been working on our academic double blind peer reviewed academic journal this week International Journal of Green Economics and I am pleased to say that a hugely increased number of papers are now coming out of India – almost every second paper which we receive. This issue -particularly renewables, green energy, wind and solar and also the green built environment and many other aspects- so the Green Economy is now starting to thrive in India which is very pleasing. Please do send in your papers for publishing in the journal or the books or speaking at our Oxford University Conferences and publishing in our academic or other proceedings and networking magazines, this month we would like to feature India and the conference in our networking magazine -The Green Economist as well! So do send in ideas and short pieces and pictures for that too so we can convince governments, policy makers and businesses that this is the easiest way to ensure that everyone has a future.

We all wish you a wonderful conference, we would like to welcome you all in the spring March 2015 for our 10th anniversary and I plan to come out in the autumn to meet up with as many of you as are available to do so. My email is greeneconomicsinstitute@yahoo.com and I wish you a wonderful 2 days. We will issue a second draft of the book shortly so if you missed this opportunity to be part of the book simply email us and let us know and we can include you in the second draft. With enormous thanks to Dr Natalie West and her colleagues, a wonderfulevent – and we wish you every success in the world.

1

The Kyoto Protocol-Carbon Market: Reflections by its Author[1]

Graciela Chichilnisky

Introduction

Human beings are today the largest geological force in the planet. They are changing the planet's atmosphere, its body of waters, and the complex web of species that makes life on earth. Climate change become very crucial for all of us.

Global Risks

There are several global risks which require immediate actions:

- Climate Change
- Biodiversity Extinction
- Clean Water scarcity
- Life in the Seas going extinct

Apart from the above risks we have some Catastrophic Risks:

Catastrophic Risks

- Global rise in the sea level threatens the survival of 43 island nations
- Polar Caps melt - accelerating warming trend
- Record breaking tornadoes, floods, droughts and devastating fires

[1] Chapter 1 is based on the presentation by noted economists Prof. Graciela Chichilnisky during the Two Day International Seminar.

- 30 million climate migration in 2011
- National Security at Risk- US Pentagon 2009
- Oceans is the source of life, and is going extinct.

So from the human side, immediate actions need to be taken. Data shows that 20% of world population caused most of world's $C0_2$ emissions; energy from fossil fuels stands at 45% of global emissions

Clean Energy is the Only Solution for our sustainable future.

The Anthropocene: The change we are producing is caused by economic forces – but will stay in rock formations for thousands of years. A new geological era - the 'Anthropocene' – follows the Holocene –it started in 1945.

The Bretton Woods Institutions after WWII led to globalization of Western Economics.

A Brief History of Western Economics

Western Economics as an Individualistic frontier Society

- Lacks connections with natural resources
- Lacks connections between present and future
- Lacks connections among people

Western Market Economics based on Competitive market, Optimal Growth Theory and Cost Benefit and Financial Model are explained as:

- **Competitive Markets:** Individualistic consumers trading private goods, there is not much connection between people.
- **Optimal Growth Theory**: Exponential growth of population and resource use. A frontier society without limits: There is no connection between the economy and ecological systems
- **Cost Benefit Analysis and Financial Models Discount the Future**: A short term vision: There is no connection between the present and the future

Dictatorship of the Present is far away from Western economics which

- Lacks connections between people
- Lacks connections between economy and environment
- Lacks connections across generations

Sustainable Development requires building connections because humans dominate the planet since time immemorial and which follows an era of rapid globalization.

Humans are changing the planet's atmosphere, its bodies of water, and the complex web of species that makes life on earth.

As we reach **natural resource and environmental limits, the survival of humankind is at stake.** Hence, we need connections between people and the ecology, between people and with the future of our species. This is main concern of the western economies today.

For sustainable economics, we need to know how to make it possible and what are the changes required. The below changes are required in terms of:

- **Change Economics** – Sustainable
- **Change GDP** - environmental markets that provide prices - value the global commons.
- **Change International Law** - UNFCCC KP process

Kyoto Protocol

We consider economic growth by assigning market value to toilet paper for instance, but assigning no market value to trees. The mistake that economies have committed for ages is: more focus on value – in – exchange rather than on value – in – use.

We lack Market Prices as below

New Market prices = New Values (New costs and new benefits).

The Carbon Market provides the main missing Signals

- 1997: UN Kyoto Protocol Placed Limits on industrial emissions.
- 2005: KP Carbon Market became International Law – now in 4 continents.

In December 2011 Kyoto Protocol extended 3 years in Durban UN COP 17 and main points are described as below:

- Existing KP limits valid until 2015
- New limits pledged for 2020
- UN COP 19 Warsaw 2013 confirms the North South nature of the earth's climate crisis

Its effects on the rich and poor nations:

Rich nations of the North: 20% of the global population consume most natural resources and caused the majority of the global emissions.

Poor nations of the South: 80% of the global population extract most of

the world resources and export to rich nations which could cause most emissions in the future.

The Carbon Market

A market that is created from the trading of carbon emission allowances to encourage or help countries and companies to limit their carbon dioxide (CO2) emissions. *Emission Limits are the basis of Carbon Market*

Carbon Market Works

The Carbon Market followings actions have been taken and their results are:

- **EU ETS trades $250 Bn/year**
- **Reduced 30% EU emissions since 2005**
- **Its CDM transferred over $100 Bn for clean energy projects in poor nations**

It links to Global Economy and we know everything is made with energy

Economic growth = Energy Use

Link to Energy

Only Carbon Market provides the Missing Signal: New Market Prices = New Values

Focus areas of Carbon Market

The focus area of carbon areas are capping emissions and emissions reductions.

- Capping Emissions
- We can't get there without emissions reductions

Markets for trading a Global Public Good: It is using the planet's Atmosphere and creating Equity with Efficiency.

REDD (Reducing Emissions from Deforestation and Forest Degradation): REDD are actions which help us in

- Reducing Emissions from Deforestation and Forest Degradation
- Limited effect on Climate
- Most Important effect on Biodiversity

Green Capitalisms: Economy, the Earth and our Species

We need to develop connections with the earth's resources, between people and with the future of our species.

Basic Needs

The Basic Needs of 80% of Humankind who live in developing nations are:

- Undermined by resource intensive economics: over-extraction of raw materials from the poorest nations in Africa and Latin America
- Resources exported and over-consumed by 20% of world population in the industrial world

Women and Survival: Women are the only Link to the Future, we need to look into:

- War on Women
- Threats to the Survival of the Human Species
- Women key to the New Economy
- Green Capitalism
- Survival of the Human Species

In order to take care of every sustainable action, we need

- Change in International Law
- Change in Economics

We all, just have to do it for the survival of our Species.

International Law

The Basic Needs:

- In 1974 I created the Bariloche Model of the World Economy
- Based on my new concept of Basic Needs
- It was the basis of Sustainable Development voted by 150 nations at the 1992 UN Earth Summit in Rio Brazil
- Adopted by the G – 20 in 2009

Sustainable Development

We need to think about the sustainable development, and the following are required:

Change in International Law: We need to change environment laws specially the Carbon Market

- The Carbon Market that I designed and wrote into the UN Kyoto Protocol in 1997- international law since 2005.
- Productive clean CDM transfers to developing nations $50 Bn since 2005

- EU ETS Trades $200 Bn/year, decreased 37% EU emissions since became law in 2005
- Makes profitable the use of clean energy for the production of all goods and services
- Change the energy foundation of the Global Economy
- China ratified the Kyoto Protocol and since 2005 leads the World in Solar and Wind markets
- US did not and we are left behind in clean technology

The **Green Power Fund** became **international law** in Durban

- I proposed it in 2009 Copenhagen COP15
- Was accepted and officially endorsed by Hillary Clinton US Sec of State two days later at COP 15
- It is a $200 Bn per year Fund to build carbon negative power plants in Africa, LA and Small Island States - economic growth that cleans the atmosphere
- The technology exists, and the funding exists in the EU ETS trading system - $250Bn/year

We need political support to make my **Green Power Fund a reality.**

It is already an international law since Durban 2011 and it be must be linked to UN Kyoto Protocol to use the $250 Bn/year to fund negative power plants in LA Africa and AOSIS

We need to promote new technology & new economics. We can create growth while cleaning the atmosphere. Changing Economics is a key because it provide the missing connections between people with the environment, and between the present & the Future

The Present and the Future Cost Benefit Analysis and Optimal Growth theory exist that do not discount the Future. A Formal Theory of Sustainable Development has been developed that provides

- Equal treatment for future generations
- Connects the present and the future
- I created the formal Theory of Sustainable Development in 1996
- Sustainable Development (Chichilnisky 1996, 2000, 2006, 2009, 2010)

Formal Theory of Sustainable Development Created in Chichilnisky 1996*

Axioms for Sustainable Development:

1. No Dictatorship of the Present
2. No Dictatorship of the Future
3. Continuity and Linearity

A Complete Characterization of All Criteria that Satisfy all My Three Axioms

Theorem (Chichilnisky 1996): The criteria of optimization that satisfy all of my three axioms. They are new, and they are all of the following form:

New types of Markets + New GDP: Market economics can be made consistent with sustainable goals. But markets themselves must change the individualistic markets, must evolve into new types of markets that I postulated - markets for public goods – which incorporate connections between people and value.

Valuing the Global Commons: They are slowly emerging due to new scarcities: carbon market I created within the Kyoto Protocol, international law since 2005 trading $200Bn/year; SO2 markets in CBOT, new markets for water and for biodiversity (Chichilnisky (1992, 1996, 2000, 2002, 2009, 2010, 2011)).

Global markets that value privately produced public goods, the Global Commons.

The Carbon Market changes the measurement of GDP: Carbon Market puts a (new) economic value to a clean atmosphere that changes GDP with the carbon market, in two identical nations, the one that produces clean energy has a much higher GDP.

New Markets change Capitalism: Markets trading privately produced public goods are new and they combine equity with efficiency.

Connecting People: They require limits on resource use.

We need to connect Economics with Ecological Systems.

Green Capitalism in the 21st Century

There is always a base which connects international law and economics. Theoretically and in practice we have:

- New markets for the global commons, new growth theory, new cost benefit analysis and new GDP measures, new international law
- Need to implement it through carbon market and Green Power Plants through UN COP

---

* Chichilnisky "What is Sustainable Development" Social Choice and Welfare, 1996

The Global Commons: New Economics are changing its steps i.e. from maximizing profits to economic progress that ensures survival of our species.

We urgently require technology which is to be used to reduce carbon from the Atmosphere and in a profitable way. The Word needs Energy.

Clean Energy for Developing Nations

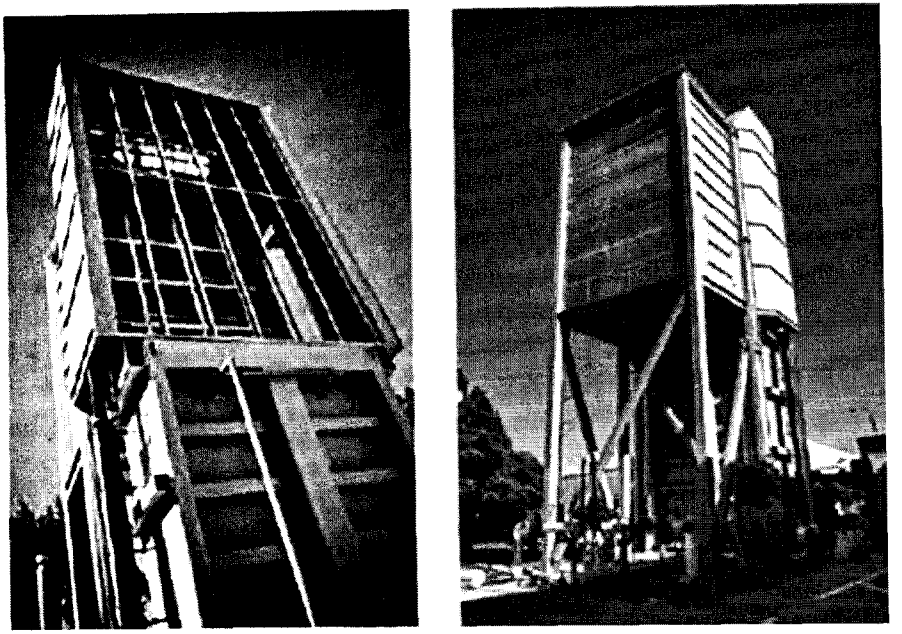


Fig. 1.1 Global Thermostat Pilot Plant, SRI International – Menlo Park California February 2011

Carbon Negative Solution

Carbon Neutral is not enough. Neutralizing emissions does not prevent further increases in atmospheric CO_2. Even the most aggressive efficiency improvements and renewables adoption are unlikely to keep CO_2 concentration at the generally agreed 450ppm to avoid catastrophic climate risk. ***Negative* Carbon is the solution**. The air captured enables direct and rapid reduction of CO_2 concentration. Global Thermostat allows for the capture of even more CO_2 than loading into the atmosphere, or the earth's systems can absorb – Negative Carbon as illusatrted in the following figures.

GT's technology directly reduces carbon concentration in the air, making *carbon negative* possible.

Closing the Carbon Cycle: GT Technology Captures Carbon from Air **and it is** inexpensive i.e. it uses Low Process Heat. It cogenerates Power Production with carbon Capture. The More Power is produced – the More Carbon is reduced. It Makes Coal Plants **Carbon Negative** and Solar Power Plants makes even more **Carbon Negative.**

GT's Air Capture Technology: Three-Step Process Produces Concentrated CO 2 Stream:

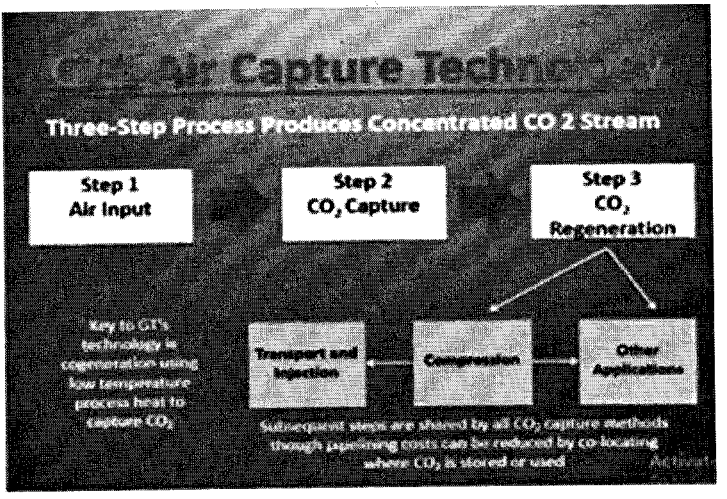


Fig. 1.2 GT's Air Capture Technology

Applications & Markets for Captured CO_2

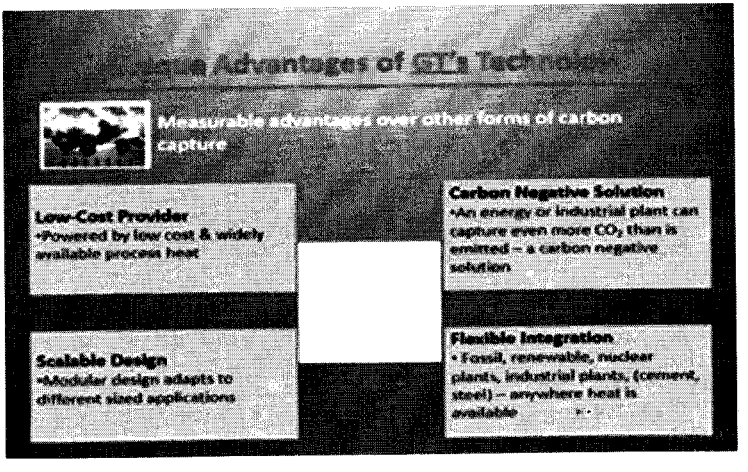


Fig. 1.3 Unique Advantages of GT's Technology

Fig. 1.4 Strategic Partners

Global Thermostat & Algae Systems

GT is developing fully-integrated bio-refinery in partnership with Algae Systems and it

- Produces *carbon negative* transportation fuels (Gasoline diesel)
- Treats municipal wastewater and produces drinking water and
- Generates green electricity and biochar fertilizers
- Provides critical municipal services while producing energy

As Green As It Gets.

Closing the Carbon Cycle

- **Carbon Negative Power Plants** – reduce 45% of the global CO_2 emissions caused by power plants
- Green Power Fund provides PPA to build Carbon Negative Power Plants
- Channel EU Emission Trading System (ETS) $250Bn/year funding to poor nations through Carbon Market Clean Development Mechanisim (CDM)
- Carbon negative fuels – the more you drive and fly, the cleaner is the atmosphere
- Economic Growth that cleans the atmosphere

Creating the Future ..... Green Capitalism

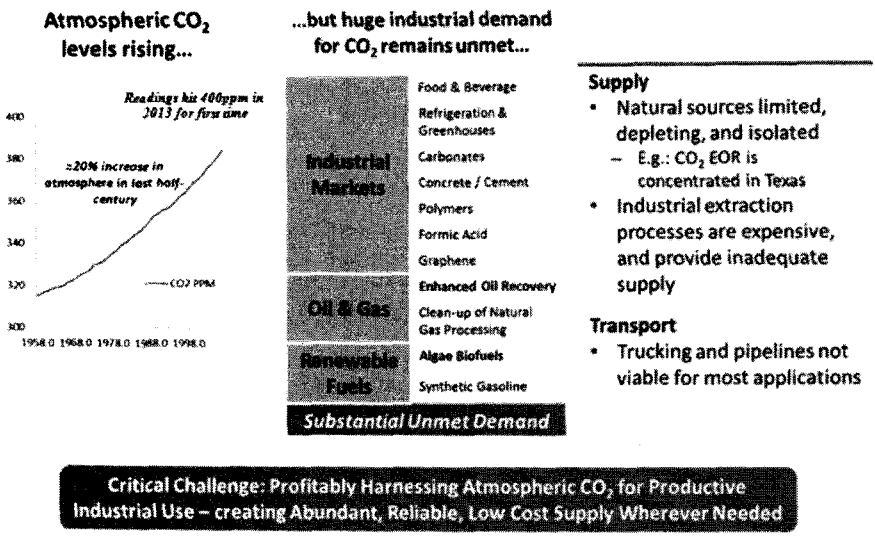
- The carbon market
- Environmental Markets for Biodiversity and Water
- Implement Sustainable Development
- Funding from Carbon Market can build carbon negative power plants and fuels globall

2

A Solution to Climate Change Business: Carbon Negative Technology Global Policy: the Green Power Fund[2]

Graciela Chichilnisky

Climate & Industry Face Carbon Challenge

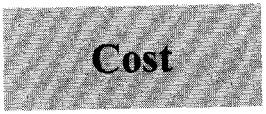


[1] Chapter 2 is based on the presentation by noted economists Prof. Graciela Chichilnisky during the Two Day International Seminar.

Challenges Must be Overcome, and a Precedent Must be Set, for Governments to Reduce CO_2 Emissions. It must take care of leadership, cost and upside actions.

Governments need to standup to help mitigate their countries' CO_2 emissions

Each Government is aware of CO_2 emissions levels



GT's technology provides CO_2 for the lowest cost in the world, and can do so practically anywhere, and in whatever amount desired

Our technology is completely modular and easily expandable

In addition to being able to solve the problem of atmospheric CO_2 levels, a new stream of revenue is created

CO_2 can be resold and used for industry

Business Solution

CO_2 is Both a Challenge to the Global Climate and a Valuable Industrial Gas because

- US Pentagon recognizes climate change as one of the US' greatest security threats
- CO_2 used in a myriad of productive industry applications: beverages, refrigeration, chemical manufacturing, oil recovery, synthetic- & bio-fuels
- Huge unmet demand due to significant shortage of CO_2 for use in industry.

GT has Solved Key Challenges of Cost, Transport & Availability – offering a Carbon Negative Solution.

- GT technology actually decreases CO2 in the atmosphere
- Current CO_2 sources limited to depleting natural reservoirs & costly industrial extraction
- Transportation is a key cost & logistical barrier, requiring massive pipeline infrastructure investment

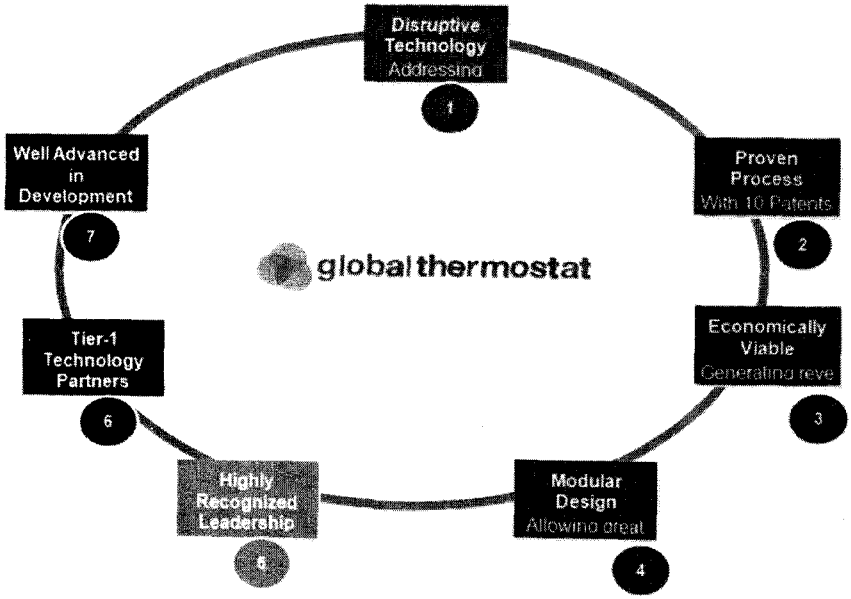
Global Thermostat Proven Solution Addresses Transportation, Availability & Costs

- Breakthrough extraction technology protected by a robust IP portfolio
- Demonstration Plants operating since 2010
- Significant industry interest from large strategics in Oil & Gas, as well as biofuels arenas
- Carbon Negative solution, adding significant social and economic upside

Tremendous Market Opportunity to Disrupt & Expand CO_2 Market by Meeting Unmet Demand

- Seeking growth equity investment to scale commercial efforts – adding resources to respond, to offer, to build GT Plants.

Global Thermostat - Company Highlights



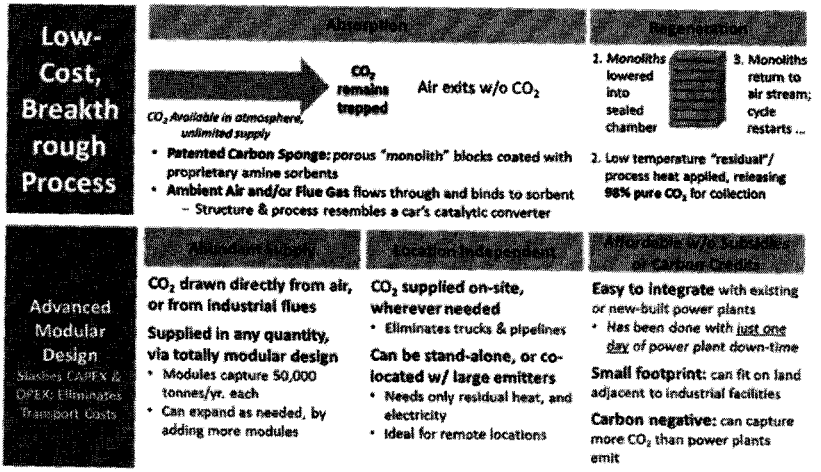
Introduction to Global Thermostat

Graciela Chichilnisky, authored the carbon market of the Kyoto Protocol, Co-founder & CEO

Peter Eisenberger, Exxon research executive leader, Co-founder & CTO

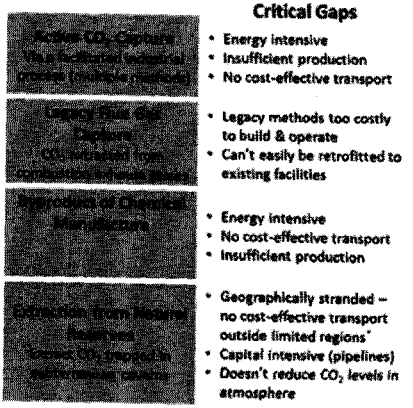
Edgar Bronfman, Jr., Global business leader, Chairman

GT's Proven, Patented Approach: A Truly Disruptive, Proven Solution

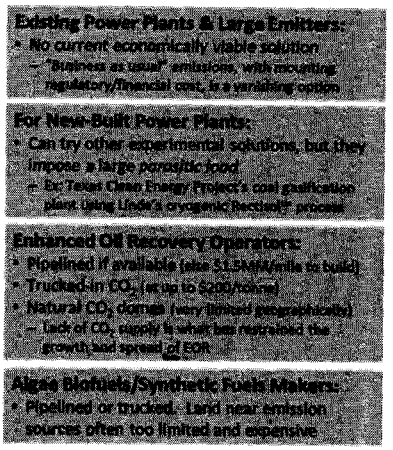


Existing CO_2 Capture

By Method



By Customer Segment



GT' Solution is Affordable, Proven, and Commercially Ready to Scale & Penetrate Global Markets

Technology Development, IP

Technology Fully Baked
- Created by Peter Eisenberger and Graciela Chichilnisky
- Tech developed at *SRI* & *Georgia Tech*; Verified by *Corning, Linde, Det Norske Veritas*
- Operational since 2010

IP Rights Secured
- Strong IP portfolio
  - *10* patents so far
  - Worldwide rights
- *Freedom To Operate* opinion

Prototype Demonstration

Prototypes Operational
- Two prototypes in Silicon Valley validate technology & economics
- Performing as modeled; results consistent from bench- to pilot-scale

Design for Manufacturability
- Developing engineering plans for full-scale production units
- Already realized large CAPEX & OPEX reductions vs. pilots
- All components fit in standard shipping containers

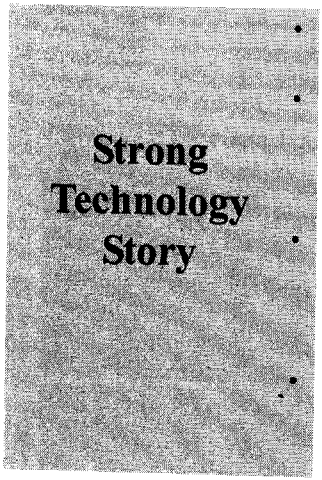
Next Step: Commercialize & Scale

Sales
- Advanced negotiations with large industrial partners (underway)
- Contract & Execute projects

IP Commercialization
- Advanced IP licensing negotiations with large strategics (underway)

Seeking growth equity investment for team build-out, tech development, and commercialization activities (investment supplemented by project financing)

Breakthrough Development, Robust IP Portfolio



IP created by Peter Eisenberger & Graciela Chichilnisky

Technology was developed & prototyped at SRI & Georgia Tech

– Fine-tuning in progress; No new science required

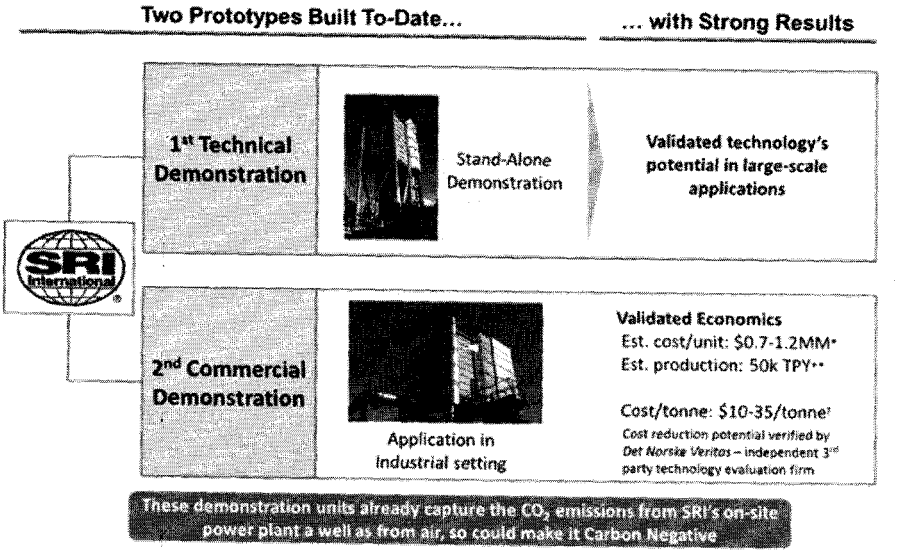
GT selected as finalist in $25MM *Virgin Earth Challenge Prize*

– 11 finalists selected from more than 2,600 proposals

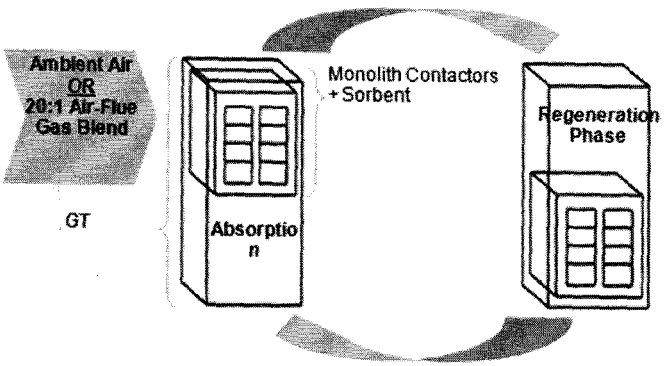
Improvements in process & materials represent recent cost breakthrough

– 3rd Party reports validate GT technology & costs

Successful Prototype & Plant Development



GT Technology Description



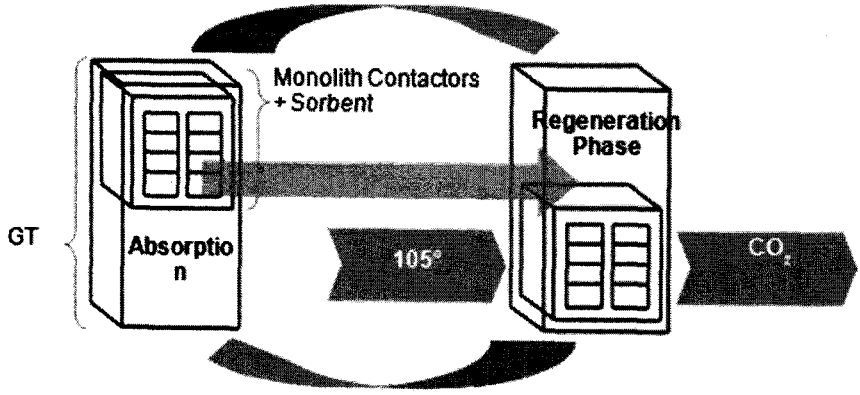
Step 1: Air Input & Carbon Capture

- GT uses stacks of ceramic "monolith" contactors (similar to those in a car's tailpipe catalytic converter), coated with an amine-based "sorbent," that together act like carbon sponges – trapping, but not transforming, CO_2 it encounters in an oncoming air/gas stream

- Monoliths provide high surface contact areas at low pressure drop (air resistance)
  - Enables movement of large air volumes with effective contact of CO_2 at low cost
- GT's advanced sorbents were proven highly effective by Georgia Tech, and further confirmed by SRI, and DN Veritas
  - Proprietary process bonds sorbent to monoliths' porous walls, at high loading
  - This dramatically reduces heat required compared to liquid-based Carbon Capture
- *~1.5-30 minute cycle (depending on embodiment and implementation)*

Step 2: Regeneration

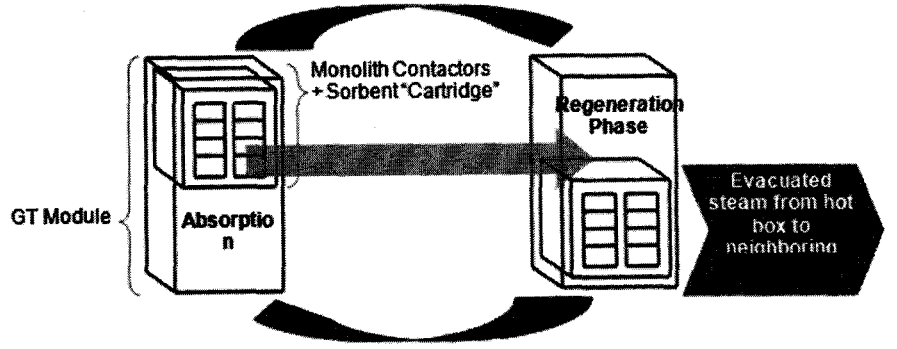
- CO_2-rich monoliths are moved into air-tight, evacuated Regeneration Chamber
- Low-temperature residual heat (90°-105°C steam) is applied, stripping CO_2 from monoliths
- Liberated CO_2 is collected and piped away, at atmospheric pressure
  - Output is 95-98% pure CO_2
  - No other inputs are consumed; no other byproducts are released



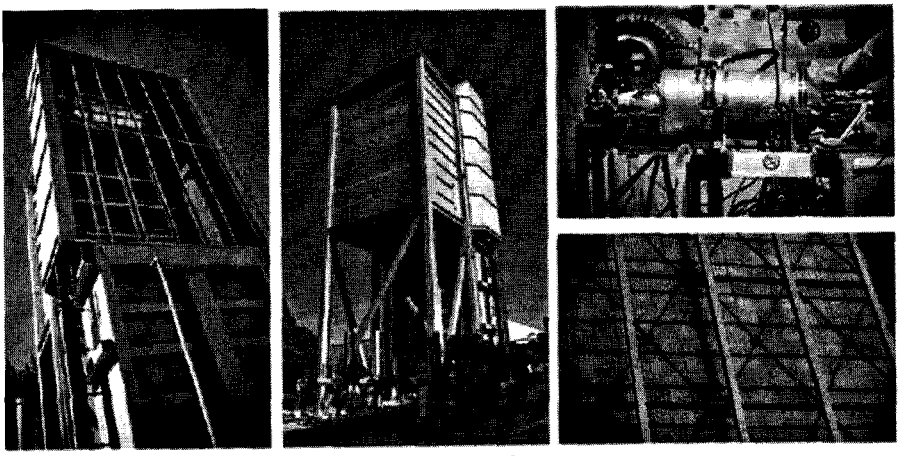
- Now-empty monoliths are raised from the Regeneration Chamber, back into the oncoming air stream, to repeat the cycle
- *~1.5-3 minute cycle*

Step 3: Heat Transfer

- Neighboring Regeneration Chambers are kept out of phase with each other, yet are interlinked, allowing steam to pass between them
- As one Regeneration Chamber completes is cycle, the other is just beginning
- In the just-completed Chamber, water evaporates from hot monoliths (cooling them to below the oxygen degradation temperature). That water & steam is piped to the just-beginning Chamber, where water condenses on the cool monoliths, pre-warming them
- Cool monoliths receive 50% of their heat this way, substantially reducing operating costs

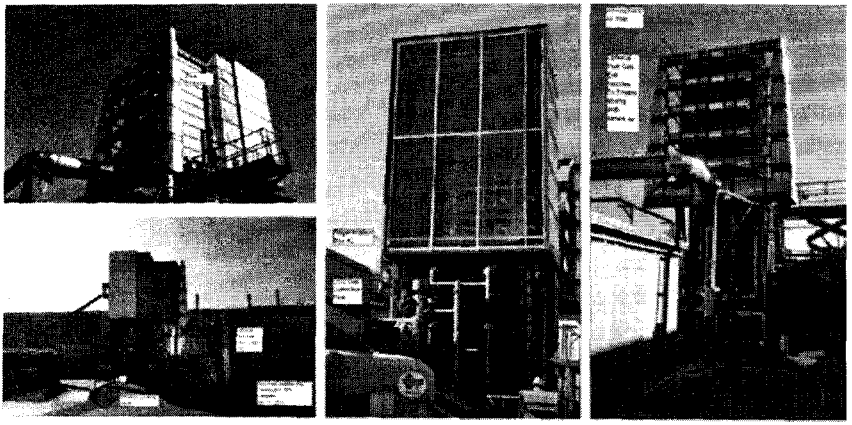


2010: GT's 1st Pilot at SRI (Stanford Research Institute)



SRI International
333 Ravenswood Avenue
Menlo Park, CA 94025

2013: GT's 2nd Commercial Demo Plant at SRIGT Achieved US DOE/ DOD Technology Readiness Level 7 - TR7



SRI International
333 Ravenswood Avenue
Menlo Park, CA 94025

GT: Carbon Negative Solution, Long-Term Upside

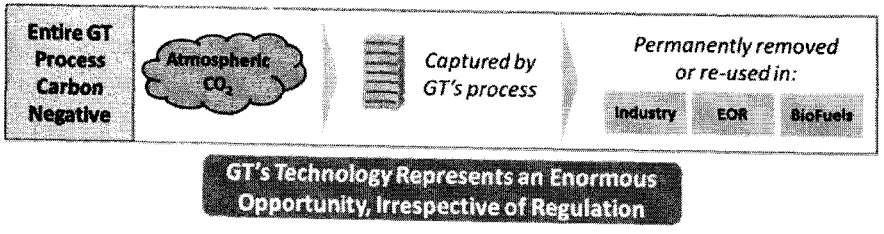
High potential for incremental profit from tax on carbon emissions under current & emerging regulations

- Beginning to be applied in some developed countries and likely to be adopted in other countries
- Recent EPA legislation demonstrates benefits of Carbon Capture technology

While not considered in any GT business projections, carbon credits & other incentives create significant upside to current opportunity

- *26 US Code §45Q* provides a CO_2 EOR tax credit of H"$10.75/tonne
- Carbon credits in California & EU-ETS trading above $12/tonne today

Independent of a tax on CO_2, Governments likely to make thousands of dollars to support the development of CO_2 capture*



Summary of Global Thermostat

True, proven technical break through	**GT proven technology solves critical barriers to productive CO_2 application in industry**
Enormous market business potential	**Large, diverse and unmet market opportunity today** **Significant opportunity to expand market**
Commercial readiness and exit paths	**Major technical proof-points established and protected with robust IP worldwide**
Global Solution to Climate Change	**Several paths to both create a big business and reach a 200 Bn/year Green Power Fund to accelerate deployment of GT plants and other solutions**

To Accelerate Carbon Negative Technologies

The Green Power Fund

- $200 Bn/year Private Public Fund
- Financial & Technological solution for Global Climate Change
- Quick global deployment of Carbon Negative Power Plants in Developing Nations
- Using funding available from the UNFCCC CDM of the EU ETS
- Providing clean power for rapid growth in least developed nations: SIDS, Africa and LA
- Liberating women and children used today as beasts of burden

G20 goals: Solving Global Poverty

Achieving Sustainable Development: through -

The Green Power Fund

Green Capitalism

Economic Growth and Sustainable Development

Focus on Least Developed Nations

- Introduced by the author in Copenhagen COP 15 2009
- Supported by H. Clinton US Department of State
- Voted partially by UNFCCC in Durban South Africa COP 17 as Green Climate Fund
- Requires only Diplomatic Completion in Lima Peru COP 20 December 2014
- Needs legislative support at global negotiations COP 21 Paris 2015
- Led by Monaco with the moral support & votes of 30 SIDS

The Green Power Fund

It works as below:

- GPF offers profitable off-takes or PPA – attracting private funding
- High IRR for building Carbon Negative power plants in Africa LA and SIDS
- Adding to CDM funding and funding from sovereign funds

Why a *Carbon Negative* Technology?

Because it is needed otherwise No solution (IPCC 2014)

Why *LA, Africa & SIDS*?

Because it is needed otherwise No solution (IPCC 2014)

Why *The Green Power Fund*?

Because it is needed otherwise No solution (IPCC 2014)

A Green Monaco

It could set a global precedent by implementing GT as the catalyst with UN mandate.

For Addressing Climate Change

Our Next Steps

1. Leading Global Thermostat to a profitable deployment of GT plants all over the world.
2. UN Legislation for Green Power Fund
    - Participation of Monaco and AOSIS in UNFCCC COP negotiation committees

- COP 20 Peru December 2014
- COP 21 Paris December 2015
- The Green Power Fund

Leadership Team

Graciela Chichilnisky
CEO & Founder

- World leading economist, entrepreneur, executive, and inventor in IT, financial instruments, and CO_2 capture
- Founder CEO of FITEL and Cross Border Exchange, successful financial services technology companies
- Authored of the Kyoto Protocol's carbon market legislation (EU ETS)
- PhD in Math from MIT and in Economics from UC Berkeley
- Tenured Professor Columbia University, previously Harvard and Stanford

Peter Eisenberger
CTO & Founder

- Leader and technology innovator in the global energy industry, and CO_2 capture
- 20+ year career including heading global R&D at Exxon, and lead scientist at Bell Labs
- Tenured professor and former Vice Provost at Columbia University
- Former Director of Columbia University's Lamont-Doherty Earth Observatory
- Founding Director Princeton University Materials Institute
- Founding Director Columbia University Earth Institute

Edgar Bronfman, Jr.
Investor & Chairman

- Chairman, Endeavor Global
- General Partner at Accretive LLC
- Former President and CEO of the Seagram Company
- Former Chairman and CEO of the Warner Music Group
- Recently successfully sold Warner for US$3.3 billion

Key Advisors
Ed Hotard
Former COO, Praxair
Eric (Ric) Redman
President, Summit Power
Ron Chance
Emeritus Science Advisor, Exxon
Rocco Fiato
Accelergy, Exxon
Michael Fleisher
Bain, Gartner
Sasha Mackler
Summit Power

Management & Technology Team:

- **Graciela Chichilnisky,** Co-founder & CEO
- **Peter Eisenberger,** Co-founder & CEO
- **Edgar Bronfman, Jr.,** Chairman
- **Kenneth Michie,** SVP of EOR Operations
- **Keith Meyer,** SVP of Energy & Oil Operations
- **Jason Offenhartz,** Finance & Business Associate
- **Dr. Eric Ping, Ph.D.,** Dir. of Technology Development
- **Tom Miller,** Engineer & Project Development
- **Sharon McIlnay,** Contract Attorney
- **Prof. Chris Jones,** Ph.D., Georgia Tech
- **Dr. Gopala Krishnan,** Ph.D., SRI International
- **Anoop Nagar**, SRI International

Advisory Board:

- **Ed Hotard,** Former COO Air Products
- **Eric (Ric) Redman,** President, Summit Power

- **Ron Chance,** Science Advisor, Exxon
- **Rocco Fiato,** Accelergy, Exxon
- **Roger Cohen,** Ex-Exxon
- **Shane Smith,** CEO of Vice

Financial & Legal Team:

- **Corporate Counsel:** Mitchell Zucklie, Esq., Chairman of Orrick, Herrington & Sutcliffe
- **IP Counsel:** Paul Sutton, Esq., of Sutton Magidoff (formerly Sr. Partner at Greenberg Traurig)
- **Investment Bankers:** Christopher Carter & Christopher Reynolds, Morgan Stanley UK
- **Auditors:** Citrin Cooperman
- **Controller:** Robert Bernstein, CPA, Esq., of Bernstein & Seidman

3

Impact of Mining on the Ecology in Parts of Khasi and Jaintia Hills

Edmund K. Mawkhiew

Introduction

The society would not be what it is today if geologic resources had not been discovered. The history of mining parallels the history of civilization. Many important cultural eras are associated with and identified by various resources or their derivatives: the *Stone Age* (prior to 4000 BC), the *Bronze Age* (4000 to 5000 BC), the *Iron Age* (1500 BC to 1780), the *Steel Age* (1780 to 1945), and the *Nuclear Age* (1945 to the present). Mining may be considered the second of human's earliest endeavours, after agriculture and the two ranked together as the primary or basic industries of early civilization. Even today, agriculture and mining continue to supply all the basic resources used by modern civilization.

This paper attempts to throw some light on mining and its impact on the ecology in parts of Khasi and Jaintia Hills based on field observations and excerpts from previous publications and reports on coal and limestone mining areas.

Mining

The term '*mining*'is used in its broadest context as encompassing the extraction of any naturally occurring mineral substances: solid, liquid, and gas, from the earth for human uses. Virtually every manufactured item contains mineral products which have been mined or quarried. Quarrying is normally associated with the extraction of rock using opencast techniques and leaving large holes in the ground.

Mining technique is a function of such variables such as depth of the

resources and the topography and geologic setting. Mining is usually done by two methods:

(i) *surface or open-castmining* or *quarrying* to extract surfaceor shallow resources and (ii) *underground* or *deepmining*, to recover deeper deposits.

The recovery of minerals and construction materials requires removal of vegetal cover with underlying soil mantle and excavating overlying rock masses which more commonly exceed the volume of the material sought. The end result is reshaping of the topography, generation of great volumes of waste and disruption of surface and groundwater circulation and impacts on the biodiversity. The network of roads constructed to service mining operations further aggravates the problem of land degradation.

Today, any mining activity attracts attention from the stand point of environmental impacts and their mitigation.

Mineral Resources of Meghalaya

Our state, Meghalaya is endowed with sizeable deposits of a number of valuable minerals. At present, coal and limestone are the only major minerals mined in the State. Locally, mining/quarrying of rocks and sand for use as building and construction materials etc. are being carried out. These include granite, quartzite, greenstone, quartz, sandstone, etc.

Coal excavation in Meghalaya started in Khasi Hills during 1840-1844. Since most of the coal deposits were small and isolated and it was not amenable for scientific mining. The extraction was locally carried out by what is known as "**rat-hole mining**", as literally the hole has an opening of 1 meter or less along which the miners crawl and excavate the coal. Mining activities proliferated to other districts of the State in the beginning of the 1970's. Commercial extraction of coal in Meghalaya began to flourish from 1979-80 onwards and a good amount of coal from Meghalaya is being supplied /exported to other states/countries. With the advance of technology and increasing demand, the mining methods became mechanized and improvised to increase the productivity but at the same time causing more damage to the environment.

At present, the *limestone* deposits are sustaining a number of cement factories. This is the only mineral-based industry in the state at present fed by the indigenous raw materials of coal and limestone. Although initially mining is being done manually, with the coming up of cement plants the state, mining is now being carried out mostly by mechanized open-cast method. Lime manufacturing was well established in Khasi Hills since 1830's but commercial extraction began to flourish only in 1965-66.

Depending on their availability, building and construction materials like quartzite, granite, greenstone, sandstone, and sand are also quarried in most

localities and the impact of this activity on the environment is significant in places where quarrying is intensive.

Quartzite, a metamorphic rock finds wide application as a building and construction material, for making walls (Mawthup), flooring/pavements (Mawsaling), and as gravels (Mawria), etc. The *Khasi greenstone*, a dark-green metamorphic rock is mainly used as a road-surfacing material. *Granites* (igneous rocks) are being chiselled into dimension stonesand also available in the form of coarse-sand (ShyiapMylliem), whereby small granite hillocks are being washed down with water pumped from nearby streams and rivers to decompose and break down the granite. Where *sandstone* (a sedimentary rock) is available, dimension stones are being chiselled as in the case of granites. Old buildings made by the well known '*Cherra Sandstone*' can still be seen till date. Sand is also locally available as hill-sand (Shyiap-lum) and river-sand (Shyiap-um). *Quartz* is also now being quarried locally and supplied to steel manufacturing plants within the state.

The famous Sonapahar *sillimanite* deposit in West Khasi Hills district, which produced superior grade sillimanite was geologically known since 1897 and had been exploited since 1922. It occurs at places in association with corundum. Initially, the mining was mainly confined to extensive surficial float ore concentrations, which thereafter got nearly exhausted and the production started declining. Mechanized open cast excavation of the main sillimanite-schist host rock was also undertaken in 1962 but due to erratic and sparse distribution of these bodies, production could not be raised to desired level.

Historically, even *iron-smelting* in Khasi Hills have been reported to have been carried out in these hills and sent to the plains or locally wrought into *codalees* (spades) and large chopper knives or *dhows* (daos), before the coming of the British. Iron slag are still being found in areas where smelting was being carried out.

The recent discovery of *uranium* at Domiasiat, has also brought Meghalaya in the limelight. In addition to the above mentioned minerals, the State is also endowed with a number of deposits of *fire-clay* and *china-clay* which are likely to sustain the future refractory and pottery industries. Besides, there are a number of recorded occurrences of varied minerals like *base metals, quartz, feldspar, corundum, glass sand, iron-ore, pyrite, bauxite,* and *rock phosphate*. As per present knowledge, most of these are either of little economic importance or yet to be assessed.

Impacts of Mining on the Environment

In general, mining affects all the components of environment and the impacts are permanent/temporary, beneficial/harmful, repairable/irreparable, and

reversible/ irreversible. Large scale denudation of forest cover, water scarcity, pollution of air, water and soil and degradation of agricultural lands are some of the conspicuous environmental implication in the mining areas. The ecological impacts of mining are complex and depend upon the location of the deposits and the mining methods.

- ***Physical Impacts***

  Defaced landscape, land subsidence, underground fires, soil erosion etc

- ***Ecological Impacts:***

  Deforestation and de-vegetation, loss of flora & fauna, ecosystem degradation

- ***Socio-Economic Impacts:***

  Positive- Employment opportunities, infrastructure facilities, economic gains, etc

  Negative- Displacement of population and migration, changes in employment pattern, changes in economy, resettlement and rehabilitation issues, etc

- ***Environmental Pollution:*** Air, water, soil and noise pollution.
- ***Health Impacts:*** Health hazards, accidents.

Ecological Impacts

The mining and quarrying of coal, limestone, sand, building and construction materials in Khasi and Jaintia Hills have made visually conspicuous impact on the ecology in the form of open scars devoid of vegetation, flora and fauna, pollution of land, water and air along with needs for resettlement and relocation of human habitat and diversions of roads and rivers. The impacts as observed can be summarized as follows:

- Intensive mining and quarrying has led to loss of natural landscape and biodiversity; loss of aesthetic value to the local landscape is visible in all places where intensive mining is being carried out. According to various studies, the number of tree and shrub species has decreased in coal mining areas. *Nepenthes khasiana* (Pitcher plant), an endangered species documented in and around the coalfields (like Jarain area) is highly threatened.
- Removal of topsoil as well as the vegetation for mining and quarrying operation affects the flora and thereby affecting the fauna of the area, changing the local ecosystem.
- Pollution of water in the surrounding water bodies have been reported,

in coal mining areas due to leaching from overburden dumps and the release of polluted water from the underground mines into the surface water bodies. The Tertiary coals of Meghalaya have a very high percentage of sulphur. Acid mine drainage (AMD), a metal-rich water is formed from the chemical reaction between water and coals containing pyrite, a sulphur-bearing mineral to form sulphuric acid and dissolved iron. This has an impact on the vegetation in the surrounding areas and the aquatic ecology of the local water bodies. Streams and rivers nearby coal mining areas are devoid of aquatic life.

- Dust in atmosphere, contributed by mining and associated activities, when deposited on the leaves of the plants in the surrounding areas retard plant growth.
- Noise and vibrations due to blasting and operation of the machines during mining and quarrying drive away the wild animals and birds from the nearby forests.
- Changes in local hydrology (water flow and quality) due to the impacts of mining and quarrying on water regime affects the overall availability and quality of water in and around the mining areas. Lowering of the water table has been observed at places such as Demthring etc.
- Indiscriminate sand mining, stone quarrying, blasting of rocks etc. is a common sight. This induces landslide and aggravates erosion causing siltation of streams and rivers beds leading to clogging and choking of channels. This can be seen around Umtyngar area. The Wah Umtyngar, a tributary of the Wah Umiew feeds the Mawphlang reservoir, which is the source of drinking water of the Greater Shillong Water Supply Scheme and may reduce the life of the reservoir. The same problem is also observed in the upstream of Wah Myntdu near Jowai.

Impact on the Society

The impact of mining on the society also needs to be mentioned as human beings are a part of the terrestrial ecology. The impact on the society starts as soon as a mineral is discovered and proved, and its mining potential is established. The impacts may be as follows:

- **Displacement of the People:** Mining activities may require clearing of the surface of all the buildings and structures along with the vegetation not only in the area designated for mining purposes but also in the neighbourhood for making external dumps and placing associated activities.
- **Changes in Employment Pattern and Livelihood:** The local people living in the designated mining areas and in the neighbourhood, who

generally depend on the land for their livelihood may give up farming, fishing etc. to work in the mines.

- **Changes in Demography:** Thepopulation of the area undergoes a major change. All the manpower - managerial, skilled, and semi-skilled required for mining and associated activities come from outside as such trained manpower are usually not available locally. In addition people come to the mining areas for trade, etc.
- **Changes in Economy and Economic Disparity:** The development of industrial and other associated activities in mining areas increase the level of the economic activities manifold. Increased industrial and economic activities generate more money and increase the buying power of the people leading to an increase in the cost of living. This adversely affects the other people, who are not associated with these activities bringing about economic disparity among the population living in these areas.
- **Water Scarcity:** Mining either by opencast or by underground methods affects the water regime, and thus causes a reduction in the overall availability and quality of water in and around the mining areas.
- **Health Impacts:** Health and well being of the people living in and around the mining areas get affected due to the pollutants in the air and water, noise and vibrations. The people working in the mines and associated facilities also get affected by the work place environment, which can cause various physical health and psycho-social problems.
- **Infrastructure Facilities:** The mining and associated activities in the mineral bearing areas may bring about infrastructural development, i.e., roads are constructed, schools and health centers are established, and communication facilities are developed, etc., which in a way tend to improve the quality of life.
- **Employment Opportunities:** The mining and associated activities offer opportunities of employment to the eligible people from the local populace.

Conclusion

Mining operations have undoubtedly brought wealth and employment opportunity in the mined areas but simultaneously has lead to extensive environmental degradation. From prehistoric times to the present day, mining has played an important part in human existence. Locally, environmental issues were hardly a problem for concern 25-30 years back. The reason could be that mining activity was being carried out manually and at a smaller scale and environmental

degradation was almost negligible. With the increase in population, there is a greater demand for minerals and as the demand grows, mining areas are also expanding; mining and quarrying methods become improvised and mechanized to increase theproduction but at the same time causing more damage to the environment.

On one hand, there are bright prospects of setting up of more mineral-based industries in the state or even the chances of setting up nuclear power plants in future, on the other hand the issue of environmental impacts and their mitigation.The mining activities may bring in the desired effect of economic growth but will affect the environment in a variety of ways, which will contribute to its further degradation. Mining and minerals are necessary as minerals form a very important part of a nation's economy, however, they are finite and non-renewable assets and even the best managed mines leave "*environmental footprints*".

Some may say that most of these adverse impacts predate environmental consciousness, laws and regulations, and technology that now enables greater control. In general, environmental priorities accompany economic affluence. But despite initiatives taken up by various bodies in the whole of the country, the quality of our environment continues to decline. The causes are many but some may be attributed to the lack of consciousness among the people and the slackness of the enforcement agencies.

Quoting from the book 'Environmental Law and Policy in India', "*If the mere enactment of laws relating to the protection of environment was to ensure a clean and pollution – free environment, then India would, perhaps, be the least polluted country in the world. But this is not so. There are stated to be over 200 central and state statutes, which have at least some bearing on environmental protection, either directly or indirectly. The plethora of such enactments has, unfortunately, not resulted in preventing environmental degradation which on the contrary, has increased over the years.*"

Environment and Mining - for our survival and growth & development, both are essential, not one at the cost of the other.

References

Bhushan, C., Zeya Hazra, M., Banerjee, S. 2008. *Rich Land Poor People – Is Sustainable Mining Possible?* NewDelhi: Centre for Science and Environment.

Coates, D.R. 1985. *Geology and Society*. Chapman and Hall, New York and London.

De, U.K. 2007. Dynamics of Coal and Limestone extraction in Meghalaya: A Comparative Analysis. http://mpra.ub.uni-muenchen.de MPRA Paper No. 5678.

Directorate of Mineral Resources 1985. *Technical report of the Directorate of Mineral Resources,* Government of Meghalaya, Shillong, Meghalaya.

Divan, S. and Rosencranz, A. 2001. *Environmental Law and Policy in India.* Oxford University Press, Second Edition.

G.S.I. 2009. *Geology and Mineral Resources of Meghalaya.* Geological Survey of India Miscellaneous Publication No. 30 Part IV Vol 2(ii) Meghalaya.

Oldham, T. 1984 (Reprint). *Geology Meteorology and Ethnology of Meghalaya.* Mittal Publications, New Delhi, India.

Sarma, K. 2005. *Impact of Coal Mining on Vegetation*: A Case Study in Jaintia Hills District of Meghalaya, India (M.Sc.Thesis).

Valdiya, K.S. 2011. *Geology, Environment and Society.* University Press (India) Private Limited.

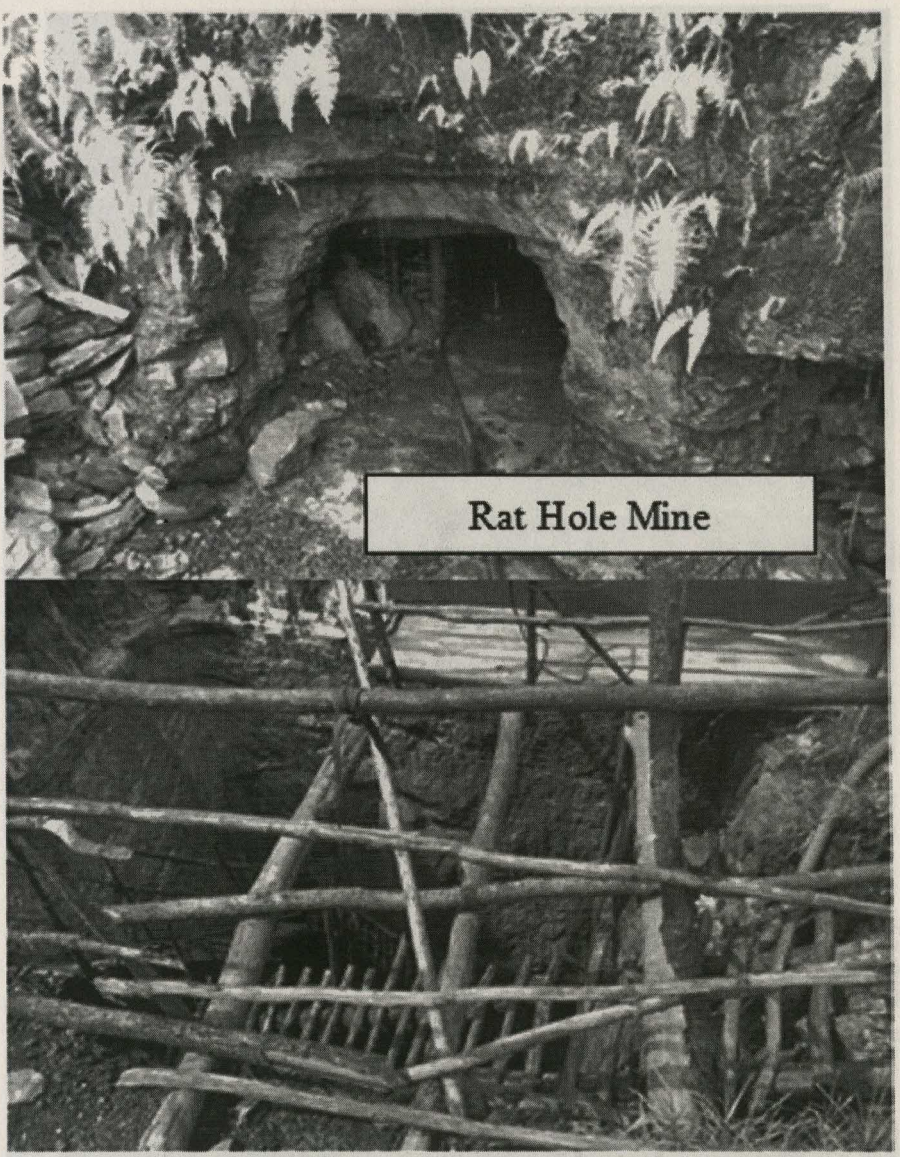
e-sources:

http://megdmg.gov.in/minerals.html

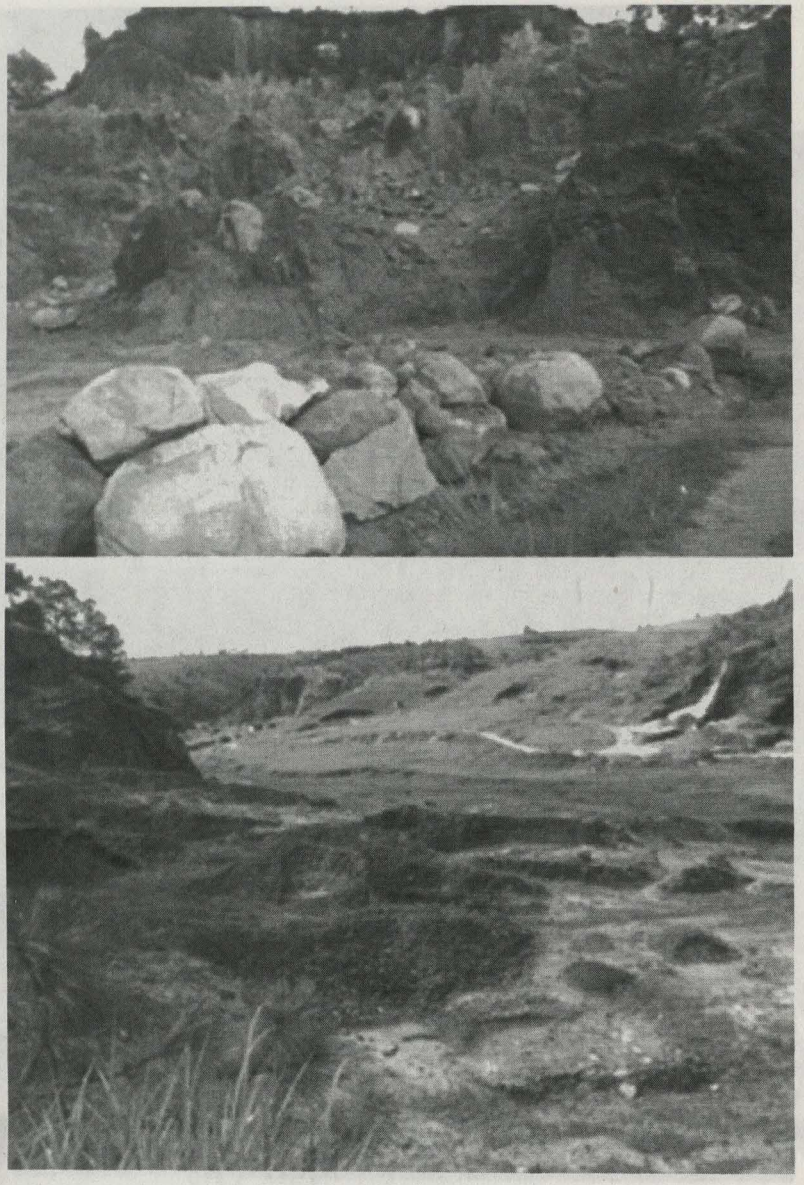
http://www.scribd.com/doc/158421142/An-Introduction-to-Geology-and-Hard-Rock-Mining

www.cienciaviva.pt/img/upload/Introductionto mining.pdf

www.oocities.org/envis_ism005/Envtl_**Impacts**.doc - *Environmental Impacts of Mining.* Contributed by: Prof. N C Saxena, Centre of Mining Environment, Indian School of Mines, Dhanbad (Jharkhand)



Traditional Coal Mining Methods



Visual Impact of Quarrying

Pitcher Plant

Silting of River

4

'Rat-Hole' Mining and the 'NGT' Ban: An Analysis of Socio, Economic and Political Impact of Mining Industry in Meghalaya, India

Iasuklang Kharumnuid
Krishna Chauhan
Sankar Sarma

Introduction

The presence of coal and limestone deposits in Meghalaya has been responsible for mining and started as a humble traditional practice carried out as a small-scale subsistence livelihood model for the families dependent in the rural area without any government interference. But in due course of time this gained volume and sizable population is depended on the coal and limestone mining which has been helping the local economy to some extent. Moreover due to the nature of property right and institutional mechanism things began to distort the model by unregulated exploitation which had its embedded consequences leading to an endless debate on right model of mineral exploitation and subsequently the environmental conservation. However the practice of unscientific and unregulated traditional method of 'Rat-Hole'* mining of coal (non-existent anywhere in India

* 'Rat Hole' mining is a primitive method that entails clearing ground vegetation and digging pits ranging from five to 100 square metres to search the coal seams. (The Hindu, 2012). Also it is a generic name used for mining of coal in Meghalaya which is unique traditional mining model (non-existent anywhere in India), where small hole of approximately two meter diameter is carved out for extracting coal which in due course takes the shape of winding caves and tunnels. This has been classified as unscientific and unsafe method of mining practice in Meghalaya.

due to safety concern) in Jaintia Hills and rampant extraction of coal has raised concern for the environmental safety and sustainability. ThereforeNational Green Tribunal (NGT) ban on coal mining has come as an institutional response to the environmental concern though various parameters of mining is yet to be analysed to justify the issue of rat-hole mining in Meghalaya.

Research Problems

'Rat-hole' mining in Meghalaya is contributing to the families' income and employment generation for long time and it has been practiced in traditional (unscientific and unregulated) model. Of late, the unexpected outcome of the coal mining and its ecosystem issues has been observed and has invited both social and political disapproval from various stakeholders. As there have been changes in the attitude and opinion on the coal mining among the people it has gradually turned into a burning issue after the imposition of ban on coal mining by the National Green Tribunal (NGT).

Objectives

To examine the impact of NGT ban on Rat-Hole mining and its various parameters like social, economic and political issues in Meghalaya.The plan of the paper is as follows: First of all, Impact of NGT ruling on mining and its effect on various stake holders in Meghalaya has been discussed. Then an analysis of alternative solution to the environmental crisis is examined.

Sources of Data

The issue being very current and problem still not addressed with sincerity, continuity of debate and discourse from various stakeholders are in progress. Therefore the study isprimarily based on the secondary data consisting of reports, various government publications, journals, news papers etc. However, primary data from labourers, families engaged in coal business and NGOs are collected to have better idea of the issue and arrive at the proper analysis.

Study Area and Climate

Meghalaya with a total geographical area of 22,429 sq. km is situated in tropical to temperate zone and characterized by undulating topography and wide variations in altitude, rainfall, temperature and soil conditions. About 85 percent of the total annual rainfall is received during monsoon season and has an average maximum temperature of 30° C and average minimum temperature of 14° C during the rainy season, with a maximum and minimum of 20° C and 8° C, respectively, during the winters. Khasi, Jaintia and Garo are the main indigenous tribal communities inhabiting the study area. The total population of the state is 2,964,007 (1,492,668 male and 1,471,339 females) with decadal population growth of 27.82 per cent (Statistical Abstract of Meghalaya, 2011-2012).

'NGT' and Its Institutional Issues

Meghalaya has large deposits of coal and limestone and unscientific "Rat-Hole" mining of coal in the Jaintia Hills and other parts of the region has been criticized for not only damaged ecology but also for its inability to uplift the economic condition of the local people and serving solely the interest of the coal merchants and compromising the welfare and livelihood security of the miners. Though, The Draft Meghalaya Mineral Policy 2010, Government of Meghalaya, a comprehensive policy on Mineral and Mining was finally approved by the Cabinet incorporating various clauses indispensable for the policy in 2012. It also announced the continuation of old practice of "Rat-Hole mining" prevalent in the state, and exploit mineral resources in a scientific manner taking into consideration interest of the state and the people. But the rat-hole mining and its embedded unscientific and unregulated issues kept environmental critics overhaul the institutional arrangement and demanded bridging of the gap between the traditional practice and current needs of the environmental and social protection. In this context The NGT on April 17 passed an interim order banning rat-hole coal mining in Meghalaya after the Assam based All Dimasa Student's Union and Dima Hasao District Committee filed a petition before it, which reported about the acidic discharge from coal mines of Meghalaya and polluting the Kopili River downstream. Following the complain, ban is also imposed in East Jaintia Hills, West Khasi Hills and south Garo Hills on transport of coal (which has been extracted and piled up at the mining site) till further order including all coal mining activities in the state.

The whole issue of Mining and NGT ban can be viewed from a simple model of institutional dynamic, where the traditional institution had approval on mining activities and was not accorded illegal till it was within the carrying capacity. Moreover the potential benefits that mining brought to the community were shared by both people and government (taxes on mining). Since institution change with time and socio, economic and political dynamic are evolved eventually, new mechanism areput in place to check the excessive resource use and to off-set the potential negatives on their concentration to a limited factor. These often lead to a conflict in the institutional arrangement and replacement of one is resisted in the beginning due to social and political maturity. Also the technological change is another key factor which determines the level of exploitation of resource and direct society when to restrain and respect the carrying capacity of a system so as and remain in sync with the nature and welfare. As resource in the economy has a life span and alternative arrangement should replace the existing, but in case of minerals like coal and petroleum efforts are still inadequate and no reasonable substitute is able to reduce the resource pressure especially in the developing and under developed countries due to various cost, availability factors etc. This has led to complex outcome like environmental

degradation, loss of flora and fauna etc. and further led to more exploitation of resource and damage to common property resource. Thus ban on mining activity is an outcome of gradual transition that has been under going over the years before it is blown out in open. However the transition period could not create smooth sail for the coal mining industry in Meghalaya and resulted in hysteria situation.

Social and Political Issues

Over the years mining became a preferred investment option to the mine owners due the nature of property right and absolute command over it without any interference from the government. The unique property right clause, where mines are privately owned by the mine owners and have unlimited access to the minerals exploration and extraction without any regulation has attracted various players. And various reports suggests that now businessman, politician, bureaucrats, and even the government officials including senior policemen are engaged in coal mining. A good number of politician and leaders are sharing a mining background though that does not question their integrity; however the crisis often gives rise to suspicion on their role and seriousness on the ecological and social issues when negative impact of mining are beginning to fall out.

Rising crime rate and rampant theft and loot has been reported from the coal mining area. Also the large exodus of migrant people and labourers to their native place has made them soft target of the anti social elements. Due to the unemployment and frustration many people are resorting to the criminal activities and reports of kidnapping, rape and killing has increased several folds in last few months after the imposition of ban by the NGT. Instances of abandoning and selling of children to the villagers for few thousands due to poor economic conditions and inability to support families by the migrant labourers after they lost employment in the mining activities has been observed. Social unrest and breakdown of the families in the mining area has created serious flaws, since it hints at the unplanned and irresponsible manner in which the tribunal is addressing these issues without taking adequate measure. Therefore families are displaced and disintegrated from their primary occupation and livelihood security. The NGT ban in a similar way has the vulnerability of creating various social ills like criminals, sick and depressed human capital, broken families, bleak future etc. in the mining belts due to sudden imposition of ban.

Politically NGT is also seen as an instrument of coercion in the hands of central government and considered to be discriminating with regard to the mining of other minerals like limestone which is kept outside the purview of the ban. It is also questioned whether mining is stopped for good with the regulation or is it a temporary phase? Whether after much debate and discourse mining will be back to its previous glory? thus, the outcome and alternative to the mining is not clear in the NGT. Besides, issues on alternative method of mining, pollution and

acidic discharge from other industries and mineral extraction including various concern of environmental protection are not addressed in the ruling. It has also been observed that there is a hidden agenda of transferring the mining in future to the big league by destroying the present set of norms and system which will facilitate the big promoters, who are said to be lobbying for mining in bigger scale and gain control over the mining rights in the state. According to certain reports and discussions there is a nexus between the politician and coal mafias at the local and national levels which is gaining momentum and are responsible for the delay in the process of redressal to the crisis. Rather there is an incentive to delay and prolonging the NGT ban for further negotiation with the various coal traders and merchants. In due course time when ban on mining is withdrawn most of the land and mine owners would have sold their lease and rights to the big multinational and league and are able to take over control of these resource and further deteriorate the ecology and economy.

Though mining has been blamed for infiltration of illegal labourers and settlers in the state and absence of time series data pose challenge to understand the accurate magnitude of the problem. However in 2012 government reported detection of over 12,000 Bangladeshi infiltrators during 2008 - 2012, in different parts of Meghalaya. Likewise laborers from Assam, Bihar, and Nepal are said to be the next big source of migration in mining industry from different parts of country and outside. In fact one of the agenda of the proposed imposition of Inner Line Permit (ILP) is primarily aimed at resolving the illegal migrant issues and check infiltration in the state. Though the ILP clause does not confront the registered labourers who are employed in various mines and construction sites under the appropriate labour laws but their numbers are very limited and majority are unregistered therefore are impacted by the rules. Together, NGT ban on mining and the ILP has caused mass exodus of the labourer from different coal mining areas and has led to a different social and economic issues. Also in the event of revival of mining activity there could be severe man power shortage and would negatively impact the mining industry.

NGT has also found that the model of safe mineral exploration and exploitation under 'rat-hole' mining have not been implemented by the coal mine owners despite the increase in the number of reported death of mine workers (Table-1), though number can be more than reported. It has also been highlighted that there has not been much effort from the government, NGOs or coalmine owners in spreading the awareness programme in connection with mine safety. Also due to non implementation of the mineral policy and relevant labour laws besides fixing the responsibility of mine owners in providing safety to the miners most accidents are occurring. Moreover this is true for the other mineral exploration though magnitude may differ but the metaphor remains the same but this has been excluded by the NGT ban which is partial in its effort to rectify social evils.

Table 4.1: No. of Reported Death in Coal Mines from different Places and Districts of Meghalaya

Year	No. of Death	Place and District	Reasons Reported for Death
2002	40	SGH	NA
2003	7	Nangalbibra, SGH	Drowned inside a mine
2009	8	Rongsa Awe, SGH	Trapped in a coal mine
2011	4	Siju, SGH and JH	Trapped and Toxic gas
2012	19	SGH and Chyrmang, JH	Trapped in coal mine
2013	10 (Till March)	EJH	Crushed and Trapped

Source: The Shillong Times, 13th March, 2013.
Note: SHG (South Garo Hills); JH (Jaintia Hills); EJH (East Jaintia Hills).

The issue of child labour is another stigma attached to the mining industry in Meghalaya and has been a serious take for the NGT and efforts from certain NGOs has significantly added volume in opinion building in this direction which is a fall out of the unscientific an unregulated mining practice in Meghalaya. But the question of child labour and extraction of coal by these minors has been observed critically and difference in opinion in this regard has been debated by both the NGOs and the Mine owners. As mining requires high physical activity with heavy implements it may be not possible for the minors to fit into the shoe of their elders and participate in the appropriate mining activity. Though, presence of some child labour between age group 14-15 is observed who are possibly participating with their elder family member in doing some petty job but that cannot be misunderstood for exploitation and employment of child labour as observed by the mine owners.

Though NGT ban is assuming to address these issues and assures changes in the employment of labours and their security from exploitative character of mining, however livelihood security of the mining labourers is a matter of concern and are silent as of now. Though the safety issues are addressed temporarily with the imposition of ban but the absence of alternative vocation and income source during the ban period is a serious concern and is threatening to trap the household to abject poverty and insecurity.

Economic Issues

The issue of timing of the NGT ban is viewed as a conflict of interest for various stakeholders who are directly or indirectly depended on the mining. Where mine owners and labourers complained of huge economic losses, due to abrupt sanction without prior notices and consultation as it compromised their survival.

With the imposition of ban only in coal mining it has resulted in the impoverishment of families dependent on it and remaining industries like limestone, sand, stone etc. mining are insulated. Such initiative by the tribunal is considered to be discriminatory and violate the fundamental right to livelihood and survival. Cement industries are also polluting the environment and threatening the ecosystem, however NGT ban has been silent on the issue. Coal being an important input for the cement industry ban has direct implication on them in near future. Since the power scenario and impending crisis in Meghalaya is getting worse over the years, it is also expected to impact cement including other industries in Meghalaya which are using coal as an input for their production. Besides, mining of other minerals is continuing to pollute rivers and degrade forest and environment in the state, region and rest of country. Rather ban should have been uniform on all mining and proper discussion and debate could be initiated before finally imposing complete ban on a particular industry.

NGT restriction on the transportation of coal from the site is another issue where about 3.4 million metric tonnes of extracted coal is lying in the open though miners' associations claim the figure to be about 9 million metric tonnes. This indicates huge loss of revenue and income to both the mine owners and the workers working in the coal mining industry. Since many mine owners could not make payment to the labourers, staffs and firms supplying goods and services due to unsold inventory which seriously impacted their household income and sustenance. The highest impact of the loss of income and employment are the wage labourers who solely depend on the daily income. Saving being almost negligible the possibility of meeting the crisis by these wage earners is remote. Therefore it is hitting hard to the wage labourers and petty firms. Also the stock pile of coal is adding volume to the pollution since extracted coal in Meghalaya is in dust form and monsoon being at peak, several lakh tons of coal is washed off to the downstream and further polluting the river and soil in the region. These are adding to the losses to the mine owners and labours whose income and investment are destroyed due to delay in the transportation of extracted minerals. Though, miners who owned and gained from mining activities over the years can seek alternative income source due to availability of capital by investing in other industries and production process and protect their income and sustenance. Though the time lag and skill is a challenge, government and NGT has not been able to give any assurance when the deadlock will open so that various stakeholders are motivated to change their business model and opt for alternative solution and explore investment opportunities.

Moreover delay in the decision to allow transportation of extracted coal, lots of hasty buying and selling of coal is taking place and big traders are engaged in future trading. Whereas small firms engaged in coal business in order to minimize the loss in the long run and fear of continuous fall in the prices of inventory due

to extension of ban and absence of any resolution and also the financial obligation they are selling their stocks at throw away prices. Which has resulted in panic situation and big businessman are taking advantage of these situation thus it is a loss of opportunity and income to them and gain for the wealthier capitalist class. Traders supplying goods and services to the coal mining areas also complained of huge losses on account of closure of mining activities and crores of rupees have been lost and there is no grantee if they would recover the losses incurred. Since most businessmen in coal mines have announced themselves bankrupt and refused to pay any dues on account of NGT ban, it has affected their business severely and fear for the worst as they are largely dependent on the business in the mining belt for their income generation and livelihood.

Also in the most cases displaced families from various developmental and conservation activities like construction of dams and hydal projects, national park, national highway etc. are given compensation and resettlement is prioritized to protect the livelihood and sustenance of the effected households. But under the NGT ban on coal mining there has not been any such assurance to the impacted families. Also, resettlement process and package for protection of livelihood security NGT is silent at present. Therefore it seriously challenges the fundamental right of the families who are traditionally depended on the mining and its related activities in Meghalaya.

Even though illegal toll gates and collection centre is menace to mining industry in Meghalaya, an average of Rs 1500 per truck is charged and about 20-30 thousand truck are plying in the coal belt and generate about Rs. 18 – 20 crores per day. Collected funds are shared by different stake holders and almost 30-40 per cent of the generated fund is directly spent in the economy by low income share groups like labourers, transporters etc. and with the ban and no activity, this will also have some impact through complex mechanism on the coal economy and various dependent factors.

Conclusion

Though NGT ban on rat-hole mining has an environmental priority and justifies the conservation issues of flora and fauna and protection from further degradation, however the man and nature conflict is not new and some balance has to be made. Neither of the stakeholders should be worse off than before so as to make lasting solution. Also, NGT should address these socio, political and economic issues while addressing the ecology so that everyone gains from the institutional interference and there is a greater participation from all parties. At the same time rehabilitation efforts has to be speed up for the families (wage labourers) depended on mining with priority on both economic and social security. NGT should also look into the issues of resource regulation so that no unscrupulous people hijack the precious resource for individual gain at the cost

of mass sufferings. Also efforts should be made to restore the degraded mining area so that a better message and conservation model can be handed down.

References

Advance Estimates of National Income, 2012-13, The Central Statistics Office (CSO), Ministry of Statistics and Programme Implementation, Government of India, 2013.

*Basic Statistics of North-Eastern Region, various issues, Shillong.*Government of Meghalaya (2009), Planning Department, *Meghalaya Human Development Report, 2008.*

Government of Meghalaya (2009), Directorate of Economics and Statistics, *Statistical Abstract of Meghalaya.*

Government of Meghalaya (2008-09), Directorate of Economics and Statistics, *State Development Report.*

Government of India, [online], http://www.censusindia.gov.in, *Census of India, 2001.*

Government of Meghalaya, Directorate of Economics and Statistics, *Pocket Statistical Handbook*, various issues.

Government of Meghalaya, Planning Department, *Twelfth Five Year Plan 2012-17 and Annual Plan 2012-13, Draft Proposals.*

Government of Meghalaya, Directorate of Economics and Statistics, *5th Economic Census 2005, vol.1.*

Hartwick, J. M. (2001), "Deforestation and Development in a small open economy," *Journal of Environmental Economics and Management,* Vol,41, 235 – 251.

https://www.oxfam.org.au/explore/mining/impacts-of-mining/(Visitedon 06/08/2014)

Kharumnuid, I., Chauhan, K., and Sharma, S. (2013), "New Mineral Policy -A Changing Perspective And Vision: An Insight Into Dynamics Of Unscientific And Unregulated Mining In Meghalaya", paper presented in the National Seminar, on the Theme,"Burning Environmental Issues: Risk to Biodiversity and Human Health with special reference to the North-East India,"organized by Saint Mary's College, on 15-16 May 2013 at, Shillong, Meghalaya, India.

NER Vision 2020, Ministry of Development of NER, NEC.

Oslon, M. (1965), *The Logic of Collective Action: Public goods and the Theory of Group,* Harvard University Press.

Ross, M. (2001), *Extractive Sectors and the Poor*, an Oxfam America Report(http:// www.oxfamamerica.org/, accessed October 29, 2012).

Strongman, J. (1998), "Mining and the Community-From Enclave to Sustainable Development," in *Mining and the Community for Asian and Pacific Nations Conference,* proceedings of a conference organized by the World Bank, Metal Mining Agency of Japan, Papua New Guinea, Department of Mineral Resources, and PNG Chamber of Mines and Petroleum, July 26-28, 1998, Madang, Papua New Guinea.

The Handbook of Statistics on the Indian Economy. RBI, 2011-2012 and 2012-2013.

The Shillong Times (2013), Shillong, 13th march 2013, Meghalaya, India.

Titenberg, T. (1968), *Environmental and Natural Resources Economics*. London: Foresman and Company.

The Hindu (2012), "Meghalaya announces mining policy, accept rat hole mining", October 2012 (http://www.thehindubusinessline.com, visited on May, 2013).

5

Myntdu Leshka H.E. Project – Experiences in Acid Mine Drainage

E. Lyngdoh
K. Tiewsoh
A. K. Jain

Introduction

Myntdu Leshka H.E. Project Stage-I is a Run-of-River Scheme on the Reiver Myntdu in Jaintia Hills District of Meghalaya. The Project utilizes discharge of Myntdu River from a catchment area of 350.00 sq.km. The Project with a net head of 300.30m available between Leshka Dam Site and the Power House site is having installed capacity of 126 MW (3x42MW).

The Causes of Acidity in River Myntdu

The Myntdu River starts off with a pH value of 6.77 at the source near Jowai. The pH value recorded after the confluence of Umshariang and Lamu with Myntdu is less than 5.0 at Leshka dam site, while before the confluence it has a pH value around 4.20. It has been observed that the tributaries having low pH are located in proximity of the coal mining and coal dumping area in the catchment area. Water flowing over coal refuses piles; dumped coal mine is typically highly acidic with slightly elevated levels of dissolve metals. These are also commonly known as Acid mine Drainage. The overall summary reaction is as follows:

$4FeS_2$	+	$15O_2$	+	$14H_2O = 4Fe(OH)_3$	+	$8H_2SO_4$
Pyrite		Oxygen		Water		Sulphuric Acid

The Nature of Attack of Acidic River Water on Concrete

Aging of concrete dams and appurtenant works is quite often related to the quality of water and permeability of concrete. Water is usually available and is generally involved in the forms of deterioration of concrete. Deleterious chemical effects causing

Lime Stone Treatment what ICOLD terms as 'aging of concrete' include leaching of cement paste by acidic solutions.

The treatment the catchment area was done very seriously. Meghalaya has large deposits of limestone near Cherrapunji and near the Myntdu Leshka project area. Major small and big nallahs/tributaries joining the river Myntdu from Urhali to Leshka dam site were identified and treated regularly with limestone to keep the pH within acceptable range. Typically these minor tributaries were allowed to pass over a band of limestone layer for this pilot projects in collaboration with IIT Kharagpur were made operational. A holistic approach was adopted taken to tackle the problem of acidic water.

Protection of Concrete

Concrete in the dam was protected externally and internally.

Internal Protection comprised making concrete as dense and impermeable as possible. Concrete with low water/cement ratio is prerequisite for making concrete impermeable. Use of supplementary cementatious materials like fly ash, ground granulated slag of silica fume were used in construction. Uses of fly ash, slag of silica fume in concrete or blended cements like PPC, helped in improving the impermeability of concrete by pore blocking, and were helpful in combating sulphate attack. Strict quality control in concreting operations was maintained.

External Protection was used as a protective barrier which made the concrete more watertight and reduced ingress of acidic river water.

Conclusion

The presence of acidity has led to the difficulty in execution of Myntdu Project with cost implications but the project authorities have protected the hydraulic structures. The question remains who will bear the cost of degraded environment? Here pit head lime stone treatment may be the answer.

Pit Head Solution: As AMD is contributed from coal mines so it is prudent if Meghalaya Government comes up with notification which makes it incumbent upon individual mine owners to make limestone treatment plant which costs about Rs. 20,000 app. To make and Rs. 5000 app to maintain very year for changing of lime stones etc. in comparison to the huge profits earned this is a meager amount. It will contribute to the protection of aquatic life in the catchment area. This responsible work may help the concerned authorities to consider lifting NGT ban which is affecting the livelihood of many state citizens.

6

Renewable Energy and its Challenges: An Indian Perspective

Mohit Gupta
Bikramjit Rattu
Jatin Sethi

Executive Summary

Indian Power sector is hugely dependent on coal as its primary energy source. Apart from coal, water, oil, gas, nuclear energy and renewable sources are also used for electricity generation, though the share of latter four is very less. India has the world's 5th largest electricity generation capacity and it is the 6th largest electricity consumer accounting for 3.4% of global energy consumption. The potential of India's renewable energy generation is about 3000 GW but only 29.8 GW which is less than 1% of the total potential has been tapped so far. Renewable energy share in total energy mix has risen from 7.8% in FY08 to 12.3% in FY13. Immense challenges on energy security are lying ahead for India. These include the urgency to immediately bridge the current gap in energy demand and supply and to ensure a secure energy future in the light of India's growing population and economy. As the prices of coal generated energy are increasing due to increasing reliance on imports, renewable energy promises not just a bridging solution to the present power crisis but also a permanent fix to India's ever increasing electricity requirements. The growth of renewable sector will boost the country's high economic growth aspiration and also benefit the millions of people in rural areas still waiting for electricity connections. In this research paper we will analyze the different central Government and state government policies to facilitate development of RE projects in the country. We

will do a state wise analysis to demarcate the states having favorable conditions and policies for the growth of RE energy. Along with this we will study the challenges for the development of renewable energy sector in India, which can be predominantly classified as a) Institutional barriers b) Economic and Technological barriers and c) Market-related barriers.

Indian Power Sector

Overview

Power has been one of the major fuels which have been driving economic growth since time immemorial. Power has been unanimously recognized as one of prime inputs which have resulted in rapid economic growth. There is a strong two-way relationship between economic development and energy consumption. On one hand, growth of an economy, with its global competitiveness, hinges on the availability of cost-effective and environmentally benign energy sources, and on the other hand, the level of economic development has been observed to be reliant on the energy demand.

Figure 1 depict the relationship between year-on-year increase in generation of electricity and GDP growth rate. Note that one clearly follows the other in all years except for the most recent 2011-2012 when economic growth (growth in GDP) plummeted due to various other reasons (including but not limited to the effects of widespread problems in EU and high inflation at home).

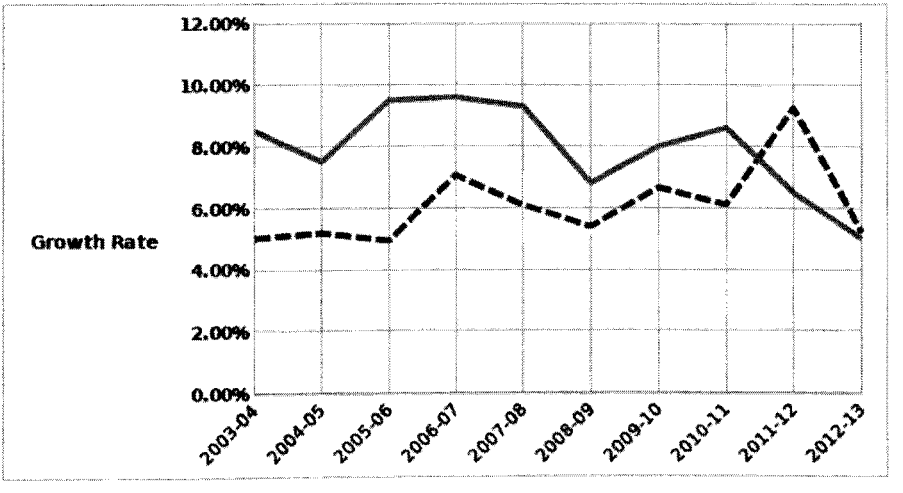


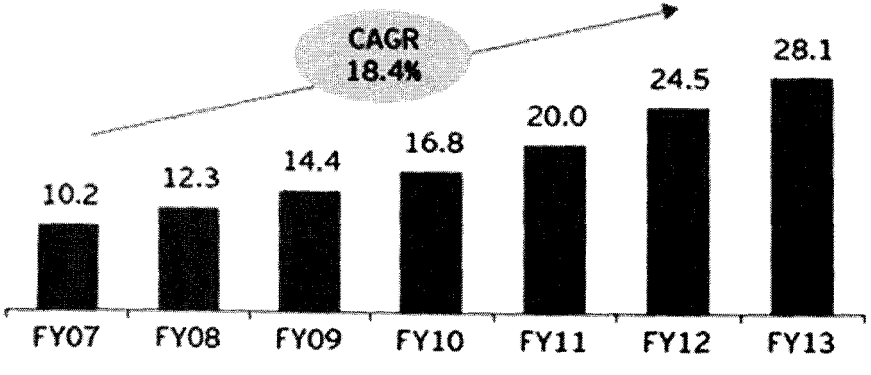
Fig. 6.1: India Growth in Electricity Generation and GDP Growth Rate – A Clear Relationship

Current Scenario

India has the fifth largest power generation portfolio worldwide. Coal and gas are the popular sources and account for 57% and 9 % share, respectively. The country has been rapidly adding capacity over the last few years, with total installed power capacity growing to 237.74 GW as of February 2014 from 98 GW in 1998. The country transitioned from being the world's seventh largest energy consumer in 2000 to the fourth largest one within a decade. Economic growth and increasing prosperity, coupled with factors such as growing rate of urbanization, rising per capita energy consumption and widening access to energy in the country, are likely to push energy demand further in the country.

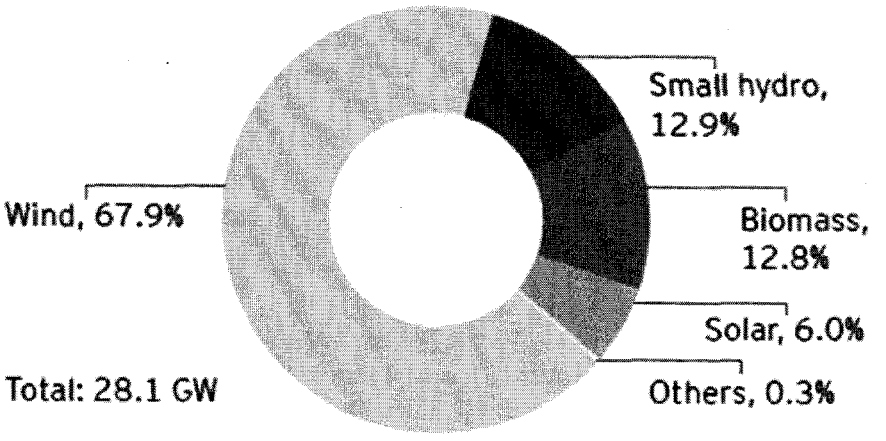
Position of Renewable Sector in the Power Sector:

Power Generation from renewable sources is on the rise in India, with the share of renewable energy in the country's total energy mix rising from 7.8% in FY08 to 12.3% in FY13. India has about 28.1 GW of installed renewable energy capacity as on 31 March 2013. Wind accounts for 68% of the capacity, with 19.1 GW of installed capacity, making India the world's fifth largest wind energy producer. Small hydro power (3.6 GW), bio energy (3.6 GW) and solar energy (1.7 GW) constitute the remaining capacity. In FY13, wind capacity additions fell to 1.7 GW from almost 3.2 GW in FY12 as a result of withdrawal of accelerated depreciation and Generation Based Incentive (GBI) benefit. Although the share of renewable energy in the generation mix has been rising over the years, India still has large untapped renewable energy potential.



Source: MNRE

Fig. 6.2: Growth of Installed Capacity of Renewable Energy in India (GW)



Source: MNRE as on 31 March 2013

Fig. 6.3: Installed Capacity of Renewable Energy in India

Investments

Investment in clean energy in India decreased 45% year on year to US$ 6.9 billion in 2012. The wind energy sector attracted US$ 3.4 billion, while the share of the solar energy sector was down 45% to US$ 2.32 billion.

Targets

The Government of India (GoI) has set a renewable energy capacity addition target of 29.8 GW for the twelfth FYP, taking the total renewable capacity to almost 55 GW by the end of FY17. This includes 15 GW from wind, 10 GW from solar, 2.7 GW from Biomass and 2.1 GW from small hydro. Investment in renewable energy is expected to almost quadruple to INR 3186 billion in the 12th FYP from INR 892 billion in the 11th FYP, implying average annual investments of nearly INR 640 billion.

Table 6.1: Renewable Energy Actual Installations and Target

Renewable Technology	2010-11		2011-12		2012-13		2013-14	
	Target (MW)	Actual (MW)	Target (MW)	Actual (MW)	Target (MW)	Actual (MW)	Target (MW)	Actual (MW)
Wind Power	2000	2350	2400	3197	2500	1699	2500	512
Small Hydro	300	307	350	353	350	237	300	54
Bio Power	472	474	475	488	475	472	425	-
Solar Power	200	27	200	905	800	754	1100	75
Total	2972	3157	3425	4943	4125	3162	4325	640

Source: MNRE

To put things in perspective, planned renewable capacity additions during the 12th FYP are almost one third of planned conventional energy capacity addition during the same period. In FY13 targets were not met, as a result of decline in wind installations.

Key Drivers of Renewable energy in India

(a) Energy Security Concerns

India ranks fourth and sixth globally as the largest importer of oil, and of petroleum products and LNG, respectively. India's primary energy consumption between 2007 and 2011 increased at a CAGR of 5.8%, from 18.8 quadrillion (10^15) Btu to 23.6 quadrillion Btu. As a result of the increasing demand and stagnant domestic production, India now meets more than 70% of its oil demand through imports (increased from INR 4091 billion in FY10 to INR7264 billion in FY12).

Given the heightened competition for the procurement of fossil fuels, the prices of petroleum products have been increasing and have witnessed considerable volatility in recent years. The increased use of indigenous renewable resources is expected to reduce India's dependence on expensive imported fossil fuels.

(b) Government support

The government is playing an active role in promoting the adoption of renewable energy resources by encouraging private sector investment and mandating the use of renewable resources. It is offering various incentives, such as GBIs and tax benefits, to encourage the development and use of renewable energy sources.

(c) Climate Change

India is among the most vulnerable countries to the impact of climate change. In June 2008, India released a National Action Plan on Climate Change (NAPCC) comprising eight national missions. The plan aimed at promoting the understanding, adaptation and mitigation of climate change, energy efficiency and resource conservation. One of the missions, National Solar Mission, aims to promote the development and use of solar energy for power generation and other uses, with the ultimate objective of making solar energy complete with fossil based energy options.

(d) Increasing Cost competitiveness of Renewable Energy Technology

Renewable energy is becoming increasingly cost competitive compared to fossil fuel based generation. Renewable energy equipment prices have fallen dramatically due to technological innovation, increasing manufacturing scale and experience curve gains. This is particularly true of solar and wind technology

where solar module prices have declines by almost 80% since 2008. Wind turbine prices have declined by more than 25% during the same period. Falling equipment prices have led to large scale deployment of these technologies in India and globally. India's installed solar capacity increased to 1686 MW at the end of FY13 from almost 20 MW in FY11.

(e) Distributed Electricity Demand

Renewable energy is a distributed and scalable resource, making it well suited to meet the need for power in remote areas, which lack grid and road infrastructure.

(f) Favorable Foreign Investment Policy

The government has created a liberal environment for foreign investment in renewable energy projects. In addition to allowing 100% foreign direct investment (FDI), the government is encouraging foreign investors to set up renewable energy based power generation projects on a build own operate basis in the country.

(g) Vast Untapped Potential

India has abundant untapped renewable energy resources. The country's large land mass receives one of the highest levels of solar irradiation in the world. It has an extensive coastline and high wind velocity in many areas. This provide ample opportunities for the establishment of land based renewable energy generation as well as for offshore wind farms. In addition the country's numerous rivers and waterways have strong potential to generate hydropower. India also has significant potential to produce energy from biomass derived from agricultural and forestry residues.

Table 6.2: Comparison of Estimated Potential and Installed Capacity of Different Resources

Resource	Estimated Potential (GW)	Installed Capacity (GW)
Wind	102.8*	19.1
Small Hydro	19.7	3.6
Bio- Power**	22.5	3.6
Solar Power (billion GWh)	6	1.7

Source: MNRE, installed capacity as at end March 2013

***At 80 meter height, wind potential has yet to be validated with actual measurements**

****includes biomass and bagasse cogeneration**

State Wise Potential of Renewable Energy Sources

Small Hydropower

Small hydro power (SHP) accounted for a share of 13 percent in the total

installed renewable capacity at end of March 2013 which is second largest after wind energy (68 per cent). Karnataka has the largest installed base of 964 MW, followed by Himachal Pradesh at 588 MW. The table below shows State-wise installed SHP capacities (end of 2012-13).

Table 6.3: State-wise Installed SHP Capacities (end of 2012-13)

States	No. of Plants	Capacity (in MW)
Karnataka	**140**	**964**
Himachal Pradesh	**149**	**588**
Maharashtra	51	300
Andhra Pradesh	67	219
Uttarakhand	99	175
Kerala	25	158
Punjab	46	155

MNRE has targeted capacity additions of 2,100 MW of SHP capacity in the Twelfth Five Year Plan. 6,474 potential sites have been identified for development of SHP plants with an aggregate capacity of 19,749 MW across different states of India.

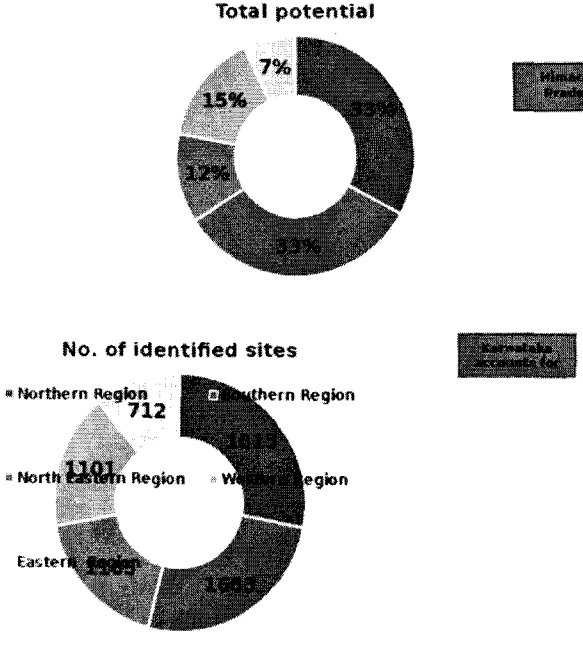


Fig. 6.4: Region-wise Break up of Identified Potential SHP sites and capacity

1,833 SHP sites with a potential capacity of 6,605 MW have been identified in northern India. Himachal Pradesh, with a SHP potential capacity of 2,398 MW, accounts for 36 per cent of the total potential capacity in this region. The southern region has a potential of 6,483 MW. Karnataka has the highest potential at 4,141 MW, which accounts for 64 per cent of the total potential capacity in this region. So, the major focus is in Himachal Pradesh in the north and Karnataka in the south.

Biomass Power

As on March 2013, the total installed capacity of biomass-based power has increased to 3,697 MW. Almost 562 MW of capacity has been added in 2012-13, of which nearly 475 MW was added by Maharashtra and Uttar Pradesh. Currently, chief sugar cane producing states- Uttar Pradesh and Maharashtra lead the market, with installed capacities of 782 MW and 767 MW respectively. The potential for power generation from biomass is nearly 17,500 MW (agro residue and plantations) while an additional 5,000 MW potential exists in bagasse-based co-generation.

Table 6.4: State wise Installed Biomass Capacity in Major States

States	Capacity (in MW)
Uttar Pradesh	**777**
Maharashtra	**757**
Tamil Nadu	539
Karnataka	491
Andhra Pradesh	381
Chhattisgarh	250

Table 6.5: State-wise Potential Capacity for Bagasse-based Power co-generation in India

State	Biomass Potential (MW)	Bagasse Potential (MW)	Total	% of Total Potential
Punjab	**3172**	**300**	**3472**	**15**
Maharashtra	**1887**	**1250**	**3137**	**14**
Uttar Pradesh	**1617**	**1250**	**2867**	**13**
Haryana	1333	350	1683	7
Karnataka	1131	450	1581	7
Gujarat	1221	350	1571	7
Tamil Nadu	1070	450	1520	7
Bihar	619	300	919	4
Andhra Pradesh	578	300	878	4
Others	4910	-	4910	22
Total	**17538**	**5000**	**22538**	**100**

Punjab has the maximum potential of power generation through biomass while leading sugarcane producing states like Uttar Pradesh and Maharashtra have the maximum potential for bagasse-based power generation. These 3 states account for 42 per cent of the total biomass and co-generation capacity in the country.

Wind Power

Considering major states, the current capacity utilization is just 14%. More than 75% of the total potential capacity lies in the states of Gujarat, Andhra Pradesh, Karnataka and Tamil Nadu. While Tamil Nadu has ultilized 36% of its potential capacity, this number is quite low in the states of Karnataka and Gujarat (under 10%), and in Andhra Pradesh it is just 2.3% (see Figure).

Table 6.6: State-wise Wind Power Capacity and Potential

Installed Capacity (MW)		Estimated Potential (MW)			Installed as % of Overall
State	Total Installed Capacity	@50m	@80m	Overall	
Andhra Pradesh	447.7	5394	14497	19891	2.3%
Gujarat	3174.9	10609	35071	45680	7.0%
Karnataka	2135.3	8591	13593	22184	9.6%
Kerala	35.1	790	837	1627	2.2%
Madhya Pradesh	386	920	2931	3851	10.0%
Maharashtra	3021.8	5439	5961	11400	26.5%
Rajasthan	2684.9	5005	5050	10055	26.7%
Tamil Nadu	7162.3	5374	14152	19526	36.7%
Total	**19,048**	**42,122**	**92,092**	**1,34,214**	**14.2%**

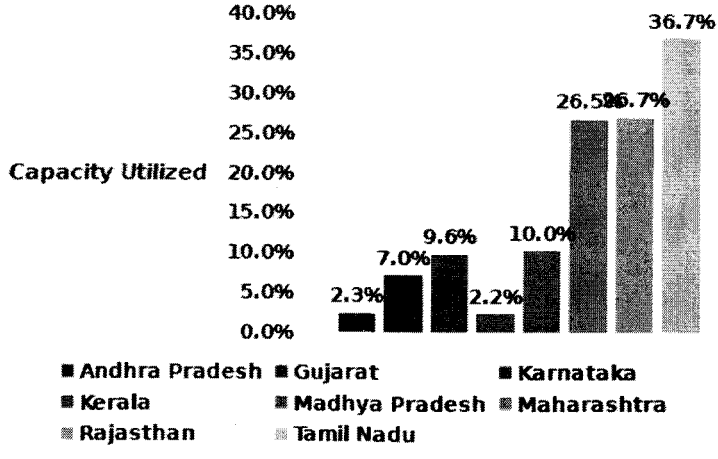


Figure 6.5: Total Installed Capacity of Wind Power as a Percentage of Total Potential

Capacity additions were led by states such as Maharashtra and Andhra Pradesh, which added 1.1 GW and 300 MW respectively (in 2013-14) driven by attractive preferential tariff. Moreover, the financial health of state distribution companies (discoms) is relatively better. On the other hand, capacity additions in Tamil Nadu continued to remain low due to inadequate evacuation infrastructure and significant payment delays from the discom. Inadequate evacuation infrastructure led to significant generation loss of 1.2 billion units over Jan-Dec 2013. Further, developers faced payment delays of over one year due to weak financial health of the state discom.

In Karnataka, while preferential tariffs are unattractive, capacity additions were steady due to additions from captive consumers on account of high industrial tariffs. In the near future, Maharashtra, Andhra Pradesh, Rajasthan and Madhya Pradesh are expected to lead capacity additions driven by favorable economics. In addition, relatively better financial health of discoms such as Maharashtra and Madhya Pradesh are also expected to support additions. This is also reflected in the upcoming projects which are at advanced stages of construction

Solar Power

Solar power capacity has observed rapid growth over the last few years to reach 1,686 MW (as of March 2013). Gujarat and Rajasthan lead in terms of capacity commissioned, accounting for more than four-fifths of the total installed solar power capacity in the country.

It is expected that 400 MW capacities will be added over the next 2 years under state solar policies despite PPAs signed for 750 MW. This is largely on account of aggressive bidding and poor payment security mechanism.

Aggressive bidding is seen under various state policies such as Tamil Nadu, Andhra Pradesh and Rajasthan. In states such as Uttar Pradesh (UP) and Punjab, bidding has been comparatively less aggressive as capacities were awarded based on reverse bidding. But, poor evacuation infrastructure in UP, high land prices in Punjab and possible delays in payments due to weak financials of both state discoms is expected to limit additions. Madhya Pradesh, on the other hand, is expected to witness healthy capacity additions given attractive tariffs, favourable policies such as banking through the year and long gestation period.

Moreover, states such as Gujarat, Orissa, Kerala and Andhra Pradesh have been encouraging rooftop projects over the last 18 months. Gujarat has installed grid connected rooftop projects in Gandhinagar (5 MW) and has such projects under implementation across five cities namely, Vadodara (5 MW), Mehsana (5 MW), Rajkot (6.5 MW), Surat (5 MW) and Bhavnagar (3.5 MW). Andhra Pradesh has introduced rooftop policy providing net metering facility to customers under which the consumer can utilize the solar energy generated for self-

consumption and inject the excess power in the grid. The state government of Orissa has also approved a proposal for installation of solar panel on rooftops of all government establishments in Bhubaneshwar and Cuttack area.

The figure below shows the source-wise installed capacity of renewable energy. It can be seen that the major contribution is from wind energy. Then, solar energy is the next major contributor making its considerable share only recently. Now, the main area of focus is on solar energy and wind energy.

Government Commitment for Future of Renewable Energy (Policy Support for RE in India)

Government interventions remain the backbone of RE market development across the globe. A review of policies and regulatory frameworks across countries indicates that commercialization of RE technologies remains dependent on government support, be it in the form of fiscal support or other support like favorable access to the grid. International experience is replete with successful examples of governments leveraging these instruments to scale up RE deployment. Some of the most successful examples are Germany (soft loans for residential solar photovoltaic systems and feed-in tariffs for wind and solar), Japan (net metering, grants for demonstration projects and subsidy for de-centralized residential solar photovoltaic systems), California, U.S. (production and investments tax credits, net metering, renewable portfolio standard for states, and feed-in tariffs for all RE technologies), Texas, U.S. (RE purchase targets) and Spain (high feed-in tariffs for solar).

Availability of suitable policy instruments provides the right incentives for the development of RE with the view of ensuring greater long term adoption and global cost competitiveness. India has been at the forefront of RE development due to its proactive policy and regulatory frameworks. India has successfully designed and launched a number of policy instruments which have enhanced the viability and bank ability of RE projects. The use of these instruments at the state and the central levels has allowed large scale deployment of RE and development of new, business models across the country. The key policy instruments for promotion of RE include: tax incentives, FiTs, subsidies, RECs, and GBI. However, India's experience with such instruments has not been without challenges: the design and implementation of these instruments has often been hampered by uncertainty on continuity and frequent revisions. This section of the report identifies some of these instruments, describes their design, use and the constraints which have been limiting their effectiveness.

Tax Incentives

Income Tax Exemption

All companies in India are required to pay taxes on their profits. At present,

the corporate tax rate is 32.45 percent for income below INR 100 million (USD 1.6 million) and 33.99 percent for incomes above INR 100 million (USD 1.6 million). The GOI, under Section 80-IA of Income Tax Law Act, 1961 (IT Law), exempts all infrastructure assets (this includes RE generators) from income tax for a block of any 10 consecutive years out of the first fifteen years of operation.

Accelerated Depreciation

In order to promote RE, the GOI provides a higher depreciation rate (80 percent for plant and machinery) for non-wind RE projects vis-a-vis 7.84 percent for thermal power plants and 15 percent for other power equipment. An additional 20 percent depreciation is available for all manufacturing and production companies in the first year of operation. Thus, non-wind RE assets and wind assets can be depreciated 100 percent and 35 percent respectively in the first year.

The benefit was withdrawn in April 2012. This withdrawal negatively impacted the growth of wind capacity. For instance, during the FY 2012-13, only 1,700 MW of wind power capacity was added as compared to 3,164 MW in the previous financial year.

Feed-in Tariffs

One of the most successful policy instruments for promoting RE has been the FiTs. State governments across the country have been providing long term support to RE through FiTs, also known as preferential tariffs. Under the FiT framework, RE power is procured by Distribution Companies (DISCOMs) at the FiT specified by SERCs. FiTs, applicable over a period of 10 to 25 years, ensure predictable financial returns over the life of the project. The SERCs determine FiTs for each RE technology (separately) using a cost plus approach based on following factors:

- Achievable capacity utilization factors based on the availability of fuel/ resource
- Operating costs (cost of fuel, O&M expenses, capital replacement)
- Capital expenditure (project cost)
- Share of debt and the cost of debt; and
- Expected return on equity.

Renewable Energy Purchase Obligations

RPOs stimulate demand for RE by providing a guaranteed market for RE power. RPOs in India have been mandated by the Electricity Act, 2003 and the National Tariff Policy, 2011. RPO targets are defined as a percentage of the total power consumed or distributed by the obligated entities, which include any of the following groups of entities:

- Distribution companies
- Captive power consumers
- Open access consumers

These obligated entities can meet their RPO targets either by generating renewable power from captive sources; purchasing renewable power; and/or purchasing RECs. If obligated entities are unable to meet their RPO targets through either of the above mentioned means, they face a penalty for non-compliance equivalent to the forbearance price of RECs. The obligated entities need to meet their RPO targets before the end of each financial year.

However there is a lack of consistency in the methodology used for determining RPO targets for a state. As a result, the RPO targets set by the states vary substantially, ranging, from one percent in Tripura to 10.25 percent in Himachal Pradesh. RPO targets have been adopted by most states but met by the obligated entities in only a handful of states. Penalty enforcement has been hindered because state utilities have poor financial health. So far, none of these entities have been penalized for non-compliance also, a proper monitoring system for tracking achievement vis-a-vis the RPO target has not been established.

Renewable Energy Certificates (RECs)

The Central Electricity Regulatory Commission (CERC) has included the purchase of RECs as one of the ways of meeting the RPOs. The REC program aims to provide market based incentives for RE developers and distribute the marginal cost of RE deployment nationwide. The REC program has two objectives: to facilitate achievement of RPO targets for obligated entities not able to invest in RE; and to facilitate creation of RE capacities in regions with the least cost of generation and abundant RE resources.

CERC, through the REC framework, has bifurcated the electricity and renewable components of RE. Power generators can sell electricity and RECs to two distinct users. Projects availing REC benefits cannot take advantage of any of the preferential benefits (concessional wheeling charges, banking facility, electricity waiver or sale of power to DISCOM at FiTs). The projects availing RECs can sell power under open access to third party or group captive customers or sell power to distribution companies at the average pooled purchase cost (APPC).

Projects must also be connected to the grid in order to be eligible for RECs. One REC is equivalent to 1 MWh of renewable power generated, and is valid for a period of two years from the date of issuance. These certificates can be bought and sold through two designated exchanges, i.e., India Energy Exchange and

Power Exchange of India. Only eligible generating entities are allowed to sell and purchase RECs. The RECs cannot be resold and, once traded, can only be used by the buyer for meeting its RPO target. CERC has established a trading range for solar and non-solar RECs by setting a floor price and a forbearance price. These prices are determined based on the difference between the marginal cost of generation from RE and conventional sources.

Subsidies

Grid-connected RE

MNRE and several state governments, support the development of grid-connected RE through the provision of subsidies. For example, for biomass based RE projects, MNRE provides a subsidy of up to INR 2.5 million per MW (USD 40,000 per MW) to special category states, and up to INR 2 million per MW (USD 32,000 per MW) in the rest of India . Some states, such as Bihar, also provide a capital subsidy equivalent to 60 percent of the total project cost for biomass-based RE projects.

Rural Electrification Programs

MNRE also provides subsidies to encourage rural electrification based on RE resources. However, most of these subsidies are restricted to state implementation agencies and not-for-profit organizations. The subsidies provided through these programs include:

- Decentralized Distributed Generation (DDG) scheme under Rajiv Gandhi Grameen Vidyutikaran Yojana, 2005 (RGGVY): The DDG scheme covers all un-electrified villages and hamlets with little or no electricity access. The scheme promotes a Build Operate Maintain and Transfer (BOMT) model.
- Remote Village Electrification Model: This is MNRE's flagship scheme and was started almost a decade ago (2002-03). This scheme covers villages that are not covered under the RGGVY program and have been designated as being remote by GOI.
- Jawaharlal Nehru National Solar Mission (JNNSM): One of the key components of the JNNSM is the development of small and off-grid solar PV applications which include DDG-based power plants. Under this program, MNRE supports village electrification projects that use solar energy with capacities up to 250 kWp through capital subsidies.
- Interest Subsidy for Off-grid Projects through IREDA: MNRE also provides subsidized debt at a five percent interest rate for off-grid solar applications through IREDA.

Commercial Off-grid Projects

Biomass Projects

MNRE provides capital subsidies for the industrial use of biomass for both combustion and gasification projects. For biomass combustion projects, the subsidy amount is the same as that provided to grid-connected projects.

For biomass gasification projects, MNRE provides subsidies for capacities up to 5 MW for both electrical and thermal applications. These subsidies are up to INR 1 million per 100 kW (USD 16,000 per 100 kW) for dual gas systems and INR 1.5 million per 100 kW (USD 24,000 per 100 kW) for 100 percent producer gas systems. An additional subsidy of 20 percent of the capital cost is available for special category states.

Solar Projects

Under JNNSM, MNRE provides capital subsidies for solar plants used for captive consumption (up to a capacity of 100 kWp). Up to 30 percent of the capital cost is provided as subsidy, with a cap of INR 30 per Wp (USD 0.48 per Wp) for projects without batteries and INR 63 per Wp (USD 1 per Wp) for projects with b atteries.

Generation Based Incentives (GBI)

Wind Projects

In December 2009, MNRE introduced the GBI scheme for wind energy projects to facilitate the entry of large IPPs. This scheme was available only to those developers who did not avail themselves of accelerated depreciation benefits and sold power to the state distribution companies.

Under the GBI scheme, IREDA provided an incentive of INR 0.50 per kWh (U.S. cent 0.8 per kWh) of wind power fed into the grid, with a total project lifecycle cap of INR 6.25 million per MW (USD 0.1 million per MW) and an annual cap of INR 1.55 million per MW (USD 24,700 per MW). While the target was to develop 4,000 MW through GBI, the scheme was discontinued in March, 2012, even though only 2,247 MW of wind capacity had been installed under the scheme.

Solar Projects

GBIs are provided to state utilities for the solar projects developed under the JNNSM's Rooftop PV and Small Solar Power Generation Program (RPSSGP). About 100 MW of solar capacity was allotted under this scheme in 2010, of which 98 MW has been developed across 78 projects. Under RPSSGP, state utilities purchased electricity from generators at the benchmark tariff of INR 17.91 per kWh (USD 0.29 per kWh). Of this amount IREDA refunded them all but a

reference tariff of INR 5.5 per kWh (U.S. cent 8.8 per kWh), which increases at three percent annually.

Including Off-Grid Re Projects in Priority Sector Lending

In its revised guidelines, the RBI has recently included loans made to off-grid RE applications as part of priority sector lending for banks. This new classification provides benefits to off-grid RE projects, as outlined below:

- The RBI mandates banks to have 40 percent of their exposure to priority sectors (as defined by the RBI), but banks often find it difficult to achieve this target. Thus, the recent inclusion of off-grid RE projects to this target will enable such projects to receive more attention from banks.
- Loans covered under banks' priority sector targets are provided at concessional rates, which are one to two percent lower than normal commercial lending rates.

Central and State wise Policies for Renewable Energy

After looking at the potential states where different renewable projects can be started. The policies in the state and central government are important for the existence of projects. The central and state polices for the renewable energy has been looked into here.

Small Hydro Power

Central policies for renewable sources of energy (SHP)

Vide letter no. 14(03)2014-SHP dated 2nd July 2014, the Administrative Approval for 2014-15 and for 12th plan's remaining period for Small Hydro Power Programme (up to 25 MW Capacity) has already been circulated. Under this programme Central Financial assistance is provided for the following:

- Resource Assessment and Support for Identification of new sites
- Setting up new SHP Projects in the private / co-operative / joint sector etc.
- Setting up new SHP Projects in the Government sector
- Renovation and Modernization of existing SHP projects in the Government sector
- Development/up gradation of Water Mills (mechanical/electrical output) and setting up Micro Hydel Projects (up to 100 KW capacity)
- Research & Development and Human Resource Development

Karnataka state policy Small Hydro Power Projects: keynotes

Department of Energy, Government of Karnataka has made the Karnataka

Renewable Energy Policy 2009-14, for the promotion of the renewable energy in the state. For the environmental benefits and the energy security of the state this policy is made with an objective to harness green and clean renewable sources of energy in the state. A fund with the name Akshaya Shakthi Nidhi will be made to facilitate Renewable Energy project financing and Energy Conservation and Efficiency measures. Green Energy Cess of Rs 0.05 (five paise) per unit would be levied on the electricity supplied to commercial and industrial consumers. Annual generation of Rs. 55 crore is estimated from this. Out of which Rs 50 Crores will be set apart for Renewable Energy project financing. Following are the assistive initiatives taken by the Karnataka state government through the policy to promote the Small Hydro Projects:

- Investment of 2700 crore would occur to achieve the target of harnessing 600 MW of power through mini hydro projects
- The Mini Hydro Project proposals which doesn't dry up the stream or river due to the diversion of water will be considered for development.
- Statuary clearances will be facilitated through single window mechanism, to pace up the successful expeditious commissioning of the targeted hydro projects
- KREDL to identify potential for development on Public Private Participation/Build Operate Own and Transfer (BOOT) mode
- Considering the environmental issues Mini Hydro projects in the Western Ghats Districts/Forest areas will be restricted to maximum 5 MW and preferably Run of the River (ROR) projects
- PICO hydel projects less than 10 kW will be identified by KREDL in fast track mode and central financial assistance of 90% of the PICO hydel projects cost provided by MNRE to be passed on to eligible beneficiaries

Himachal Pradesh state policy Small Hydro Power Projects: keynotes

Himachal Pradesh Small Hydro Power Policy above 5MW came into force in 2006 and was amended in January 2010. The main features of the policy are as follows:

- Investor /Cooperative Society comprising of the bonafide Himachalis
- Up to 2 projects can be allotted to the independent power producers
- The developer has the freedom to dispose off merchant power, however the Government of HP and HP State Electricity Board have the authority to check/refuse power.

- This policy offers free power @ 12% for 12 years, 18% for next 18 years and thereafter 30%.
- The projects under this policy will be eligible for all incentives by MNRE and the State Government. Also incentives would be given for early commissioning

Himachal Pradesh Small Hydro Power Policy up to 5MW came into force in 2006 and was amended in January 2010. The main features of the policy are as follows:

- For up to 2 MW projects the producer has to be from Himachal or a member of cooperative society comprising of, preference is given for Himachalis even till 5MW.
- For permanent structures acquisition of land will be done by the government of Himachal Pradesh and for other purposed it will be leased out by Government at approved rates
- After 40 years of operation the projects would be handed over to the government.
- Power generated will be sold to HP State Electricity Board preferentially and if the developer intends to sell the power to a third party he is free to do so at a higher cost.
- No water royalty up to 5 MW for 12 years, 12% for next 18 years and beyond at 18% for sale within the state.
- Upfront premium exempted for projects up to 2 MW, is given as incentive for the new projects.

Solar power

Central policy for the Solar power in India

Jawaharlal Nehru National Solar Mission (JNNSM) is formed to promote the use of solar energy for power generation and other application, and also the use of other renewable energy sources like wind and biomass along with solar power.

Following are the key Highlights of the JNNSM Program:

- In this program state electricity boards not burdened with power having high priced
- Payments are guaranteed by the public entities
- A target of 20GW of grid connected solar power is set and is to be achieved by 2020
- Lucrative tariffs are allocated to the first 184MW projects

- Promotion of local manufacturing is also taken care off
- Other benefits like Generation based incentives (GBI), 80% accelerated depreciation income tax benefits on renewable energy products including solar are also there in the program

State Policies

Till 2011-12, only Gujarat and Rajasthan had a state solar policy. In 2012-13, various states such as Andhra Pradesh, Tamil Nadu, Karnataka and Madhya Pradesh have also announced solar policies given the sharp fall in capital costs for solar modules.

Following are the state policies which have been developed by different states to promote the use of solar projects, the key points of the polices are also being mentioned:

Gujarat

The state introduced the solar policy in 2009 and it is operative till March 31, 2014. Some the salient features of the policy are as follows-

- A minimum capacity of 5 MW for both (thermal & PV) and a maximum capacity 500 MW will be allowed
- Solar PV projects shall commission within 12 months from the date of signing PPA.
- PPA shall remain operational for a period of 25 years
- Land acquisition will be the responsibility of the developer
- The power evacuation transmission infrastructure shall be laid by the state at the cost of the developer
- Exemption from the electricity duty.
- Wheeling charge of 2 per cent of the energy will be levied
- Cross subsidy surcharge should not be applicable for open access consumers
- Developer will have to furnish a bank guarantee of Rs. 5million per MW at the time of PPA signing.

Rajasthan

The policy have come into operation with effect from April 19, 2011. The state plans a capacity addition of important policy highlights are as follows:

- PPA shall remain operational for a period of 25 years
- A minimum capacity of 5 MW for both solar thermal and solar PV

projects. Maximum capacity 10 MW will be allowed for solar PV projects and 50 MW for solar thermal project

- Solar projects shall commission within 12 months from the date of signing PPA.
- The power evacuation transmission infrastructure shall be laid by the state at the cost of the developer
- Captive users shall be exempted from payment of the electricity duty

Wind Energy

Central Policies

Following are the incentives provided by the Central government through the policies made in the wing energy sector:

- In the Union budget 2013-14, generation-based incentive (GBI) was reinstated for wind energy projects and an amount of Rs.8 billion had been allocated for this purpose. GBI is available at Rs 0.5 per unit for a maximum period of 10 years subject to a cap of Rs.10 million per MW.
- Ten-year income tax holiday under 80 IA of Income Tax Act
- Concessional customs import duty on specified parts and components
- Excise duty relief

Earlier, accelerated depreciation of 80 per cent on wind assets in the first year of installation was available, which has been withdrawn with effect from April 2012.

State Policies

Andhra Pradesh

Following are the key notes/incentives of the policies regarding the wind energy in state:

- Captive generation are exempted from the payment of Electricity Duty, given the condition that the total electricity generated shall be utilized by them.
- Each Eligible developer may be allocated available Govt. land to generate/harness up to a max of 200 MW of wind power initially.
- Only after commissioning of 100 MW capacity Wind farms in 1st stage in the allocated Government land, the Government may allocate land for another 100 MW capacity Wind Farms. The application from the developers for Government land will be considered on a first-cum-first-served basis.

- Total Wheeling and Transmission Charges Including the losses in kind @ 5% of Electricity delivered to the Grid

Gujarat

Following are the key notes of the policies in wind energy in the Gujarat state:

- Except in case of TPS, the electricity generated from the Wind Turbine Generators is exempted from Electricity duty
- Wind Turbine Generators for Captive use are exempted from the demand cut to the extent of 30% of installed capacity
- The Wind Turbine Generators may be set up on, GEDA land /revenue wasteland, or private land if available

Challenges and Barriers in Renewable Energy Development

Despite the cost reductions achieved over recent years, the largest barrier to greater renewable energy use is its high cost. Intermittent electricity generation characteristics from renewable resources like wind and solar, result in their low reliability in meeting power demand, especially during peak periods. These technologies need to be supported by effective back-up power supply options, which increases cost. There are additional issues related to grid connection and costs of transmission. Lack of full cost pricing when determining the cost of competing energy supplies also hinders the development of renewable energy since the cost of environmental impacts are usually not included in energy prices. Renewable energy development is impeded under conditions of electricity markets undergoing transition when high discount rates and competition on short-term electricity prices within a regulatory framework disadvantage projects with high capital costs but low running costs, such as renewable electricity systems. In addition to cost-related barriers, non-cost barriers also inhibit the greater use of renewable energy. This is particularly the case with the imperfect flow of information and the lack of integrated planning procedures and guidelines. The barriers for the penetration of renewable energy technologies are broadly classified as a) Economic and Technological barriers b) Market-related barriers and c) Institutional barriers.

Economic and Technological

Investment Costs: This relates to the current high levels of capital cost of renewable energy technologies based on new technologies, low volume production and current manufacturing practices.

Technology Maturity-level: Renewable energy technologies such as solar have not attained technological maturity and are still in the developmental stages.

Technology Standards and Reliability: For most of the renewable energy

technologies, technical standards not very well established. Technologies such as Solar PV have low reliability with uneven technical quality.

Resource Availability: The scale of operation of wind and solar technologies is constrained by matching supply with load duration curve, leading to very low Plant Load Factors (PLFs) with a very high percentage of unused capacity.

Location of Supply Sources: Renewable energy sources such as small hydro are very often located in remote, dispersed and inaccessible areas that necessitate high investment requirements in T&D for power supply.

Demand/Supply Match: High potential of renewable energy supply sources exist in areas with low level of demand due to developmental and socio-economic patterns. This supply-demand mismatch coupled with the problems in transfer of power from such regions leads to a very large share of the potential remaining unexploited.

Fuel diversity for biomass: There is a large diversity in biomass fuel supply and devices are specifically designed to handle these. The lack of adherence to fuel specifications in the case of biomass gasifiers by the consumers leads to operational problems of the technologies.

Peak Coincidence Factors: Low peak coincidence factors for renewable energy technologies, especially for wind and solar, make them unreliable sources for power supply during the peak periods.

Grid Stability: Unstable electricity grids and their low reliability in operation create problems in power off-take from renewable.

Reactive power requirements: Wind energy penetration is restricted by high reactive power requirements for start-up of operations that necessitate drawing of power from the state grid.

Maintenance and Servicing Infrastructure: Inadequate servicing and maintenance of equipments along with low reliability in operations lead to very low customer confidence and hampers technology adoption.

Market-related

Market Reforms: There are possibilities that market reforms adversely affect the penetration of certain renewable energy technologies. The reforms measures leading to setting up of an electricity market with competitive and reliable power supply, better grid operations and extension of the supply networks, lower transmission and distribution losses, tariff rationalization and elimination of subsidies and grants may bring down the penetration of renewables.

Privatization: Increasing private participation as part of market reforms policies can increase the cost of capital and make the high initial investment in renewable energy technologies unattractive. Privatization is also likely to dampen

interest in serving rural markets where renewables have a comparative advantage. Shareholders may require higher rates to justify investments in rural markets, which are inherently perceived to be more risky.

Discount rate and Payback period requirements: Investments in renewable energy technologies are not attractive under high discount rates and short payback period requirements. Under such conditions, generation options that have relatively lower capital costs, shorter gestation periods, high efficiency and availability are preferred- none of which fit into the characteristics of renewable energy technologies except to a certain extent for biomass based generation.

Wheeling Contracts: The intermittent generation characteristics of renewable energy technologies and their site-specific nature may place the renewable energy developers in an unfavorable position regarding structuring of contracts for power transmission as compared to non-renewable energy developers. Renewable energy developers may not have equal access to transmission capacity. Intermittent generators may be required to pay higher charges per kWh than their dispatchable competitors to transmit power, with transmission charges being based on the rated capacity of the generator or the actual generation during peak periods. The site-specific nature of the renewables may be a drawback under some transmission pricing schemes where the rates are based on the distance.

Fuel Market for Biomass: For biomass-based technologies, the barriers are unsustainable biomass supply and non-existence of a fuel market, unreliable supply of biomass and frequent price fluctuations. Coupled with this are the difficulties in setting up of a fuel transportation network due to the transportation difficulties of biomass.

Trade Practices: Restrictive trade practices and imposition of trade barriers obstructs the import of advanced technologies and adversely affects their competitiveness. For example, high import duties on PV modules result in much higher prices than the international level and leads to very high costs in the system.

Energy and Electricity Pricing: Distortions in the pricing of different energy forms and an irrational tariff structure for electricity do not provide incentives for investment in generation capacity.

Transaction Costs: Due to non-existence of market for renewable energy, high transaction costs are involved in commercialization of technologies.

Power Purchase Structure: With the power purchase agreement structured at utilities buying power at fixed rates from generators, there may not be sufficient incentives for power generation from renewable sources with fluctuating cost.

Risk Perception: High-risk perception in adoption of most renewable energy technologies arises due to uncertainties regarding technology performance and low level of information and awareness surrounding these technologies. This is

especially valid for renewable energy technologies like solar with a low level of technological maturity

Institutional

Regulatory Forums and Processes: The increased accountability of public expenditure may hinder push for renewables through financial incentives like grants, subsidies, soft-loans, etc.

Non-incorporation of renewable energy issues in the regulatory policy and lack of awareness among regulators further restrict technology penetration. Renewable energy projects are also adversely affected by frequent and inconsistent regulatory proceedings across states.

Policy Regime: Unstable and non-uniform policy regime across states and between the center and the states with no clear policies for third party sale, wheeling, banking and buy-back of power lower investor confidence in renewable energy projects.

Private Participation: Lack of well-defined policies for private participation and delays in clearances and allotments for private sector projects hinders private participation in renewable energy projects.

Co-ordination Issues: In the existing institutional arrangements, lack of co-ordination between planning and implementing agencies delays and restricts the progress in renewable energy development.

Nature of Incentives: The government push policy for penetration of renewables, driven by fiscal and financial incentives, is unsustainable. This is seen especially in the case of wind energy where lowering and removal of incentives led to almost capacity stagnation.

Allocation of Incentives: Due to lack of clear policy guidelines, the incentives provided by the government are often misallocated.

Marketing Infrastructure: Lack of consumer service orientation in terms of technology features and sales and service requirements and barriers in setting up of marketing infrastructure with promotion campaigns, after-sales service infrastructure, quality control measures, etc. for most of the renewable energy technologies restrict their penetration.

Availability of Finance: There are barriers in obtaining finance for renewable sector projects as investors are not very familiar and they lack awareness of renewable technologies. Moreover the risk perception is very high for renewable sector projects.

Financial Networks: A limited network of Financial Institutions to provide micro-credit access in rural decentralized regions crucially restricts the penetration of renewable energy technologies. Institutions like the Industrial Development

Bank of India (IDBI) do not have provisions to supply micro-credit to local bodies through a network of nationalized banks having a wide rural reach.

Project Structuring: Intermittent fuel supply for cogeneration projects requires supplementary fuels for continuous power supply. Quite often, the supplementary fuel may be a fossil fuel like coal, oil or gas. Under the existing institutional arrangements, such a project using a combination of fuels may not qualify for IREDA's requirements for a renewable energy project.

Business models: Lack of successful and replicable business models hinders renewable energy technology adoption. This stems from the fact that most of the renewable energy projects lack sustainable commercial arrangements among the various participants.

Infrastructure Availability: Non-availability of infrastructure such as land and transmission and distribution networks in potential sites of renewable energy supply leads to low exploitation of their potential. This is especially valid for wind energy projects.

Networking with Local Organizations: There is insufficient networking with local organizations for flow of credit with the result that most of the credit flows to the corporate sector whose primary motivation is taking advantage of the financial incentives. This has disabled renewable energy promotion at the local level.

Rural sector Delivery Mechanisms: The lack of appropriate initiatives for rural sector delivery mechanisms hinders providing energy services using renewable energy for decentralized and rural applications.

Conclusion

Immense challenges on energy security are lying ahead for India. These include the urgency to immediately bridge the current gap in energy demand and supply and ensuring a secure energy future in the light of India's growing population and economy. As the prices of coal generated energy are increasing due to increasing reliance on imports, renewable energy promises not just a bridging solution to the present power crisis but also a permanent fix to India's ever increasing electricity requirements. The growth of renewable sector will boost the country's high economic growth aspiration and also benefit the millions of people in rural areas still waiting for electricity connections.

With regards to solar energy greater economies of scale, better technology and progressively cheaper panels and modules are bringing down the prices of solar generated power. But still these costs are not as low as compared to coal, nuclear or natural gas. To excel in solar power it is imperative that India develops an indigenous industry for solar panels and equipment which will further reduce the prices.

With the future in sight it is necessary that the government have an ambitious, logical but stipulated national renewable energy target based on generation. The current target from the NAPCC which targets 15% generation from renewable energy by 2020, looks conservative if we see the way renewable energy is developing and the costs of major renewable technologies are reducing. Logically the current target under NAPCC should be revised and scaled up higher based on the rapid growth, high potential and economic viability of renewable energy. This will bring a major transformation in the country's job sector also. There is a need of a rationalized, realistic and differential RPO which would help in creating energy equity in the country. The existing RPO target set up by different SERCs only factor capacity addition forecasts based on the potential of various renewable energy technologies and ignores other important factors which influence it. Electricity demand of any state is highly influenced by its industrial and commercial activities which increases the demand, in turn increasing the purchasing capacity of the state, and in a spiraling effect leads to more expensive electricity. Therefore, the Government of India through CERC should frame guidelines on differential RPO targets for all states based on relevant criteria.

Assessment of current RPO mechanism suggests that electricity utilities of only seven states meet their RPO targets, while the majority of states fail to meet their renewable energy obligation. The major bottleneck that prevents state electricity utilities meeting their obligation is lack of a proper compliance mechanism. Since there is no uniform and stringent compliance mechanism in place, there is no pressure nor mandate on electricity utilities in the states to meet their RPO target. The Forum of Regulators (FOR), constituted under the Electricity Act, 2003, should also set up a mandatory and uniform RPO compliance code for all states which shall be adopted by SERCs across the country. The compliance code should have both penalty and reward elements.

The current RPO mechanism lacks uniformity in provisions for a longer trajectory for RPO targets in different states. Currently only few states have longer RPO trajectory. Longer trajectories of RPO's have an inherent advantage of reducing uncertainties for state utilities as plan for renewable energy supply and procurement can be made accordingly which will have a positive impact on the pricing and tariff for electricity from renewable energy sources. Therefore, the Government of India should set a timeframe under which all SERC's should set long term RPO frameworks which should include annual RPO targets for its electricity utilities and other obligated entities for a minimum period of 10 years up to end of the 13th FYP.

There is still lack of interstate transmission of renewable energy and lack of clarity on interstate generation and transmission which are acting as a major bottleneck for the growth of this sector. This restricts significant development of renewable energy infrastructures under inter-state generation and transmission

scheme because renewable energy projects commissioned under state's renewable energy policy cannot enter into a long-term electricity agreement with other states. The Government of India through CERC should set guidelines that allow renewable energy developers from any state to undergo long-term power purchase agreements with other state power utilities in a similar manner as with conventional electricity power projects.

So the role of renewable energy sector is definitely going to gain a much important share in India's future energy needs. While many big projects are already underway, many major projects will also be coming in the future as the government of India understands the importance and value of renewable energy. It is expected that the momentum will pick up very shortly.

References

MNRE website. www.mnre.gov.in

MNRE annual report

India Energy Exchange website, http://www.iexindia.com/

CEA Website: http://www.cea.nic//

Energy Statistics released by Central Statistics Office, Ministry of Statistics and Program Implementation, Government of India

World Bank Databank

Energy Statistics released by Central Statistics Office, Ministry of Statistics and Program Implementation, Government of India

Crisil

"Schemes for development of New and Renewable Energy ", PIB 12 August 2013

Twelfth Five Year Plan (2012-17), Planning Commission, Government of India, http://planningcommission.gov.in/plans/planrel/12thplan/pdf/vol_2.pdf

Load Generation Balance Report (2012-13), Central Electricity Authority, http://www.cea.nic.in/reports/yearly/lgbr_report.pdf

Indian Wind Energy Association, http://www.inwea.org/installedcapacity.htm

State Owned Electricity Distribution Companies: Some positives, though several concerns remain, ICRA, http://www.icra.in/Files/ticker/Power20 Distribution20 Note.pdf

Annual Report 2011-12, Power Finance Corporation, http://www.pfcindia.com/writereaddata/userfiles/file/Annual20reports/ann_rpt1112_2708 2012.pdf

India Solar Generation Facility by Asian Development Bank, http://www.adb.org/site/private-sector-financing/india-solar-generation-guarantee-facilityorig

7

Coal Mining with Reference to Environmental Royalty

Natalie West Kharkongor
Jasiel. H. Massar

Introduction

The study proposed to understand the coal industry in India and what relations or similarities does it have with the rest of the world. Coal presently constitutes a little over 50% of India's energy mix. Given the rising environmental pressures, there has been a call for reducing the consumption of hydrocarbons, especially coal, by various countries. A deeper study of the coal sector reveals that an innocuous initiative to reduce coal consumption to improve the environment can very well create a politically volatile situation for the government. Issues pertaining to coal mafias, coal unions and its politics ought to be addressed if any meaningful reforms or cuts in coal consumption are to be made. The politics of the coal sector must be addressed to understand why significantly reducing coal consumption may not be easy. To address the mentioned concerns, this paper proposed to study coal reserves and deposits in the world, and the state – wise distribution in India. The paper will specifically deal in detailed with the coal royalty in Meghalaya, and its analysis to increase proceeds from coal in the coming years.The paper concludes by overemphasizing the need to utilize the proceeds from coal for ecology value addition and reclaiming the ecological loss.

Literature Review

Coal originated from the arrested decay of the remains of trees, bushes, ferns, mosses, vines and other forms of plant life which flourished in huge swamps

and bogs millions of years ago, during prolonged periods of humid, tropical climate and abundant rainfall (***Tester, Drake, et al, 2012***). Coal is a familiar substance and an important natural resource. It is also however a complex and diverse material. It has close links with peat, which can be considered a precursor and with other fossil fuels, including petroleum and natural gas which were formed by related processes. These fossil fuels are the most important readily available energy source and within this group, coal represents by far the largest fraction of the resources and reserves (***Graigner, Gibson, et al,2012***). Coal is not another form of carbon like graphite and diamond. It consists of a complex mixture of organic chemical substances containing carbon, hydrogen and oxygen, together with smaller amounts of nitrogen, sulphur and some trace elements. Coal is black or brownish-black in reflected light and its surface may be dull or bright, often in bands within the same deposit.

Coal formation occurred in two distinct stages one biochemical and the other geochemical processes. Differences in the planet material and the extent of its decomposition during the first stage largely account for the different petrographic components known as macerals; the subsequent action of differing degrees of pressure and heat over different periods of time during -the geochemical stage, acting on the peat like deposits, was responsible for the different in coalification or maturity of the coal, referred to as the "rank" of the coal.

The chief properties of coke which influence its value for metallurgical purposes are its size, hardness, shatter strength, resistance to abrasion, porosity, percentage of fixed carbon, volatiles and ash, fluxing property of the ash and the sulphur and phosphorous content. The coke of coal macerals is commonly grouped together under the names vitrinite, liptinite, inertinite (***SIU Carbondale***)

The first knowledge and use of coal probably occurred several thousands of years ago. Coal seams outcrop frequently and since coal has a usual appearance and is combustible (it seems probable that it was known and used for ornaments and possibly for heat) in prehistoric times. There are reports of Chinese knowledge of coal thousand years ago. Coal mining may have become more common about 2000 years ago and the Roman certainly make use of coal during their occupation of Britain (***Bromehead, C. E. N., 1940***).

Geological Origin

At various times in the geologic past, the Earth had dense forests in low-lying wetland areas. Due to natural processes such as flooding, these forests were buried underneath soil. As more and more soil deposited over them, they were compressed. The temperature also rose as they sank deeper and deeper. As the process continued the plant matter was protected from biodegradation and oxidation, usually by mud or acidic water. This trapped the carbon in immense peat bogs that were eventually covered and deeply buried by sediments. Under

high pressure and high temperature, dead vegetation was slowly converted to coal. As coal contains mainly carbon, the conversion of dead vegetation into coal is called carbonization.

The wide, shallow seas of the Carboniferous Period provided ideal conditions for coal formation, although coal is known from most geological periods. The exception is the coal gap in the Permian–Triassic extinction event, where coal is rare. Coal is known from Precambrian strata, which predate land plants—this coal is presumed to have originated from residues of algae.

Distribution

The coal deposits although exist in nearly every region, but commercially exploitable deposits occur in Europe, Asia, North America and Australia. In 1999, China was the top producer as well as the top consumer of coal..

Table 7.1 Top Coal Reserves/Deposits Countries in the World

Ranking	Country	Total Recoverable Coal Reserves in 2008 (million tons)
1	United States	237295
2	Russia	157010
3	China	114500
4	Australia	76400
5	India	60600
6	Germany	40699
7	Ukraine	33873
8	Kazakhstan	33600
9	South Africa	30156
10	Serbia	13770
11	Colombia	6746
12	Canada	6528
13	Poland	5709
14	Indonesia	5529
15	Brazil	4559
16	Greece	3020
17	Bosnia and Herzegovina	2853
18	Mongolia	2520
19	Bulgaria	2366
20	Pakistan	2070

21	Turkey	2343
22	Uzbekistan	1900
23	Hungary	1660
24	Thailand	1239
25	Mexico	1211
26	Iran	1203
27	Czech Republic	1100
28	Kyrgyzstan	812
29	Albania	794
30	North Korea	600
31	New Zealand	571
32	Spain	530
33	Laos	503
34	Zimbabwe	502
35	Argentina	500
36	All others	5613

Source: Mining Technology, Last Updated on March 24, 2017

India

Coal mining in India began in 1774 when John Sumner and Suetonius Grant Heatly of the East India Company commenced commercial exploitation in the Raniganj Coalfield along the Western bank of Damodarriver. As on 31 March 2015, India had estimated coal reserves of 306.6 billion metric tons (338.0 billion short tons), the fifth largest coal reserves in the world. India is the fourth largest producer of coal in the world, producing 536.5 million metric tons (591.4 million short tons) in 2014.

Table 7.2 The state-wise distribution of coal resources and its categorisation

State	Geological Resources of Coal			
	Proved	Indicated (MT)	Inferred (MT)	Total (In Million Tons)
Andra Pradesh	9256.51	9730.37	3029.36	22016.24
Arunachal Pradesh	31.23	40.11	18.89	90.23
Assam	348.65	35.85	3.02	387.52
Bihar	0.00	0.00	160.00	160.00
Chhattisgarh	12441.01	30230.12	4010.88	46682.01
Jharkhand	39633.05	30992.38	6338.26	76963.69

Madhya Pradesh	8504.85	11266.70	2216.07	21987.62
Maharashtra	5359.82	2983.76	1964.51	10308.09
Meghalaya	89.04	16.51	470.93	576.48
Nagaland	8.76	0.00	306.65	315.41
Orissa	21506.66	32074.29	12726.30	66307.25
Sikkim	0.00	58.25	42.98	101.23
Uttar Pradesh	866.05	195.75	0.00	1061.80
West Bengal	11752.54	13029.61	5070.69	29852.84
Total	**109798.17**	**130653.70**	**36358.54**	**276810.41**

Source: Indian Power Sector (2010)

Coal distribution and its characteristics in northeast India

As on April 2014, India's inventory of coal resource was 300 Billion Tons (BT) comprising of: Proven—125 BT; Indicated—142 BT and Inferred—32 BT (Ministry of Coal 2014). Northeast India contributes 105 Million Tons (MT) of the Gondwana coal and 1492 MT of tertiary coal reserves. Meghalaya and Assam in northeast India contain 73 % of the total tertiary coal reserves. Nagaland and Arunachal Pradesh contribute 21 % and 6 % of the total tertiary coal reserves, respectively. Coal inventory of northeast India is given in Table below

Table 7.3 Coal Inventory of Northeast India

Coalfield	State	Proved	Indicated	Inferred	Total
Gondwana	Assam	0	4	0	4
	Sikkim	0	58	43	101
	Total	0	62	43	105
Tertiary	Arunachal Pradesh	31	40	19	90
	Assam	465	43	3	511
	Meghalaya	89	17	471	577
	Nagaland	9	0	307	316
Total		**594**	**99**	**799**	**1492**

Source Ministry of coal (2014)

History of Coal Deposit in Meghalaya

Coal deposits in Meghalaya were found in the year 1815 in several places of Khasi and Jaintia Hills during the British period. Mr. Stark, a British official

reported to the government that he had found some coal seams in the lower hills of Sylhet (Now Bangladesh). Owing to non-availability of markets and complexity of transportation due to topographical difficult terrain, coal extraction was considered infeasible. In the year 1832, Mr. Crocroft, noticed the existence of coal beds close to Cherra-Poonjee. This discovery was followed up by the finding of other beds of coal in various places in the adjoining district (***Hunter; 1990***). The coals of Sohra as well as that of Lakadong were found feasible to be mined for commercial production. The other coalfields did not attract much attention due to inaccessibility, complex geographically topography and lack of demand. At that time, the British government had advocated for the need of having a systematic mining in Khasi-Jaintia State as reported by ***Oldham***, **(1854)**.

Coal seams were also discovered in the beds of Mahadeoriver and in several parts of Garo Hills by Major Godwin Austen. Coal was also found to be abundant near the village of Dhobakhal on the Sameswaririver was also reported. These coalfields were examined by Mr. Medlicott of the Geological Survey as reported by ***Hunter (1990)***. In the year 1877-78, five thousand mounds of coal were quarried from Jaintia Hills District. The coal produced was used for industrial purposes and a small portion of it was used by the European residents for private consumption (***Lamin, 1995***). Coal mining operations in Langrin coalfields was first taken up by the Assam Bengal Cement Company for supplying to Bangladesh but was discontinued in the 1960's (***Das G and Purkayastha: 2000***). Since then the production of coal became sluggish because of geographical conditions and absence of consumers.

The beginning of coal mining in Jantia Hills was made in the second half of the 19th century during British period (1815) at Ladadong (Pomsru) coalfields, now called LumMooiong, bordering to Bangladesh. During those days, the extracted coal was lifted manually by men in a pair of baskets containing about 60-80 kgs at a time to vicinity of the Tisang river bank and a fully loaded boat use to ferry the coal to Bangladesh. This process of exportation of coal was stopped because of the geographically difficult terrains and the cost of the coal could not be adjusted with the cost of production.

Since there was no proper route for disposing if mined coals from Jaintia Hills, no further mining of coal was taken up until 1970s. The coal mining in Jaintia Hills District was revived in a minor scale after 1970s. Initially the coal mining was done by the local people in groups consisting of their own family members. While the adult male member of the family was engaged to cut the coal at the pit face, women and children loaded it into cone (khoh) and lifted it to the over ground.

But coal mining began to flourish in the mid-seventies. Immediately Jaintia Hills was recognized as rich coal belt in Meghalaya. During that period, the

extracted coal was marketed to Southern Assam (Silchar) to the tea estates and brick kilns industries. Large-scale commercialisation of coal mining began from 1980s onwards. Since then a huge exploration of coal was carried out from the district and carried to different parts of India.

Coal Deposits in Meghalaya

In Khasi Hills deposits are found in Bairung, Sohra, Laitryngew, Mawlong-Shella, Mawstoh, Mawsynram, Mawdon, Maonai-chhora, Mawbehlarkar, Lyngkyrdem and Pynursla. In Jaintia Hills, coal deposits are found in Amwi, Lakadong, Narpuh, Sutnga and Shyrmang

The prominent coalfields of the state are West Darrangiri, Siju, Pendengru-Balpakrsm in the South Garo hills District; BorsoraLangrin in the West Khasi Hills District; East Darrangiri partly in West Khasi Hills and partly in East Garo Hills; Mawlong=Shella and Sohra-Cherrapunjee in the East Khasi Hills District and Bapung-Sutnga in the Jaintia Hills District.

Meghalaya is predominately rich in tertiary coal deposits belonging to the Eocene age (36-56 million years ago). The latest total estimate of coal reserve found in Meghalaya is about 576.48 million tonnes as reported in the year 2010. Meghalaya Coal, which is categorized as tertiary coal, is generally sub-bituminous in composition. However, it has high sulphur-content. The coal seams in and around the district are hard, lumpy and bright mostly sub-bituminous in nature with moisture content varying from 0.4% to 9.2%, ash content from 1.3% to 18.1% and sulphur content from 2.7% to 5.0%. The calorific value varies between 5694-8320 Kcal/kg.

Coal Mining Belts in Jaintia Hills

Jaintia hills District being a component of Meghalaya Plateau has its physiographical features almost similar to that of Khasi Hills District, situated in the eastern part of the state Meghalaya. The district was created in 1972 with Jowai as the administrative headquarters. It covers a total area of 3819Sq.km. Jaintia Hills District is bounded by the state of Assam in the North and East and the plains of Bangladesh in the South and East Khasi Hills District in the West. The Marangksih peak on the eastern Plateau of Jaintia Hills stands majestically at the elevation of 1631m and is the highest peak.

The Jaintia Hills is richly endowed with natural resources with coal and limestone deposits. The total estimate inferred reserve of coal in Jaintia Hills District is about 40 million tonnes spreading over about 60sq.km. Besides coal and limestone deposits, other minerals like clay, shale, and phosphate have also been detected in Jaintia Hills District.

The prominent coalfields of Jaintia Hills District are Bapung, Lakadong, Sutnga, Rymbai, Chiehruphi, Lumshnong, Narwan, Byrwai, Sohkymphor,

Myntriang, Jalyiah, Lumchyrmit, Lumskhem, Rangad, Iapmala, Musniang, Moollamanoh, Moolang, Mookhain, Semmasi, Umkyrpong, Lakasein, Mooriap, Jalaphet, Moolait, Lamyrsiang, Mynthning, Kyrluh, Sakhain, Umthei, Umlawang, Tluh, Moolamylliang, Latyrke, Nongkhliehelaka, Khliehrait, Lad Rymbai, Byndihati, Moosianglamare in Khliehrait Civil Sub-Division, Iooksi and Shangpung under JowaiSadar whereas Jarain and Skhentalangcoalfirlds in Amlarem Civil Sub-Division.

Coal Mining Royalty in Meghalaya

A royalty payment is made to the legal owner of the property, patent, copyrighted work or franchise by those who wish to make use of it for the purposes of generating revenue.

Royalty Flow

Royalty is collected by the government at a fixed rate from all the coal mines in the different states of India, it is paid directly to the state government. Along with Royalty, Land Reclamation Fund is also charged. In some cases, income tax at a certain percentage can also be levied on the parties operating the coal mines.

In Meghalaya, as provided in the sixth schedule of the Indian Constitution, the government has little control over the natural land resources. The prevailing land holding system allows the landowners to unearth coal seams without any restriction. In Jaintia Hills, the coalmines are under the control of private mine owners, therefore coal seams are extracted haphazardly without any care for regeneration of the environment

Table 7.4 Collection of Royalty on Coal during 2011 – 12 to 2015-16

Year	Jaintia Hills (Rs.)	Khasi Hills (Rs.)	Garo Hills (Rs.)	Total (Rs.)
2011-12	145,28,54,845	78,96,90,602	13,62,08,686	**237,87,54,133**
2012-13	155,14,02,531	31,57,77,085	141,92,79,160	**328,64,58,766**
2013-14	203,40,89,866	186,66,86,024	26,25,39,734	**416,33,15,624**
2014-15	84,57,44,146	36,69,38,303	35,94,76,601	**157,21,59,050**
2015-16	1,28,250	1,10,564	6,75,000	**9,13,814**

Source: Field Data

- Analysis of the above table depicts that the period after NGT ban reflected a substantial decrease in the amount of royalty produced.
- The amount of royalty collected on coal is Rs. 675/MT (Metric Ton).
- The Royalty collected is deposited in the State Exchequer.
- The money collected is divided accordingly, 75% will remain with the State Government and 25% will go to the Three District Councils.

- Bulk of the export is to Bangladesh and other neighbouring countries (but not in huge amounts) and to Assam and cement industries in Jaintia Hills.
- Quantity of coal assume to be available is around 8.7 million/MT. Out of which so far only 8 Lakhs/MT is available for transport, that is the extracted coal available. (Assumed values)
- Use of the Royalty is not properly defined
- The state of Nagaland had a Coal Mining Policy since 1991 unlike Meghalaya. Hence, the NGT ban was implemented.
- Mining in Meghalaya is mainly by Rat-Hole Mining (Traditional).
- The right for the Government to collect royalty is under the section 21 of the MMDR (The Mines and Mineral Development and Regulation) Act, 1957 under Sub-section 5; The Government collects royalty in terms of penalty.
- The mines are tagged illegal when they are not registered with DMR.
- Royalty Collected and Acts associated with it can be amended only after 3 years after it was agreed upon initially.
- The coal quality can be determined from its Calorific value.
- The amount of royalty needed to be collected can also be calculated by the formula i.e. Sale amount/Sale price%. The recent ad valorem is around 14%.
- Apparently, there is no limit to the mining or export of coal of those mines not registered with DMR (Directorate of Mineral and Resources).
- The main root of all problems faced in the coal sector of Meghalaya is the number of unregistered mines.

The Meghalaya Minor Minerals Reclamation Fund (MEPREF) is mainly a compensation fine initiated on 25th March 2015, its operation is in the restoration and conservation of the environment especially the ones affected by the mining and deforestation. The collection of money for this Reclamation Fund will be done through the DFOs at the time of collection of royalty. They will collect this separately by A/c payee cheque in the account of MEPREF. The Order states that the amount to be credited to this fund will be 10% of the sale proceeds. This will be determined, in the case of export, by 10% of the value shown in the LoC (Letter of Credit) and for sale within the country, as per the schedule of rates of the PWD. The DFOs will transfer these cheques to the PCCF and HoFF for deposit into that account.

MEPRF (Meghalaya Environmental Protection and Reclamation Fund)

After the ban, the NGT ordered for the mine owners to pay one more payment on top of the royalty and sales tax on the remaining coal to be transported. This was known as the MEPRF, whose sole purpose is to reclaim the environment which had been destroyed due to the long years of mining. Coal mines in the country was nationalized by Coal Mines (Nationalisation) Act, 1973 as amended from time to time. As per the Act and its amendments, the eligible persons/parties to do coal mining in the country are:

1. The Central Government, a Government company (including a State Government Company), a Corporation owned, managed and controlled by the Central Government.
2. A person to whom a sub-lease has been granted by the above-mentioned Government, company or corporation having a coal mining lease, subject to the conditions that the coal reserves covered by the sub-lease are in isolate small pockets or are not sufficient for scientific and economic development in a coordinated manner and that the coal produced by the sub-lease will not be required to be transported by rail.

As per the provision in Section 3 (3) (a) (iii) of the Coal mines (**Nationalization**) Act, 1973, a company engaged in the following activities can do coal mining in India only for captive consumption:

- Production of Iron and Steel
- Generation of power
- Washing of coal obtained from a mine, or
- Such other end use as the Central Government may, by notification, specify.

Under the powers vested with the Central Government by Section 3 (3) (a) (iii) (4) of the Coal Mines (**Nationalisation**) Act, 1973, Gazette Notifications were issued on 15.3.96 and 12.7.07 as per Annexures I and II to provide cement production and production of synthesis gas obtained through coal gasification (**underground and surface**) and coal liquefaction as approved end-uses for captive mining of coal. Therefore, cement and synthesis gas producing companies are now eligible for undertaking coal mining for captive consumption.

In, Meghalaya, the private parties including the petitioner's Associations who are operating the coal mines are not eligible as per the above provisions of Coal Mines (**Nationalization**) Act, 1973 as amended from time to time. As such, their coal mining activities are without any lawful authority. Statutory document viz mine layouts, plans and sections, notices, returns etc in respect of their coal mines

are not available with them. In the circumstances, the State Government is recovering royalty on coal produced in the State by the private parties in terms of Section 21 (5) of the Mines and Minerals (**Development & Regulation**) Act, 1973 which reads as "Whenever any person raises, without any lawful authority, any mineral from any land, the State Government may recover from such person the mineral so raised, or, where such mineral has already been disposed of the price thereof, and may also recover from such person, rent, royalty or tax, as the case may be, for the period during which the land was occupied by such person without any lawful authority."

As per Section 9 of the **Mines and Mineral (Development & Regulation) Act, 1957**, royalty on coal including other minerals are to be paid by the mining lease holders. Under the same Section, the Central Government is empowered to reduce or enhance the rate of royalty in respect of any mineral including coal. The Central Government while issuing the Notification No.349 (E) dated 10th May 2012 as per Annexure III has placed the rate of royalty on coal @14% ad-valorem on price of coal, as reflected in the invoice, excluding tax, levies and other charges.

As per the above Notification No.349 (E) dated 10 May 2012, the price of coal as notified by Coal India Limited/Singareni Collieries Company Limited is taken into consideration for calculating royalty on coal produced from captive mines operated by other companies eligible to operate coal mines.

The grade and price of Meghalaya coal, as conveyed by the Coal Controller, Kolkata of Ministry of Coal vide Letter No.CC/CCO/Grade of Coal/'09-'10 dated 15.06.2009 at Annexure-IV is like Assam Coal.

Party's (Meghalaya Coal) sample No.	Proximate Analysis				Total Sulphur %	Carbon %	Hydrogen %	Calorific Value Kcal/Kg	Grade
	Moist %	Ash %	VM %	Fixed Carbon %					
DMR/BAP/I	1.78	5.55	46.4	46.29	5.17	78.4	6.19	7615	A
DMR/SUT/I	0.86	2.60	62.2	34.34	5.26	80.1	5.34	8265	A
DMR/SIJ/1	3.50	11.70	49.10	34.34	4.03	69.4	6.19	6945	A
DMR/NANG/I	7.84	4.60	43.90	43.66	2.78	70.5	6.31	6775	A
DMR/BP/I	5.39	6.80	42.90	44.91	4.11	84.1	7.22	7035	A
DMR/SHA/L	1.89	6.80	50.40	40.91	5.30	49.0	5.75	7665	A

Source Annexure-IV

Coal Payments

In Meghalaya, as provided in the sixth schedule of the Indian constitution, the government has little control over the natural land resources. The prevailing land holding system allows the landowners to unearth coal seams without any restriction. In Jaintia Hills, the coalmines are under the control of private mine

owners, therefore coal seams are extracted haphazardly without any care for regeneration of the environment.

The types of payments paid by the Coal Mine owners are as follows:

Royalty of Coal	@ Rs 675/Metric Ton
MEPRF (Meghalaya Environmental Protection and Reclamation Fund)	@ Rs 485/ MT
Sales Tax	@ Rs 241/MT

Royalty is collected in the form of challans; a Challan is a receipt which is made for a single truck loaded with coal. The challan is issued by the Directorate of Mineral Resources and the mine owners are supposed to report to the office of the DMR to pay the royalty. The Royalty collected is kept in the state Ex-Chequer.

Distribution Rates of Royalty Collected

Destination of Money	Rate of Distribution of Royalty Collected
State Government	75.00%
Autonomous District Council	25.00%

Destination of the mined Coal

Destination	Export/Domestic
Industries in Assam, Meghalaya	Domestic
Industries in Bangladesh	Export

In 2012, CIL (North Eastern Coal Field) Prices are as under

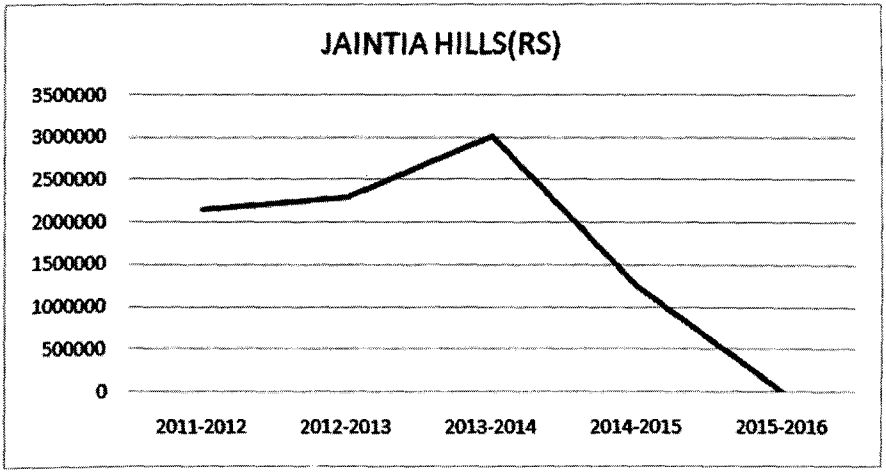
Unit/Grade of Coal	UHV Range (Kcal/kg)	Price Rupees per Tonne
North-Eastern Coalfields A	Exceeding 6200 Kcal/kg but not exceeding 6299 Kcal/kg	4100
North-Eastern Coalfields B	Exceeding 5600 Kcal/kg but not exceeding 6299 Kcal/kg	3990

(As per Annexure-V)

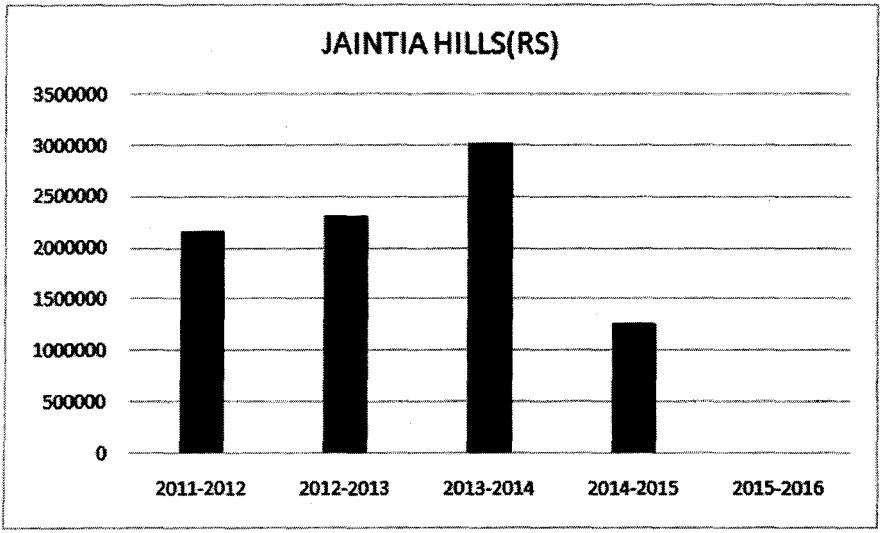
For coal exceeding 6299 Kcal/kg the CIL price stipulated that for every additional WHV of 100 Kcal/kg an additional Rs.145 per metric tonne shall be added to the above price. Based thereon, Rs.725 (Rs.145X5) has been added for additional calorific value of 500 Kcal/Kg, over the 6299 Kcal/Kg (100 Kcal/KgX5) and the least price of Meghalaya Coal was arrived at Rs.4825 (Rs.4100 for Coal with UHV of 6299 Kcal/kg + Rs.725 for Meghalaya coal of least UHV 'Useful Heat Value' of 6775- the difference of +500Kcal/Kg which is 725 @ 145 per 100 Kcal/Kg) per metric tonne. Hence the rate of royalty was arrived @ 14% of Rs.4825 per metric tonne which is = Rs.675 per metric tonne.

We could see from the given tables that huge amount of money has been collected from the coal miners. The question here is: where do the State utilized that money? Practically, the entire royalty collected from coal miners should be utilized in creating awareness about scientific mining and climate change initiatives. It should be spent on climate change projects to add value to the ecology, and to reclaim the ecological loss caused mining.

Analysis of the Amount (in Rs) of royalty collected from Jaintia Hills during the period 2011-2016



Analysis of the Amount (in MT) of coal produced from Jaintia Hills during the period 2011-2016



The amount of royalty being collected from the miners decreased suddenly as shown in the graph after the NGT ban on coal mining in Meghalaya. However, the ban allowed for the already excavated coal lying out in the open to be transported. The State cannot afford to lose this royalty as it is one of the main sources of revenue for the State. Hence, it calls for the State to immediately adopt certain measures to restore the royalty from coal mining by following the NGT rules and laws, or work on the alternatives to increase State's revenue.

Findings and Conclusions

From the interviews and data collected from various organizations (Government Departments and officials, retired-government officials, miners) it can be said that there is no policy or functionary that is helping in the proper development and prosperity of mining in the State. Hence, proper analysis and cooperation of both the coal miners and the government are required for sustainable mining. The data and royalty statistics mentioned in the paper shows that revenue dropped drastically after the NGT ban. The ban was imposed to deal with rampant rat- hole and illegal mining in different parts of the State. A comprehensive mining policy is the need of the hour to improve mining activities and to increase revenue to the State.

Furthermore, the proceeds from royalty should be utilised in imparting training to the miners on scientific mining and climate change initiatives. The

analysis brought forward in the paper reveals the shortcomings of the royalty system in the country. Royalty rates are fixed on an ad hoc basis without any economic rationale. Even these rates remain unrevised for years sometimes for decades. Looking at the advantages of the royalty system based on ad valorem principle, it is high time that the Centre takes a definite measure to switchover to this system. However, there is need to examine the rationale behind fixing the royalty amount and rate of royalty in a scientific manner with least subjectivity. A system, which is simple, transparent and easy to estimate the quantum of royalty, is desirable for the State and the country as a whole. Equally important is the utilization of the proceeds from coal royalties to add value to the ecology, and to reclaim the ecological loss.

References

Tester, W, Jefferson, Drake, M, Elizabeth (2012) *Sustainable Energy: Choosing Among Options*, MIT Press

Energy Report, SIU Carbondale, Southern Illinois University, USA

Bromehead, C. E. N, *The Geographical Journal* Vol. 96, No. 2 (Aug., 1940), pp. 101-118

Prasad, A. R. (1986) *Coal Industry of India, Page: 55, 62, 63,* South Asia books Publishers

Stokke Hugo (2017) *Unorganized Coal Mine Workers in Meghalaya*,Bergen: Chr. Michelsen Institute (CMI Brief vol. 16 no. 2) 4 p.

Mishra P. C, Nayak, Asutosh (2003) *Environmental management in coal mining and thermal power plants*, ABD Publishers

Grainger, L, Gibson, J (2012) *Coal utilization: Technology, Economy and Policy, pp. 3 – 8*, Springer Publications

Butts, H, B (1994) *Strategic minerals- Vol I & II*, Strtegic Studies Institute, U.S. Army War College.

Dwivedi, R. M (2011) *Energy Sources and policies in India*, New Century Publications

www.Cleic-net/news/industry-focus/classification-of-coal-by-rails(astm-d3888-12)-html

www.chemistry-explained-10m/Ce-Co/Coal-html

www.vanguardngr.com/2013/11/coal-orgin-types-mining-uses/

www.encyclopidia.com/environment/encyclopedia-almanacs-transcript-and-maps/coal-transportation

www.geometric.com/en/coal-storage.domes

www./ce-co.in/coalstockpile-in-Indian-powerplants.pdf.

Statistical Review of World Energy 2008

www.worldenergy.org/data/resources/resource/coal/andstorage

www.worldenergy.org/coal/wherecoal-found

www.mapsofworld.com/business/industries/coal-energy/world-coal-deposits.html

www.listsspringr.com/article/10.1007/540789-016-0126-1

www.ncpa.org/pub/ba575
www.ehow.com/info-8741530-positive-impacts-coalmininghuman.html
www.//connectusfund.org
www.theworldcounts.com/stories/negative-effects-of-coal-mining

8

Towards a People Centred Afforestation Programme for North East India

Abhijit Kumar Bezbarua

Introduction

The overall environmental health of any nation (or any part thereof) is determined by a large number of factors. The extent and quality of the forest cover as a percentage of the geographical is one of the more important indicators of such environmental conditions. Forest cover enhances the supplies of water, fire wood, small timber, fodder, medicinal plants etc. used by the fringe dwellers, many of whom are marginalized tribal communities. In consideration of the vital role of forests, the Constitution of India has the following provisions:

- Article 48A ('Directive Principles of State Policy') mentions that 'the state shall endeavour to protect and improve the environment and to safeguard the forest and wildlife of the country'.
- Article 51A ('Fundamental Duties') states that it shall be the duty of every citizen of India '(g) to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures'.

The National Forest Policy of 1988 aimed at bringing one third of India's geographical area under forests and tree cover. In its Approach Paper to the 10th Plan (2002-07), the Planning Commission had fixed the target of increasing such forest/ tree cover to 25% of the geographical area by the end of the Plan period (March 2007) and to 33% by the end of the subsequent Plan period (i.e. by March

2012).[1] However, the country has been able to keep just 24% of its geographical area under forest and tree cover as stated in the biennial 'India State of Forest Report 2013' (released on 8th July 2014).[2] In addition, substantial forest area has been diverted for non-forest use. Between 1980 and May 2004, about 9.21 lakh hectares of forest land had been diverted for non forestry uses. In addition, forest land aggregating up to 1.14 lakh hectare had been diverted after May 2004 till March 2012.[3] Hence, there is a pressing need to expand forest cover through planned interventions.

Moreover; the management of the nation's forests has attracted the attention of the judiciary at the apex level. In fact, the Supreme Court of India started playing a proactive role in the matters of forest policy and governance from 1995 onward. In the Godavarman case (T.N. Godavarman Thirumulpad v/s Union of India related to large scale illegal felling of trees in Gudalur, Tamil Nadu), the Supreme Court issued interim rulings related to aspects such as tree felling, operations of saw mills, violations of approvals for forest diversion, de-reservation of forests and matters related to compensatory afforestation. In 1996, the Supreme Court put a stop to all on-going activity like functioning of saw mills and mining within any forest in the country that was being carried out without the approval of the Government of India.[4]

On-going Government Interventions

In view of the above imperatives, the Government of India and the State Governments have been taking measures to increase the area under forests and to regenerate degraded forest lands. Some of the programmes being operated for improving forest / tree cover include:

- National Afforestation Programmes (NAP)
- National Mission for a Green India
- Compensatory Afforestation Programme

A brief description of the above schemes is furnished below.

(a) National Afforestation Programme (NAP)[5,6]

The NAP is the main programme of the Government of India for increasing forest and tree cover in India, including the regeneration of degraded forest areas. It was launched in 2002 (i.e. at the outset of the 10th Plan period) by merging four existing schemes, viz. Integrated Afforestation and Eco-Development Projects Scheme (IAEPS), Area Oriented Fuelwood and Fodder Projects Scheme (AOFFPS), Conservation and Development of Non Timber Produce including Medical Plants Scheme (NTFP) and Association of Scheduled Tribes and Rural Poor in Regeneration of Degraded Forests (ASTRP).

The funding of this programme is routed through the National Afforestation & Eco-development Board (NAEB) which functions under the Ministry of Environment & Forests, Government of India. This body is responsible for promoting afforestation, tree planting, ecological restoration and eco-development activities in the country. The planning and implementation of this programme is carried out in accordance with guidelines periodically issued by NAEB. Since the commencement of the NAP, various afforestation projects had been implemented across the nation. The project components are executed by village based Joint Forest Management Committees (JFMCs). These committees work under the supervision and control of Forest Development Agencies (FDAs), which have been formed at the level of the Forest Divisions.

(b) National Mission for a Green India[7]

The National Mission for a Green India (GIM) is one of the eight Missions under the National Action Plan on Climate Change (NAPCC). GIM acknowledges the influences that the forestry sector has on environmental amelioration through climate mitigation, food security, water security, biodiversity conservation and livelihood security of forest dependent communities.

It will focus on the quality of forests (density of forest cover) and ecosystem services, with an emphasis on biodiversity, water and improved biomass while treating carbon sequestration as co-benefit. GIM also aims to focus on democratic decentralization by treating the village based Gram Sabha (Village Institutions in 6th Schedule Areas) as the grass roots level institution to facilitate implementation of the Mission activities at the village level. Further, it also aims to create a new cadre of community youth as foresters.

(c) Compensatory Afforestation Programme[8]

Whenever forest land is to be diverted for non-forestry purpose, the Forest (Conservation) Act 1980 requires that compensatory afforestation be taken up on forest land, preferably in lands contiguous to the affected forests. The above Act also requires that funds for raising compensatory afforestation etc are to be realized from the user agencies requiring such forest land on the basis of the rates fixed by the State Forest Department. Such rates are site specific and vary according to the species, type of forest and site

Afforestation Programmes in NE India

The North Eastern (NE) region of India consists of eight states of the country. It may be noted that these states account for a quarter of the forest cover in India[9], while having about 8% of its geographical area. The above mentioned afforestation schemes are being implemented in the region through the various State Forest Departments. However, the NE Region has several distinguishing

features that set it apart from most other states of India. These factors have an impact upon the forestry operations being carried out in the states.

Under Article 244(2) of the Constitution of India, special provisions have been kept in the 6th Schedule for the administration of the tribal areas in Assam, Meghalaya, Tripura and Mizoram. These include the formation of District Councils or Regional Councils for the protection of tribal communities. Such Councils have been vested with powers to make laws for 'the management of any forest not being a Reserved Forest'[10]. Thus, in the areas covered by these Councils, the role of the State Forest Department is limited to the management of Reserved Forests.

Further, in most parts of the region (excluding the valley areas of Assam and parts of Tripura); land has not been surveyed and 'settled' for determining land revenues as elsewhere in the nation. In fact, in most hill states of the region, land belongs to the community, clan or the individual as per the customary practices. Usually, the State Government has limited powers to acquire land for developmental purposes – including for afforestation projects.

Another factor is the widespread prevalence of 'shifting (jhum) cultivation' in the hill states of NE region. As a percentage of the state's area, the areas under current and abandoned jhum range from 2% in Meghalaya to 17% in Nagaland.[11] This excludes lands with dense and open scrub, scrub dominated forests etc. that may have been caused by such practices. Shifting cultivation lands remain the most dominant form of land use in many North Eastern states and it has a larger extent than settled agriculture and horticulture. A view has emerged that shifting cultivation has deteriorated and has become ecologically unsuitable because of the shortening and unsustainable management of the forest-fallow phase of the shifting cultivation cycle.[12]

It may be noted that various afforestation works have a limited impact in the region. In fact, as per the latest State of Forest Report of 2013, the region has registered a decline of 627 km^2 of forest cover as compared to its forest cover recorded in 2011.[13] Nagaland, Tripura, Manipur and Mizoram have recorded high loss of their forest cover in relative terms as per the above Report.[14] Hence, there is a necessity to develop a new approach to accelerate the regeneration of forest and tree cover in the NE region.

Limitations of the Current Approach

The present model of afforestation relies upon the State Forest Departments for planning and implementation of works. The department controls and guides the involvement of communities involved in the projects. The works have to be carried out in accordance with the guidelines and circulars issued by the Ministry of Environment & Forests, Government of India. Hence, there are many limitations in the current approach of the Government for forest regeneration. At

best, it is able to maintain the forest cover of the country despite the pressures on account of population growth and developmental activities. However, the present cover (24.01% in 2013) is considerably lower when compared with the stipulation of the National Forest Policy of 1988 to increase the forest / tree cover of India to 33% of its land area.

The main limitations of the present approach of afforestation, *especially* in the North Eastern region of India, are summarized as follows:

- Top down uniform model of afforestation;
- Low levels of community involvement;
- Non-availability of land;
- Choice of species used;
- Flow & Utilization of Public Funds for Afforestation; and
- Sharing of Benefits.

The discussion given below is based on the writer's experience of evaluation of schemes like the National Afforestation Programme (NAP), Tree Plantation under Twenty Point Programme (TPP) and the erstwhile Grants-in-Aid scheme providing assistance to voluntary agencies for tree plantation (VA Scheme). Further, readily available secondary information has been referred to wherever needed.

Top down Uniform Model of Afforestation

The State Forest Departments are officered at the higher levels (Forest Division and above) by personnel of the Indian Forest Service (IFS), which is one of the three all-India services. In this aspect, this department stands out amongst almost all the other state level departments. Except for the Administration and Police, none of the other state level departments (like Public Works, Agriculture, Health, Education, Rural Development etc.) have a similar all-India cadre of officers working from the district (divisional) level upward.

The above structure of the Forest Department has facilitated a top down uniform model of afforestation through schemes like the National Afforestation Programme (NAP), which is being entirely funded by the Centre. For the implementation of the NAP, the Government of India had laid down the operational guidelines in May 2002. Such guidelines cover aspects like planning (including micro-planning), proposal formulation, funding, monitoring and evaluation. The National Afforestation & Eco-development Board (NAEB) issued circulars periodically whereby these guidelines were modified or supplemented.

Despite the fact that the nature of forests varies widely in the country, the guidelines fix the same amount of funds for afforestation throughout the country for the same daily wage levels. For example; if a degraded forest had to be

regenerated, an amount of Rs. 9,750/- was fixed as the permissible cost for 'Aided Natural Regeneration' with 200 plants per hectare, based on a daily wage level of Rs. 75/-.[15] If the number of plants or wage rates differed, then the above permissible cost was subject to pro rata variation. Thus; even in spite the wide variation of costs like labour, planting materials, maintenance etc.; the permitted costs were uniform throughout India for different work components for afforestation.

Low Levels of Community Involvement

The NAP guidelines provide for the development of micro-plans to carry out afforestation at the village level. These micro-plans form the basis of the planning exercise for the district afforestation works. Such plans are to be prepared by the village based Joint Forest Management Committees (JFMCs), which are constituted by including all able bodied and willing adult members of the village. In addition, the works are to be implemented by the JFMCs through their members who are to be paid a daily wage.

However, in most villages of the region, the villagers were unable or unwilling to prepare the micro-plans by themselves. Usually, these plans had to be framed by the field level officials of the Forest Department in consultation with their superiors and after the necessary community feedback. Further, the implementation of afforestation works was found to be usually done as a departmental exercise through the engagement of labourers, who are shown to be paid through the JFMCs.

NAEB had envisaged that the community involvement would avert the need for fencing off the areas where plantation works are carried out. In fact, the concerned guidelines specify that fencing costs are not to exceed 5% of the plantation cost in usual circumstances. In practice, the need for fencing has been repeatedly voiced by the Forest Department officers, who often state that the allocation for fencing works is low under NAP and that their field staff cannot protect the young trees from straying cattle belonging to the local villages due to this factor. This indicates the low level of community participation in the planning and implementation of afforestation works. In recognition of the issue, the Revised Operational Guidelines of 2009 state that 'If the local edapho-climatic and biotic factors require fencing beyond the stipulated 5% costs, the same may be supplemented by additional funds admissible for problem lands ... or by additional funds under other schemes'.[16]

Unsurprisingly, the Mid Term Evaluation of NAP projects carried out on a national basis by the Indian Council of Forestry Research and Education, Dehra Doon has observed that 'communities should be involved in micro-planning and project implementation activities'.[17]

However, the execution of the 'Entry Point Activities' under the NAP seems

to be guided by the public requirements. These activities are carried out in the project villages to gain the cooperation of the local communities. It is seen that many useful assets like water supplies, ponds and fisheries, concrete steps, community halls etc. have been built in the project villages after duly consulting with the members of the project village.

Non-availability of Land

The NAEB has stated that plantation works under NAP are to be carried out within recorded forests or in adjoining lands (such as community land, revenue waste land, village common land, degraded jhum land etc.) using the watershed or catchment area approach. Clusters of compact blocks measuring 20 hectares or more can be taken up. The major part of project area was expected to comprise of degraded forests, pastures and community lands. Strip plantations can be carried out in two rows or more along roads, canals or railway lines.[18]

However, if works were undertaken within Reserved Forests, then the villagers will not be able to avail of usufruct benefits such as firewood, fodder, fruits etc. Hence, there was a disincentive to undertake the regeneration of degraded forests located within the protected areas.

Nationally, the availability of land was cited as a major gap area by the Planning Commission in its discussions on the 10th Plan[19]. Under the Revised Operational Guidelines for NAP finalized in 2009, the requirement of block size has been reduced to 5 hectares. Smaller areas could be taken up if the JFMC agreed to extend additional voluntary support required for regeneration and maintenance of a smaller area.[20]

As discussed previously; in the hill states of the North Eastern region, land usually belongs to the community or to individuals as per customary laws. Apart from the Reserved Forests and Protected Forests, the Forest Department has a limited role. Further, in states like Meghalaya, Tripura and Mizoram, the management of forests (excluding reserved forests) has been kept under the ambit of the District or Regional Councils formed at the sub-state levels under the Constitution of India. Hence, in the hill states, the Forest Department faces additional hurdles in finding available land for carrying out afforestation projects.

Choice of Species Used

The choice of species used in afforestation is usually guided by the Forest Department officials. As the Mid Term Evaluation of NAP projects, carried out by the Indian Council of Forestry Research & Education, had observed, 'However, area selection for treatment and choice of species for plantation have followed departmental decisions as these are still being viewed by foresters and communities alike as forte of the technocrats'.[21] For their own reasons; the Forest Department and commercial growers usually choose to raise hardy tree species

that grow comparatively quickly, and which command higher market demand and prices mainly for their woody biomass.

Consequently, out of India's total estimated forest plantation area, nearly 45% is composed of fast-growing, short-rotation species such as *Eucalyptus grandis*, *E. tereticornis*, *Acacia auriculiformis*, *A. mearnsii* and *A. nilotica*. Teak (*Tectona grandis*) accounts for about 8% of the total plantation area. Other commonly planted hardwood species are *Albizzia* spp, *Azadirachta indica*, *Casuarina equisetifolia*, *Dalbergia sissoo*, *Gmelina arborea* and *Hevea brasiliensis* (rubberwood). Pines and other conifers make up about 10% of the total forest plantation estate.[22] On the other hand, the needs of the fringe village communities are better served by species endowed with larger crown biomass, which can perform functions for maintenance of life support systems, hydrological and nutrient cycles and form the most important source of production of biomass for use as fuel, fodder, manure, fruits etc.[23]

The NAP guidelines provide for the use of improved technologies like clonal seedlings, root trainers, hormonal treatments etc. to encourage a wider variety of species and to improve the planting stock. Additional funds up to 25% of the plantation costs can be utilized for adopting such improved technologies. However, the existing limitations like skills and know how available at the field level prevented the effective utilization of funds in this direction. In addition, it has been observed that 'the NTFP (Non Timber Forest Product) species still constitute a minority in the plantation programmes'.[24]

Flow & Utilization of Public Funds for Afforestation

The flow of funds for the forestry sector originates from the budgets of the Government of India and of the various State Governments. In addition, externally aided projects are being operated for afforestation works. The major sources include NAP, Green India Mission, Compensatory Afforestation, Finance Commission grants etc. The plan outlays and expenditures incurred through the NAEB / Green India Mission during the 11th Five Year Plan period have been tabulated below.

Table 8.1: Outlays & Expenditures on schemes of NAEB, NAP & Green India Mission

Financial Year	Rs. in Crore	
	Plan Outlay	Expenditure
2007-08	359.23	422.05
2008-09	398.62	370.71
2009-10	386.62	354.97
2010-11	352.00	353.93
2011-12	330.00	334.92
Total for 11th Plan	**1,826.47**	**1,836.58**

Source: Ministry of Environment & Forests: 'Outcome Budget for FY 2012-13', Page Nos. 52-53

From the above table, it is seen that the average annual expenditure incurred on the above schemes was over Rs. 367 crore per annum – i.e. just over Rs 1.00 crore a day for the entire plan period. This figure excludes funds from the Finance Commission award, external sources, compensatory afforestation and state budgets. The magnitude of the funds available from the above sources is given below[25].

- The Thirteenth Finance Commission award for the forestry sector was Rs 5,000 crore for a five year period starting from FY 2010-11, of which 25% was allocated for forest development and infrastructure.
- Compensatory afforestation funds ranged between Rs 1,000 crore and Rs 1,500 crore per annum during the 11th plan period, with such funds being available for mandatory compensatory afforestation in lieu of diverted forest area for non-forestry purpose, catchment area treatment, strengthening the protection and management of forests, infrastructure development and maintenance of older plantation etc.
- Externally aided projects were being operated in 11 states in the above plan, with their combined annual outlays ranging between Rs 500 crore and Rs. 600 crore per annum.

The present budget for FY 2014-15 makes a total plan outlay of Rs. 2043.00 crore for the Ministry of Environment & Forests; of which Rs. 1169.20 crore has been earmarked for 'Forestry & Wildlife'. The plan outlay for some schemes for the FY 2014-15 is given as follows:

National Afforestation Programme (NAP)	...	Rs 318.15 crore
Green India Mission	...	Rs 80.00 crore
Intensification of Forest Management Scheme	...	Rs 68.25 crore (*)

(*) for forest infrastructure, boundary demarcation and management of forest fire

It may be noted that a substantial part of the above funds are allocated to the North Eastern states. For example, the Thirteenth Finance Commission had awarded Rs. 1676.72 as grants-in-aid for forests – i.e. 33.53% of its total award. Similarly, the funds released to these states under NAP formed 18%, 16% and 20% of the total funds released by NAEB in the first three years of the 11th Five Year Plan.[26]

While the availability of funds is substantial, as indicated at above; there have been some issues with the utilization of funds as well as with the timely release of funds. The following examples are cited in this connection:

· The Comptroller & Auditor General of India (CAG) has observed that the NAEB had sanctioned Rs. 47.03 to Voluntary Agencies (VA) and State Forest Departments (SFDs) / Forest Development Agencies (FDAs) for implementing

647 projects under its 'Grants-in-Aid scheme for providing assistance to voluntary agencies for tree planting' (VA Scheme). Only 3.6% of the projects sanctioned to VAs and 23% of the projects sanctioned to SFDs / FDAs could be completed. In over three fifths of the above projects sanctioned to VAs (352 out of 560 cases), only one instalment was released as the NAEB did not receive Utilization Certificates, Progress Reports and other documents from the VAs. The CAG has stated that 'the possibility of misuse / fraud could not be ruled out'.[27]

- Regarding fund flows under the NAP from the NAEB to FDAs, the Mid Term Evaluation carried out for the programme on an all India basis had observed that 'Most of the FDAs have reported delay in transfer of funds from NAEB, New Delhi office. This delay is more pronounced in release of 2nd and subsequent instalments'.[28]
- The progress of compensatory afforestation (CA) is marked by low achievement on the ground and poor utilization of funds as pointed out by the Comptroller & Auditor General of India. The pertinent details are furnished below.

As per Supreme Court order and forest laws, the Government is to collect funds from projects intending to use forest lands. These funds are based on rates set for different classes of forests, called the Net Present Value. These funds were then to be spent on greening other available lands in lieu of the forests handed over. In April 2004, the Ministry of Environment & Forests notified the Compensatory Afforestation funds Management and Planning Authority (CAMPA) to administer such Compensatory afforestation funds. Since the CAMPA was not made operational, the Supreme Court had intervened and formed an ad-hoc body in May 2006.

After examining the utilization of compensatory afforestation funds, the Comptroller and Auditor General of India has observed[29] that 103,382 hectares of forest land had been diverted for non-forest use since the notification of the Compensatory Afforestation funds Management and Planning Authority (CAMPA) by the Ministry of Environment & Forests in April 2004. But only 28,086 hectares of non-forest lands had been received for compensatory afforestation, which was just 27% of the diverted forest lands. Further, compensatory afforestation had been carried out in a mere 7,281 hectares (i.e. 7% of the forest land handed over to non forest use).

The quantum of funds for compensatory afforestation had grown to Rs. 23,607.67 crore by the end of 2012. However, as per CAG the states / UTs had not deposited all monies collected towards Compensatory Afforestation Fund. 'The divergence in data of transfer of funds available with Ad-hoc CAMPA and collected from States/UTs was Rs. 6,021.88 crore, which was 26.32% of the principal amount with Ad-hoc CAMPA.'

The utilization of the released CA funds was low. Out of Rs. 2,925.65 crore of the compensatory afforestation funds released by Ad-hoc CAMPA during the period 2009-12 for compensatory afforestation activities, only Rs. 1,775.84 crore (61%) were utilized by the State/ UTs. In 11 of the states studied, the above utilisation ranged between 0% and 50%. These included some states in NE India like Meghalaya (0% utilization), Arunachal Pradesh (9%) and Tripura (32%)

The above are some recorded cases of delays in fund releases and poor utilization of funds. Similar instances cannot be ruled out in the case of afforestation projects carried out in the states of the NE region.

Sharing of Benefits

Another drawback in afforestation schemes carried out with the peoples' participation is that they are not very aware about the sharing of benefits, which are governed by legally non-tenable documents. As per the guidelines issued by the Government of India in 1990 for Joint Forest Management (JFM)[30] and the follow up guidelines for strengthening the JFM programme in 2000[31], the sharing of benefits is not dealt with in detail. Any Memorandum of Understanding (MoU) signed between the Forest Department and the JFM Committees has no legal status and such MoU exists for a limited period only.

As the Mid Term evaluation of the NAP carried out in 2007-08 by the Indian Council of Forestry Research and Education had observed, 'The rights under MoUs are weighted in favour of SFDs (State Forest Departments). Moreover, the benefits envisaged under project are too distant on time horizon and implementation of the scheme is only (five years) to provide a meaningful and clear incentive for community investments and support.'[32] Further, the lack of awareness about benefits may deter participation by women in afforestation works.[33]

Further, as per the Recognition of Forest Rights Act[34], forest dwellers have the right to collect and dispose of minor forest produce. Hence, they have little incentive to join hands with the Forest Department now for the **extension of JFM in 'good' forest areas** (with crown cover of 40%) as envisaged by the Ministry in its follow up guidelines for strengthening the JFM programme in 2000. The said guidelines state that in such forests, the JFM activities would concentrate on NTFP management.

Proposed People Centred Model for Planning & Implementation

In view of the above mentioned shortcomings of the current afforestation projects, especially in the hill states of the North Eastern region; it is proposed to outline a people centred approach for afforestation in these areas. The objective is to develop an alternative paradigm for the afforestation in such hill areas, wherein the planning and implementation of works are led by local communities / individuals.

The proposed model may be viewed as an *additional* approach to 'institutionalize the people's participation' for 'managing environment, forests, wildlife and challenges due to Climate Change' as envisioned for the 12th Five Year Plan.[35] It can supplement the existing efforts of the Forest Departments and other stakeholders, including the Joint Forest Committees. While developing this model, the local ground realities have been kept in mind and there is an effort to optimize the utilization of public funds.

The basic outlines of the proposed approach are given below.

(a) *Land for Afforestation*

In the hill areas, land is customarily held by the community, clan or by individuals. The afforestation works may be carried out in such lands. Such works may be encouraged through plantation of trees on degraded forests (scrub land) and open forests (having crown density of 40% or less). The aided natural regeneration of forests may be encouraged.

It may be noted that over two fifths of forest cover in the NE region consists of open forests (having 10% - 40% crown density) and nearly 45% of the cover consists of moderately dense forest (40-70% crown density). Further, protected forest areas (Reserved Forests and Protected Forests) constitute only 25% of the geographical area of the region. If one leaves aside Assam, unclassed forests account for nearly three fifths of the recorded forest area of the rest of the region. Hence, there is an ample scope for taking up afforestation works by individuals or communities in the hill areas.

Preference may be given to cases where the quantum of land available for afforestation works is 10 hectares (or more) in a compact block, but this should not be a constraining factor. This aspect may be debated and modified. However, the advantages of having compact blocks for afforestation are to be considered carefully.

(b) *Association of Community / Individuals*

The community, on whose common land the afforestation work is proposed, may associate as a society or trust to carry out the afforestation works. In case of individually owned lands, the land owner(s) and persons related to them or otherwise chosen by them may suitably associate to carry out the afforestation works. Such association may take the form of societies, trusts or companies registered with the appropriate registering authority.

The above associations may be certified by the Forest Department after vetting by the Gram Sabha or Village level Institution formed under the District or Regional Council in order to avail of public funds.

(c) *Planning of Works & Choice of Species*

The planning of the afforestation works may be left to the community or association of individuals. This should not be constrained by the Working Plans of the Forest Department, but the plans should be intimated to the Department for its records and for receiving its support in matters like technical advice and permits for felling and transit.

The community / individuals may decide the area to be planted, spacing of plants, wage rates, components of work, soil and moisture conservation works, treatment of problem area, sourcing of planting materials etc. based on their own judgement. In such matters, they may seek the technical guidance from the Forest Department, professionals or other sources.

However, if the planned works have to be publicly funded (even partially), then the above mentioned plans have to be approved by the Forest Department after being vetted by the Gram Sabha or Village level Institution formed under the District or Regional Council. In such cases, photographs of the proposed area with geographical coordinates may be required to be attached with the plans while the same are forwarded for approval.

The choice of species may be left to the community / individuals who may grow fast growing species, horticultural crops, fodder and fuel wood providing species etc. However, preference may be given to species which do not need permission from the Forest Department as per the applicable rules governing the felling of trees on non-forest lands. In most NE states, the felling of horticultural trees like mango, jack fruit, guava, jamun (*Syzygium cumini*) etc. and of home-grown bamboo are usually exempt from permission requirements.

(d) *Implementation of Works*

The works may be implemented by the Association of Community / Individuals as per their own plans. They may engage labour if sufficient voluntary labour is not available locally. All labourers / volunteers may be paid at market rates or the minimum wage rate. The different works like Advance Work, Plantation and Annual Maintenance may be carried out as per the best practices in the area of forestry.

The planting materials used have to be certified as being 'disease free' in case the vegetative propagation route is used through methods like cutting, bud grafting, layering etc. This is necessary to prevent the spread of diseases that may defeat the purpose of undertaking the afforestation works.

In case the works are needed to be publicly funded (even partially), then the implementation of works shall be supervised by the Forest Department and the release of instalments of funds should be linked to the progress of works certified by the field officials of the Forest Department, apart from the reports of the

concurrent evaluation undertaken by independent agencies (as described later in this section).

(e) *Funding of Works*

The afforestation works under the proposed approach can be funded from a combination of the following sources:

- Own sources of the individuals / community (in form of cash, kind or labour);
- Bank loans for commercially viable projects against reduced security requirements;
- Public funds from the following (for certified associations with approved plans):
  - MG NREGS (Rural Employment Guarantee Scheme)
  - CAMPA (Compensatory Afforestation)
  - National Afforestation Programme / National Mission for a Green India
  - Integrated Watershed Management Programme
  - Other Government programmes (Central / State Governments);
- Grants by Corporate Bodies / Individuals / Trusts (in case of donations made to community afforestation carried out by certified associations, tax exemptions may be considered);
- Corporate Social Responsibility Funds;
- External Aid (in case of large projects); and
- Other sources – which may be emerge from brain storming sessions.

The basic aim of diversifying the funding sources and including own contributions (in kind or labour), is to encourage the individuals and communities of the region to look beyond the Government and to develop a spirit of self help and initiative at the village levels.

(f) *Concurrent Evaluation of Works* (for Publicly Funded Projects only)

If the afforestation works involve the use of funds, then the progress of works may be concurrently evaluated by independent agencies to record aspects like the physical progress of works, fund utilization, quality aspects, problems faced and solutions adopted etc.

The agency carrying out the independent evaluation may be required to take photographs of the plantation areas with their geographical coordinates. These photographs may be reviewed against the photographs of the areas furnished along with the proposal to detect any possible misuse of public funds.

(g) *Sharing of Benefits*

In case of self funded individual projects, the benefits will accrue to the individuals. For the community projects without public funding, the benefits will go to the community members as provided for under their rules / understanding. In case the individual / community avail of bank loans, the same has to be repaid with interest as per the bank's terms.

For projects funded by Corporate Social Responsibility Funds, grants or donations etc.; the conditions of the corporate body concerned or donor has to be followed along with the provision of the laws of the land.

If public funds are involved or external aid is availed of with Government guarantee, then a legally enforceable agreement may be drawn up by the parties regarding the sharing of the benefits. The agreement will incorporate the terms of the Government / external donor which have to be understood and accepted by the community beforehand.

Further, a limited quantum of the benefits like fuel wood, fodder, small timber, medicinal plants etc. may be kept aside for vulnerable members of the local community including women headed households, except for forests raised with bank loans.

(h) *Role of the State Forest Department*

The Forest Department will play a facilitative role in the entire approach. It can render technical assistance for planning and implementation of the works. The Department can help the associations to obtain planting materials from its own sources or its registered suppliers. It can also assist the community / individual to obtain felling and transit permits, including in states through which the timber has to pass while reaching markets.

In case public funds are involved, the role of the Department will be greater including the certification of the associations, approval of plans, supervision of works and coordination with the independent agencies appointed for concurrent evaluation of the works, including review of their reports.

Conclusion

The above model for development of forests on community and individual lands has been proposed based on the ground situation in the hill states of the region and the limitations of the present afforestation measures of the state.

The proposed approach is open for extensive debate and changes as deemed necessary. As an outcome, all attempts must be made by the stakeholders in the region and their well wishers elsewhere to mainstream the model (after all necessary modifications have met with stakeholder acceptance) and to create the ground conditions for its adoption by the local communities, so that a people led

afforestation movement can take root in the hill states of the region. This is necessary as the NE Region is still losing forest / tree cover, despite having nearly two thirds of its area under forest. Thereby, local communities are being adversely affected in many ways.

The adoption of the people centred approach will develop the confidence of communities and individuals to develop their living standards on their own initiative, thereby breaking the on-going dependence on government handouts. This may have several positive implications for the growth of the North Eastern region of the country.

References

Ministry of Environment & Forests, Government of India: '*Annual Report 2004-05*', Page No. 75

'*The Hindu*', Wednesday, July 9, 2014, Page No.10

Comptroller & Auditor General of India: '*Compensatory Afforestation in India*', Report No. : 21 of 2013, Page No. 3

Barik & Darlong: '*Natural Resource Management Policy Environment in Meghalaya Impacting Livelihood of Forest Poor*', Centre for International Forestry Research (CIFOR) Bogor, Indonesia Page No. 19

National Afforestation & Eco-Development Board: '*National Afforestation Programme, Compendium of Operational Guidelines and Circulars*', November 2003

National Afforestation & Eco-Development Board: '*National Afforestation Programme Revised Operational Guidelines, 2009*'

Ministry of Environment & Forests, Government of India: '*National Mission for a Green India*', March 2011

Comptroller & Auditor General of India: '*Compensatory Afforestation in India*', Report No. : 21 of 2013

Forest Survey of India: '*India State of Forest Report 2013*', Page No. viii

As provided under Paragraph 1 (b) of the Third Proviso of the Sixth Schedule related to 'Powers of the District Councils and Regional Councils to make laws'.

Department of Land Resources, Government of India: '*Wastelands Atlas of India, 2010*', Page No. 37

Ministry of Environment & Forests: '*Report of the Inter-Ministerial National Task Force on Rehabilitation of Shifting Cultivation Areas*', 2008

Forest Survey of India: '*India State of Forest Report 2013*', Page No. vii Ibid, Page No. 17

National Afforestation & Eco-Development Board: '*National Afforestation Programme, Compendium of Operational Guidelines and Circulars*', November 2003, Page Nos. 8-9

National Afforestation & Eco-Development Board: '*National Afforestation Programme Revised Operational Guidelines, 2009*', Page No. 8

Indian Council of Forestry Research and Education: '*Mid Term Evaluation of the NAP Schemes implemented through FDAs*', June 2008, Page No. vi

National Afforestation & Eco-Development Board: '*National Afforestation Programme, Compendium of Operational Guidelines and Circulars*', November 2003, Page Nos. 6-7

Comptroller & Auditor General (CAG): '*Environment Audit Report*', Report No. 17 of 2010-11, Page No.13

National Afforestation & Eco-Development Board: '*National Afforestation Programme Revised Operational Guidelines, 2009*', Page Nos. 3-4

Indian Council of Forestry Research and Education: '*Mid Term Evaluation of the NAP Schemes implemented through FDAs*', June 2008, Page No. 19

International Tropical Timber Organization: '*Encouraging Industrial Forest Plantations in the Tropics*', 2009

Dr. Vandana Shiva: '*Monocultures of the Mind*', Palgrave Macmillan, 1993, Page No. 34

Barik & Darlong: '*Natural Resource Management Policy Environment in Meghalaya Impacting Livelihood of Forest Poor*', Centre for International Forestry Research (CIFOR) Bogor, Indonesia Page No. 32

Planning Commission: '*Report of the Sub-Group-I on Forestry*' [Constituted under Working Group for Forestry and Sustainable Natural Resource Management for the 12th Five Year Plan (2012-17)]

Indian Council of Forestry Research and Education: '*Forestry Statistics of India – 2011*', Page Nos. 67 and 69

Comptroller & Auditor General of India: '*Environment Audit Report*', Report No. : 17 of 2010-11, Page Nos. 13-16

Indian Council of Forestry Research and Education:''*Mid Term Evaluation of the NAP Schemes implemented through FDAs*', June 2008, Page No. v

Comptroller & Auditor General of India: '*Compensatory Afforestation in India*', Report No. : 21 of 2013

Letter No. 6.21/89-PP dated: 1st June, 1990 issued by the Ministry of Environment & Forests

Letter No. No. 22-8/2000-JFM (FPD) dated February 21, 2000 from the Ministry of Environment & Forests

Indian Council of Forestry Research and Education:'Mid Term Evaluation of the NAP Schemes implemented through FDAs', June 2008, Page No. 38 Ibid, Page No. 51

Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (No. 2 of 2007)

Planning Commission: '*Twelfth Five Year Plan (2012–2017) Faster, More Inclusive and Sustainable Growth Volume I*', Chapter 7, Page No. 202

9

Sustainable Development through Community Participation: A Case Study of Mawlyngot Village, Meghalaya

Evakorlang Kharkongor

Introduction

The growing awareness and concern about the ramifications of environmental degradation since the sixties have provided the foundation for the concept of Sustainable Development. This process of development requires the building up of sustainable relationships between people and their environment. It emphasizes on new approaches that involve a cross-sectoral coordination and the integration of environmental and social concerns into all development processes (Allen, W. 2005). In other words, the multiple dimensions of sustainable development emphasize the broad participation of all members of society in the decision-making process in order to enhance the quality of life. This brings into sharp focus that community participation in sustainable development strategies cannot be over- emphasized.

Objectives of the Study

Community participation in development strategies has assumed significance in the present day context for its capacity to promote sustainable development through participation, sharing of responsibilities in identifying, designing, management and execution of developmental projects. In other words, community participation plays an effective role in evolving strategies that integrates development priorities to local needs and their impact on the natural resource base. Therefore, this paper would attempt for an in depth analysis into the following:

1. To analyze the leading role of community participation in promoting sustainable development with special reference to the economic activities of the Mawlyngot Tea Grower's Society.
2. To analyze the effective strategies adopted based on local needs, which have enabled the community to diversify into rural tourism and link the development process to other villages.

Methodology

The data for this analysis is drawn from primary and published sources. The primary sources included interviews and spot investigations pertaining to relevant parameters in the analysis. The methodology is both descriptive and analytical where the data so collected will be tabulated and analyzed with relevant statistical tools and techniques.

Sustainable Development and Community Participation

The concept of sustainable development is usually associated with the Bruntland Commission Report - Our Common Future, presented to the United Nations General Assembly in 1987. This Report has brought out the significance of the concept of Sustainable Development as follows, "Humanity has the ability to make development sustainable ... to ensure that it meets the needs of the present without compromising the ability of the future generations to meet their own needs (World Commission, 1989). Further, it had also declared that, "sustainable development is a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations (World Commission, 1989).

Since then, discussions on sustainable development have gained wide momentum at the international level. The Earth Summit organized by the United Nations Commission on Environment and Development in June, 1992, at Rio-de-Janeiro, Brazil was the culmination of the growing awareness of environmental degradation. This Summit which endorsed Agenda 21 as a detailed follow up to the Bruntland Commission Report have emphasized for more citizen participation in environment and development. This was reaffirmed in 2012 at the United Nations Conference on Sustainable Development held in Rio-de-Janeiro, Brazil. The Agenda Rio+ 20 that was adopted confirmed that the fundamental pre requisites for sustainable development depends upon broad public participation involving all stake holders from the governments, business corporations, agencies, members of the civil society and indigenous people. It reaffirms that, the key agents for sustainable development are not the global managers of limits and survival or the experts with managerial hierarchy at the disposal of administration

rationalists (Dryzek, 2013). Instead the relevant actors can exists at many levels including the grassroots too in which the green radical slogan, "think globally, act locally" can be adopted (Dryzek, 2013). Clearly the multiple dimensions of sustainable development depend upon integration, co-ordination and participation of members of the community which may be at the local, national and global levels. The participation of these stakeholders is integral in the developmental process that will contribute to the environmental and social dimensions of sustainable development.

A community has been defined as "an organic natural kind of social collectivity whose members are bound together by a sense of belonging; created out of everyday contacts covering the whole range of human activities (Tonnies, F. 1957). Moreover, Mac Iver and Page (1965) had aptly described the term community as follows:

> *It is the term we apply to a pioneer settlement; a village, a city, a tribe or a nation. Wherever the members of any group small or large; live together in such a way that they share ... the basic condition of a common life; we call that group a community."*

These definitions have clearly indicated that the essence of a community lies in the presence of a well-defined and close knit participation among the members in almost all the conditions that affect the basic quality of life.

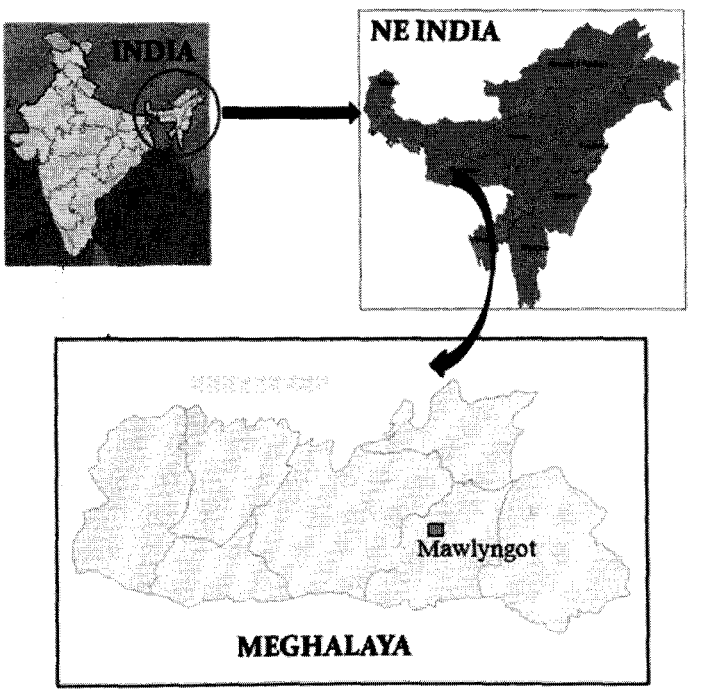
Participation had been defined as a process through which stakeholders influence and share control over development initiatives and the decisions over resources which affect them (The World Bank, 1996). Further, the United Nations Development Program (UNDP, 1996) had coined the term "Sustainable Human Development", to describe the essential feature of "Human - Centeredness", in the process of sustainable development. All these have pointed out that sustainable development involved changes that allow people to exercise meaningful choices for their own benefit and for the society at large. It would depend upon the active participation of the community; their resilience and adaptation to necessary changes that would consider economic benefits in terms of sustainability of the natural resources in which they are based (Allen W., 2005).

In India, conscious efforts have been made for maintaining environmental security along with developmental advances as evident from the Indian constitutional provisions, environmental policies and planning objectives. The pronounced objectives of the Eleventh Five Year Plan (2007-12) which aimed "towards faster and more inclusive growth", recognized the fact that in order to enhance the quality of life is by ensuring better access to basic physical infrastructure, health and education. This was reiterated in the Twelfth Five Year Plan (2012-17) which focussed on enhanced public participation in order to

achieve sustained and inclusive growth. The role of public participation in the Indian context is further evident by the presence of the Cooperative Movement since 1904 through the establishment of the Cooperative Credit Societies. The success of these societies and the presence of a large number of Non-Governmental Organisations and local bodies highlighted the presence of public participation in India. Moreover, the provision of constitutional status (73rd Amendment) to the grassroots institutions for local governance such as the Panchayati Raj in 1993, highlighted the efforts of the Government to ensure public participation in the decision making process.

Brief Profile of Meghalaya

Meghalaya is one of the eight states of the North Eastern Region of India. The other states are Assam, Arunachal Pradesh, Mizoram, Manipur, Nagaland, Tripura plus the Himalayan state of Sikkim. The State has an area of 22429 sq. km. accounting for about 6 per cent of the total land area of the country. The land surface of the State is interspersed with steep hills and deep gorges the valley lands being very small. Meghalaya is predominantly tribal in nature: the main tribes are the Khasis, the Jaintias and the Garos. The population of the State according to



The Mawlyngot Village: Socio-Economic Scenario

the Census, 2011 was 29,64,007 persons which accounted for 0.25 per cent of the total population of the country. The State is basically agrarian in nature and a major section of the population of about 79.92 per cent depends on agriculture for their livelihood.

Community participation is inherent in the socio-economic and cultural structure of the tribal society which is matrilineal in nature. This is evidenced in the existence of exogamous clans spread all across the hills and the prevalence of community ownership of land. Moreover, the presence of grassroots institutions such as the Dorbar Shnong[1], the Raid[2] and the Hima[3] that operate collectively for

Table 9.1 Population Structure in Mawlyngot: 2013

Age Category	M	F	Total
0-1 years	3	5	8
1-5 years	15	15	30
6-10 years	13	11	24
11-15 years	10	11	21
16-20 years	4	5	9
21- 25 years	6	7	13
26-30 years	11	8	19
31-35 years	10	5	15
36-40 years	5	8	13
41-45 years	3	8	11
46-50 years	4	4	8
51-55 years	3	1	4
56-60 years	8	1	9
61-65 years	-	2	2
66-70 years	4	2	6
71-75 years	4	-	4
76-80 years	5	-	5
Total	108	93	201

Source: Nongspung, D.L.: Participatory Rural Appraisal – Mawlyngot Village: 2013-14.

1 A collective political body which consists of a general assembly of all the male adults of the village.

2 A conglomeration of several villages

3 Conglomeration of Raid and Villages. Decision making process. In addition to these intrinsic nature of community participation that is present in the tribal society, the existence of a large number of organisations and cooperative societies indicated that community participation play a significant role in the process of economic development of the State. Therefore, an in- depth analysis of such community participation as evidenced in the Mawlyngot Village of Meghalaya would be presented subsequently.

local governance at their various levels highlighted strong public participation in the Mawlyngot village is about 40 kilometres from Shillong and falls within the Mawkynrew Community and Rural Development Block, East Khasi Hills District of Meghalaya. It is strategically located at the tail end of one of the headland ridges of the world famous Cherrapunjee range, (Campfire Trails) with slopes tapering towards the South and touching the rain forest areas before connecting to the hinterlands bordering Bangladesh. It occupies a total land area of about 250000 sq metres and like all other villages in Meghalaya, Mawlyngot too is sparsely populated. In 2013, the population of the village was 201 persons. The structure of population in Mawlyngot is shown in Table 9.1.

The inhabitants came to the village from somewhere along the border between Bangladesh and Meghalaya following the course of the river Umsong. In 1752 (Nongspung, 2014) there were only five to six houses which later gradually expanded as the inhabitants came into contact with people from the neighbouring villages such as Mawblang, Rngibah, Thangbnai and Khapmaw. The relationships and social bonds between the people in these villages were strengthened through marriage ties among the different clans.

The coming of Christianity through the Presbyterian Church in 1922 in the neighbouring village of Mawblang had a great impact on the social and educational set up of the villages. Subsequently the first Lower Primary School was set up in Mawlyngot village. Further, the Roman Catholic Church also came to Mawlyngot in 1960 and greatly contributed towards improving the social and educational set up of the village. In spite of these contributions, there are only two Lower Primary Schools in the village at present which indicate the extent of backwardness and unbalanced nature of development that prevails in the rural areas of the State. However, the growing demands for schooling were keenly felt by the villagers not only in Mawlyngot but in the neighbouring villages as well. In order to solve this problem an initiative and collective decision was taken by the Raid Rngi to upgrade one of the Lower Primary School to Upper Primary level in 1984. This educational scenario is still prevailing in recent times resulting in a higher number of drop-outs mainly because of the inability of parents to send their children to other areas of the State for higher schooling due to poverty.

Considering the other parameters of development in terms of basic amenities it is pertinent to note the absence of proper health facilities resulting in undue hardships to the villagers who have to travel to neighbouring villages of Smit and Jongksha and also to Shillong for medical treatment. It is further noted that until the year 2000, (Nongspung, 2009), the village had no proper roads and communication, absence of safe drinking water facilities and electricity.

Another important economic indicator of the Mawlyngot village is the presence of a market which was started in 1974 and referred to as the ***Iewrynghep.***

The market which is open once a week has become the centre of economic activity not only for the people of the village but for the neighbouring villages as well. The agricultural produce from the different villages are brought to this market for transactions and it make available the much needed supplies of basic services to the villagers. The strategic location of Mawlyngot at the headland ridges in the proximity of a number of villages and hamlets with varied agricultural produce has enhanced the significance of this market in the area.

The main occupation of the people in Mawlyngot is agriculture and more than 85 per cent of the labour force is engaged in agriculture and allied activities as evident from Table 9.2 which represents the occupational structure of the labour force in the village. It is evident from the Table that the other important sector for employment is the services sector although the number of persons engaged in the different activities in this sector appears to be negligible. This analysis clearly indicated the absence of any secondary sectors or industries in the village and neighbouring areas.

Table 9.2 Occupational Structure of the Labour Force in Mawlyngot: 2013-2014

Category	Male	Female	Total
Agriculture and allied activities	34	30	64
Business Men	1	--	1
Teachers	2	3	5
Government Employees	4	--	4
Total	41	33	74

Source: As Table I above.

The system of Jhum Cultivation is practised in the Mawlyngot village along with wet cultivation in the low lying areas. The main crops cultivated are yam, millets, ginger, potatoes, cabbage, wheat, chillies and others. The main horticultural crops are bananas, oranges, pineapple, cucumber and others. The cultivation of broomsticks as a commercial crop is also carried out on the low lying areas of the village. However, agriculture is marked by low productivity such that the agricultural operations in the village are mainly subsistence in nature. As a result, there is the prevalence of low levels of income affecting the standards of living and the quality of life of the inhabitants.

A significant aspect of the occupation of the people in Mawlyngot was the practice of brewing local alcohol which started way back in1942. Since then, the inhabitants of the village have continued to brew country made liquor and supply it to the neighbouring villages. This practice became rampant in the village leading

to the neglect of agriculture which continues to remain at the subsistence level. The negative effects of this occupation became apparent over the years and affected the village community greatly. In order to counteract this problem the village community under the leadership of able persons deliberated on various measures that would provide alternative solutions for a better and sustainable livelihood. These deliberations sought to arrive at informed decisions that would improve the economic and social well being of the village. They were based on a rational understanding of the natural resources available and the need to properly manage them in such a way that would motivate the community to participate in the process so that the benefits would flow to the entire village. The result of these deliberations was the collective decision to sought guidance from the Office, District Training Officer, Farmer's Training Centre, Upper Shillong under the able leadership of Mr D.L.Nongspung; a teacher by profession of one of the Lower Primary Schools in the village. The outcome of this meeting was that the farmers of Mawlyngot were encouraged to form a unit under the national umbrella of farmers known as the Charcha Mandal Farmers Centre which was carried out immediately in 1987.

Community Participation in the Mawlyngot Village

The developments that had taken place in Mawlyngot brings into sharp focus the sense of responsibility that is present amongst the community members that enabled them to provide a forum for addressing issues to find out solutions based on local needs and priorities. The result of the collective decision to form the unit under the Charcha Mandal Farmers Centre in 1987 proved to be a boon to the village which opened up various opportunities for agricultural improvements. These opportunities are as follows:

- In 1988 a group of farmers from the village were facilitated for training and capacity building to other states of India for the adoption of improved methods of cultivation such as the scientific use of manure and others.
- In 2000, the World Vision of India contributed towards improving the welfare of the village in terms of health, education and also for farming activities. This project incorporated the participation of the community and able persons were appointed to co-ordinate the developmental activities. Moreover, a Village Development Committee was formed to work jointly with the World Vision of India. As a result of this collaboration a number of benefits were brought to the village and a group of farmers were again facilitated for training in organic farming to different states in India.

A significant milestone that was achieved through the initiatives of the

community was in 2001when a joint meeting was organized by the local headman, Mr D. L. Nongspung between the village community and their then, local representative to the State Assembly (Late) Shri B.B.Lyngdoh. This meeting which viewed with concern the prevailing practice of brewing country made liquor and its adverse impact sought to find solutions that would permanently solved this problem. The training and the exposure that the group of farmers had received in other states of India had enhanced their capacity to adopt decisions that were based on the available resources and how to allocate them to their best use. The outcome of these deliberations resulted in the significant initiatives for the adoption of tea cultivation in Mawlyngot. This decision was followed by a great deal of effort and hard work by the local headman and members of the village community who work tirelessly to prepare feasibility report on tea cultivation. Based upon the recommendations of the local representative and with assistance and cooperation from the officials of the Department of Agriculture, the report was prepared and submitted to the Director, Border Areas on July 2003. The result was that the Ministry of Tribal Affairs, Government of India through the Department of Border Areas, sanctioned the project for tea cultivation at an estimated amount of Rs 58.72 lakhs and an amount of Rs 5.67 lakhs was contributed by the village community. This project was to cover an area of about 45.5 hectares.

The task for implementation of the scheme was deliberated upon by the village community and the outcome of these deliberations was the formation of the ***Mawlyngot Tea Growers Society on July, 2003***. The main objective of the Society is to improve the economic condition of the village by taking up the challenges of tea cultivation. Initially, the society faced a number of difficulties to launch the project since the cultivation of tea needed special training and specific techniques of production. However, with assistance from the appropriate authorities in the State, the first batch of tea was planted in August, 2003. Since then, the project had taken off successfully impacting the economic and social life of the villagers in Mawlyngot who had, by this time, practically given up their practice of brewing and supplying local made alcohol.

Moreover, since 2004, the farmers were sent for training programmes on the various aspects of tea cultivation in training centres within the State and also in tea estates of Darjeeling. These were followed by training on Organic Farming in the year 2007 under the Directorate of Horticulture, Shillong.

The operation of the Mawlyngot Tea Growers Society is that it facilitates various input support to the farmers who retain ownership rights over their tea plantations. Moreover, in order to ensure economic viability and sustainability of the tea growers, the Society took up the initiative to set up a tea processing unit. This venture became possible when financial assistance from abroad was facilitated by the World Vision of India. The tea processing unit was thus set up

on September, 2008 and this unit produces black, green and white tea under the brand name of Urlong Tea. The farmers while maintaining their own tea gardens have an implied understanding of their inter - dependence with the Society. The understanding was that they should sell their plugged leaves to the processing unit in the village to ensure its operation on a commercial basis. This implies that the processing unit is the only asset that is owned by the Society and operated for the benefit of the members.

The uniqueness of the tea plantations of Mawlyngot village is that the tea grown is exclusively organic which brings out the environmental sustainability of this activity. Although the non-usage of chemical fertilisers and pesticides have resulted in lower yields, the organic tea grown and processed in Mawlyngot has been recognized and granted an Organic Certification in 2010 from the Control Union of Organic Certificates, Maharashtra, India under the brand name ***Urlong Tea***. In order to further strengthen and streamline their operations, the village community again took a collective decision and formed the ***Urlong Tea Processing Unit of Tea Growers Co-operative Society in 2011***.

At present the total area of the tea gardens in Mawlyngot is 50 hectares with an annual production of 6500 kilograms in terms of ***green leaf*** and 1300 kilograms of the final product of ***made tea*** in 2013. The tea that is produce from Mawlyngot provides a unique flavour besides being highly organic in quality. There is a growing demand for the Certified Organic Urlong Tea not only in the State but in the country and abroad. The market rate for the finished product in 2013 is represented in Table 9.3.

Table 9.3 Market Rates of Tea – 2013

Category	Rate per kg (in rupees)
Green Tea	1080.00
Black Tea	850.00
White Tea	5000.00

Source: Same as Table 10.2

The initiatives and the performance of the Mawlyngot Tea Growers Cooperative Society have provided an alternative source of income to the farmers in the village and greatly improve their standards of living. Comparisons between the incomes earned per household before and after tea cultivation have shown that there have been marked increases in the levels of income after tea cultivation. The annual income earned per household before tea cultivation ranged between Rs 5000 - 30,000/- during the period 2002 – 2003 which increase to Rs 25,000 - 50,000/- after tea cultivation during the period 2013-14 (Nongspung, 2013-14).

No doubt, the increase in the income levels appears to be modest. However, it should be noted that the income generated from tea cultivation is not only stable, but has provided an alternative opportunity that supplements the income of the farmers, besides being sustainable to the natural resource base of the village.

Sustainable Development through Community Participation

The sense of responsibility towards the development project and natural resource management that had been promoted through community participation motivated the members to diversify their activities to include tourism. The Mawlyngot village is endowed with a picturesque landscape and is known for its exotic natural beauty. The strategic location of the village offers breathtaking view points for travellers besides the presence of the organic tea plantations. The collective decision that was taken to diversify into tourism was based upon the strong sense of environmental consciousness that is inherent in the tribal society and the desire to promote an efficient system of conservation techniques for the environment. Hence, after due consideration into the economic viability of the activity that also accounted for the preservation of the environment, the village community formed the ***Urlong Tea Integrated Village Co-operative Society in 2013,*** that would also include sustainable tourism in its activities.

The task was taken up enthusiastically by the members and their effective functioning and success was noticed by the Government of Meghalaya. The Urlong Tea Integrated Village Co-operative Society was selected to act as a coordinating agency for the promotion of sustainable tourism in the State. In order to take up this challenging task separately that would ensure equitable representation from all stakeholders resulted in the decision to form the ***Meghalaya Village Development Promotion Tourism Co-operative Society Limited*** in July, 2013. This Society is a State Level Co-operative Society with membership of cooperative societies from different villages that are involved in promoting Sustainable Village Tourism. It acts as the coordinating agency for handholding other cooperative societies and village communities in their endeavour to better their incomes through sustainable tourism. Hence, the Meghalaya Village Development and Promotion Tourism Co-operative Society Limited functions as an apex body having more than five villages under its umbrella at present. These villages which have been encouraged to promote sustainable tourism are as follows:

- Umden in Ri Bhoi is famous for Eri silk production and weaving of tradional handlooms like ryndia, stoles in exquisites' pattern. The Umden Travellers Nest is owned by the Divon Handloom Cotton Khadi and Village Industrial Cooperative Society limited. The women of the society have been in the silk production and weaving for many years and have now decided to venture into Village Tourism as an

additional livelihood activity to increase incomes and provide employment to the youth of the village.

- Mawlongbna is an example of a place that is blessed by Mother Nature. The inhabitants of the village are a model of a community that is totally in sync with the environment. Mawlymbna is a keeper of many secrets with its protected forest, plateaus, caves, rivers, streams and is the birthplace of many legends.
- The Mawphanlur Traveller's Nest is owned and managed by the Mawphanlur Integrated Multipurpose Cooperative Society Limited comprising of enterprising individuals from the village.
- Kongthong nestled between Sohra and Pynursla, is a part of Khatar Shnong and is famous for the traditional bamboo and wood cottages. The Kongthong Travellers Nest cottages are designed entirely in a way that is traditional to the area and are famous for their unique culture.
- The Urlong Tea Integrated Village Co-operative Society in Mawlyngot is known not only for its organic tea but has also ventured into village tourism. The society has diversified into producing and processing local turmeric, mushrooms, coffee, preserving medicinal plants and many others.
- Besides the above, there are others who had recently joined this apex body namely the village Umngot which is famous for bee production and the Eco Park in Cheerapunjee.

Summary of Findings

The above analyses have clearly revealed that community participation provides a strong support base in the decision making process that affects the quality of life. A brief summary of the findings and conclusions thereof may be presented below:

1. Mawlyngot village is reflective of the nature of other villages in Meghalaya being sparsely populated and underdeveloped. However, the presence of a close knit and strong sense of community participation that marked the tribal society is a positive factor that can be taken advantage of, in order to promote inclusive and sustainable development in the State.
2. Effective Government policies and interventions are extremely relevant to provide the much needed impetus for the development of the educational facilities in the village. Besides, a lot of improvement needs to be done in terms of drinking water facilities, health and other basic amenities in order to uplift the socio-economic condition of the people in the village.

3. Considering the economic benefits of the market in Mawlyngot, it becomes necessary for the evaluation of effective strategies that would provide the necessary infrastructure to improve and expand the market to enable it to become an important and strategic market for agriculture produce in the State. It can also be promoted for marketing the Organic Urlong Tea and the other organic products that is produced in Mawlyngot. The promotion of this market would increase the attractiveness of the area for tourism.
4. There is a need for proper road connectivity between the various villages and small hamlets in the remotest interior parts which have no road connections even in present times. The development of proper road connections would enable the farmers to sell their produce easily in the market and to buy the necessary inputs for enhancing agricultural productivity.
5. The occupational structure of the labour force in Mawlyngot is reflective of the underdeveloped industrial scenario of the State. Notwithstanding, the fact that Meghalaya is basically agrarian in nature this analysis brings into sharp focus on the need to develop proper policy options that would bring about a balanced industrial development that takes into account the rich natural resource base of the State. For instance, the opportunities for developing agro-based industries in terms of organic fertilizers and manure; storing and packaging; tea nursery and a host of others need to be tackled in a proper perspective.
6. The above analyses have revealed that the involvement of the community from the initial to the final stages of a programme have ensured a sense of responsibility amongst the participants that is so essential for the success of a programme It has also helped in identifying leadership skills among members and encourages entrepreneurial skills and abilities.
7. The analyses have clearly revealed the significant role that had been played by the Government and the World Vision in enhancing the socio economic condition of the Mawlyngot village specially in promoting tea cultivation. There is a need to strengthen the efforts of the Government to monitor and provide the necessary training and finance to the farmers that would enable them to develop the village into a Model Organic Tea Village.
8. Concerted efforts to promote the potential of Mawlyngot as a tourist destination by showcasing the organic highland tea plantations and its rich and varied natural landscape should be taken up by concerned agencies in consultation with the community.

9. A unique occurrence in Mawlyngot is the phenomena of the Blue Worm (Ri Khasi Channel, 2014) which takes place during the monsoons. The environmental significance of this phenomenon is that their presence enhances the fertility of the soil that is so essential for the cultivation of the organic Urlong Tea. This phenomenon should be promoted to showcase the intrinsic link between man and nature.
10. There is a need to facilitate the villagers for training and capacity building which would enable them to meet the challenges of tourism.
11. The efforts of the Meghalaya Village Development Promotion Tourism Co-operative Society Limited should be further strengthen to enable it to carry its task successfully for the benefit of the rural areas in the State.

Conclusion

Community participation as a strategy for sustainable development becomes highly significant for its capacity to spread the gains of development to a wider community. Therefore, there is a need to promote effective community participation in developmental programmes of the State in particular and the country in general in order to achieve changes that is desirable for enhancing the quality of life.

References

Allen, W.: Learning for Sustainability. Net. This site is compiled and maintained by Will Allen (PhD): license under Creative Commons Attribution, 2005-15.

Campfire Trails: Camping and Adventure in Meghalaya; Shillong.

Dryzek, John. S: *The Politics of the Earth: Environmental Discourses*, Oxford University Press; 2013; Third Edition.

Exotic Meghalaya: www.villagetourism.in.

Maclver, R.M. and Charles, H.: *Society-An Introductory Analysis*; Macmillan London; 1965.

Nongspung, D.L.: *Participatory Rural Appraisal – Mawlyngot Village*: 2013-14, Shillong.

Nongspung, D.L.: *Genesis of Tea Cultivation in Mawlyngot; East Khasi Hills District*: 2009.

Tonnies, F. Community and Association; 1957.

UNDP 1996, hdr.undp.org.

World Commission on Environment and Development, "*Our Common Future*", Oxford University Press, New York: 1987: Reprinted in India: 4th Impression, 1989.

World Bank Environment Department: 1996, Washington U.S.A. www.ivc.wash.org.

Mawlyngot Travellers' Nest

Tea Plantation in Mawlyngot

10

Developing an Ecotourism Model for Meghalaya

Prachi Agarwal
Ujjawal Kumar

Introduction

Tourism is an industry which has been growing at a fast pace. Tourism is a resource intensive industry and uses economic, environmental, social and cultural resources. It has three types of impacts on the area: economic impact, environmental impact and socio-cultural impact. Ritchie (1984) has developed a framework which categorizes the impact of tourism against four dimensions: physical environmental, socio-cultural, psychological and administrative. Some other authors include motivational factors in this framework as well. In this paper, we are more concerned about the first two factors hence would restrict the discussion to them. Impact of tourism can be understood as 'the development of tourism infrastructure using natural and cultural resources, leading to depletion and degradation of the natural resources with other socio-cultural issues'. The economic impact is in terms of providing means of generating revenue and inflow of foreign currency in the country. The environmental/physical impact is both positive and negative. Positive impacts include renovation of historic monuments and aesthetic development of natural tourist spots while the negative impacts include dealing with generated tourist waste and the threats faced by the fauna and flora of environmentally sensitive area. Globally natural forest areas have been used for the construction of tourist facilities which leads to destruction of the very reason of tourism. The socio-cultural impact include the benefits of acceptance of the culture and traditions of the natives, cross cultural interaction and availability of job opportunities for the local people. Tourism is an industry which

develops to exploit and threaten the very reason of its existence and success. The dilemma for the tourism industry has always been to find the optimal balance between financial gain and minimizing resource exploitation. This has led to a new concept of sustainable tourism or ecotourism which balances the financial benefits with environmental benefits and results in a positive socio-cultural impact.

Ecotourism

In four out of five countries, tourism ranks as one of the top five export earners. The number of international tourist arrivals surpassed 1 billion for the first time in 2011 and is forecasted to reach 1.8 billion by 2030. With continuing growth in travel there is growing concern among consumers and travel professionals about responsible travel. The concept of eco-tourism is a result of this thinking. The purpose of Ecotourism is to preserve ecosystems while simultaneously creating economic profit. It has been defined by the Eco-tourism society as "responsible travel to natural areas which conserves the environment and sustains the well-being of local people".

Various Models of Ecotourism: Introduction

This paper tries to understand successful models of ecotourism and what are the underlying characteristics of such models that can be applied to other tourist destinations. Some of the successful ecotourism models are as follows:

A. Australian Eco-Tourism Model

It has an accreditation system of rating tour operators and resorts on the basis of their "greenness". It has recognized some 5800 locations as protected areas which have been specifically designed and internationally defined as areas dedicated to the protection of biodiversity in Australia. A number of community based nature conservation programs have been initiated to protect and regenerate native vegetation, e.g. "One billion tree program", save the bush program etc.

Apart from conserving the environment, eco-tourism also aims at providing jobs and economic advancement to the aboriginal people of Australia. There are programs that involve the local people in natural and cultural resource management. These programs provide skills and training to work as guides, interpreters, cooks and office staff. Also it promotes unity amongst the community and feeling of ownership and responsibility towards conservation of their resources.

This model also advocates training indigenous people to protect and preserve official reserves and national parks by putting them in authority positions to promote the feeling of ownership amongst the natives.

B. Kenyan Eco-Tourism Model

This model proposes creation of a conservancy and making it prosper to such an extent that it assists local communities to have access to employment, schools, healthcare and revenue generating wildlife schemes.

The second model is of a company called Abercrombie and Kent that donates part of its revenue to different wildlife parks and sanctuaries. Here the company's motive is profit. The park may use part of the money to employ local people but Abercrombie and Kent does not engage with the local people directly. Their most important way of impacting the nature is by making the tourists aware of the plight of the environment and how it's degrading quickly. This way the company helps in providing employment to the locals as well as creating awareness among the tourists about how their actions impact the environmental balance of the area. This is a multiple stakeholder benefit model where the company, locals and tourists have active roles to play which result in responsible tourism.

Various models of Ecotourism: Challenges

Problems with existing models of eco-tourism

a. Leakage

A study revealed that out of every dollar spent on tourism $0.40 went to buy imports for tourist demands, another $0.40 went to private hotels and other businesses and $0.20 went to host governments in the form of taxes. Very little of the money spent by tourists is actually left for conservation and invested back into the communities. Most of the so called eco-tourist models suffer from this leakage of funds. A truly eco-tourist model should ensure that the money spent is used to provide local employment. Indigenous products should be encouraged and sold.

b. Employment

It has emerged as a sad truth that in most cases local people are employed on low paying service jobs such as potential maids, waiters and gardeners. In most of the cases, these jobs are favored to more sustainable jobs like fishing, farming, arts and craft. This arises from the fact that most of the locations witness huge inflow of tourists during the particular seasons. Although GDP and employment rates may show increase, these jobs do not empower the local people in the real sense. The government should pitch in and provide training to the local people so that they are ready for jobs requiring more skills and better remuneration. In addition to revenue generation for locals, the locals being aware of the history and environmental sensitivity of the tourist spot would ensure that the visiting tourists are also made aware of the same and made to understand about how important it is to support locals in protecting the flora and fauna of the site.

c. Indigenous Cultures Threatened

It has been seen that local people are forced to adapt their culture to what the tourists want to experience. Influx of tourists impacts the culture, as these communities which had little outside connection start seeing people of different cultures in huge numbers. It has also been seen that local people have aversion towards such parks and sanctuaries because these are built on their farming lands and are inaccessible to them. This is a very sensitive issue and is a major cause of most of the cultural differences being observed in many tourist places. The development of urban entertainment facilities to satisfy tourist needs is many times not acceptable to the locals as it is in direct conflict with their cultural and social beliefs and practices.

d. Environmental Impact

This is the most important problem with eco-tourism. If a tourism destination becomes popular, it inevitably leads to its failure to maintain its uniqueness which attracted the tourists in the first place. The amount of infrastructure required to be built in order to accommodate the increasing number of tourists results in huge loss to the bio-diversity of the place. Local areas start getting polluted, more and more deforestation occurs to make way for hotels and business centers, improper management of the waste generated leads to degeneration of the local environment and many other problems.

The influx of more and more tourists is sure to have an impact but this can be reduced by proper management practices.

e. Model of Working Together

It is said that with proper cooperation between the industry, governments, NGOs and local communities there will be successful implementation of eco-tourism. This view of working together is fundamentally wrong because the interests of all these groups are different. The power shifts more into the hands of the powerful institutions with financial backing. Rules get bent and are not followed to the spirit, ultimately compromising the efforts towards effective implementation. The model of working against each other is more in line with the aim of having effective policies that are applicable in the real sense and maintaining a balance.

Ecotourism Model for Meghalaya

Based on the challenges and a study of the successful models across the world we propose a three-fold multiple stakeholder involvement eco-tourism model for Meghalaya as follows:

a. Community based model

Meghalaya is the abode of India's hill communities. Dance, music and sports

reflect their way of life. There are about twenty-four communities in the state amongst which fifteen are scheduled tribes that have migrated from other states. There are twelve non-tribal communities who have migrated for trading and business purposes. Amongst the many tribes the most important are Khasi, Jaintia and Garo. The hills are the lifeline of these communities and hence no tourism model can relegate them. The model that we propose gives the community major control and involvement in the eco-tourism project. The community can take the help of government or other agencies in implementing these projects but the major control over the revenue and benefits must lie with the community. Community leaders must be actively involved to understand their expectations from the government and tourists. They can then act as influencers in their community to create awareness among the locals for the need of tourism projects and increase their acceptance amongst the community. They can also help in identifying volunteers from the community for taking positions of authority to ensure that no harm comes to the natural resources.

b. Government should act as a support:

The government should help these communities in managing the resources by giving proper training for skill enhancement. It should also manage the other stakeholders in such a way that motives of all stakeholders go in sync. It should ensure that outside private players do not run away with the money and that most of the revenue generated is invested back for the preservation of the eco-system and the development of the local population. Since the government has a non-profit motive only it can be relied to do this job properly. The major challenge for government would be to gain the trust of the locals as most of these tribes have their own apprehensions about the motives of the government.

c. Sensitizing the tourists:

Uniqueness of the local culture should be advertised. One of the reasons for degradation of environmental resources is lack of knowledge about the local culture and the sensitivity of the natural resources of the area and the impact of tourist activities on the same. Tourist destinations should be positioned in the minds of the tourists as environmentally important for biodiversity so that they are sensitive to the requirements of the local population and respect their culture. Tourists must not only enjoy the beauty of the place but must also experience the unique culture of the locals and mingle with them giving due respect to their beliefs and traditions.

Conclusion

Ecotourism has been gaining wide recognition and acceptance due to the resource intensive nature of the tourism industry. Despite the benefits of ecotourism, there are a number of practical hurdles which make it difficult to

implement the concept. Each area is unique in its mix of resources, social factors and economic needs hence a successful ecotourism model should not just ape practices from other models but study the adaptability of those practices in the given region, their impacts and their acceptability by various stakeholders. Meghalaya has highly unique cultural and environmental resources hence a community based model with the support of various stakeholders will be more successful. A combined effort by sensitizing the tourists, natives and active contribution by the government will result in financial gains with minimal harm to the natural resources of the area.

References

http://www.unl.edu/plains/ecotourism-namibian-models.pdf

http://databank.nedfi.com/content/tourism-meghalaya

http://web.stanford.edu/class/e297c/trade_environment/photo/hmodels.html

11

Urbanization and its Impact on Environment: A Perspective from the State of Meghalaya, India

Magdaline Umdor

Introduction

Urbanization is the process by which large number of people becomes permanently concentrated in small areas forming cities. The definition of city or an urban area changes from time to time and place to place. In United States 'Urban Place' means any locality where more than 2,500 people live. In census of India 2011, definition of urban areas adopted is as follows:

a. All statutory places with Municipality, Corporation, Cantonment Board or notified town area committee etc.

b. A place satisfying the following three criteria simultaneously

   i. A minimum population of 5,000

   ii. At least 75% of male working population engaged in non-agricultural pursuits and

   iii. A density of population at least 400 per square km.

The world population is estimated to increase from 7 billion to more than 9 billion by 2050. Today 3.9 billion of us i.e. more than half of the world's population live in cities and by 2050 about two-third of us will be within the urban areas. In 1975 only 27% of the people in the developing world lived in urban areas. By 2000, this had grown to 40% and by 2030, well informed estimates state that this will grow to 56%. The developed world is already highly urbanized with

75% of its population living in urban areas. Rapid urbanization has also been witnessed in the hilly state of Meghalaya in terms of growth of existing towns and cities and development of new urban centres in different districts of the State. In Meghalaya, urbanization started in the early 1900's and the urban population which was about 3,30,047 in 1991 increases to 5,95,450 in 2011. According to the census of India 2001, the highest density of population was recorded in East Khasi Hills District with 141 persons per square km in rural area while in urban there are 7976 persons per square km. Based on the level of urbanization, the State falls into three categories viz, high urbanization (40 to 50 %), low urbanization (10-20 %) and very low urbanization (0-10 %) . Under this only East Khasi Hills District falls in first category and as per the standard of classification of city, Shillong is the only class I city in the State and there is a marked increase in the number of towns under class III, IV and V and this growth is largely due to migration from the surrounding rural areas and hinterlands of the respective urban centres and migration from other States.

Meghalaya being a hilly State with variable climatic conditions and geomorphic features is not conducive for the concentration of large urban population as this creates environmental problems. It has been observed that as urban area expands, it not only spreads outwards into the surrounding agricultural lands or natural areas such as forests, grasslands and wetlands but also grows skywards with high-rise buildings. The towns loses its open spaces and green cover and bring destruction of the quality of life in urban areas. Moreover, the unplanned and haphazard growth of urban complexes has serious environmental impacts whereby increase solid waste and slum areas, improper garbage disposal, pollution are frequent side effects of urban expansion and a challenge to sustainability. The main objective of the study is to get an insight into the impact of urbanization in the State in relation to environment and to find remedies to reduce the negative impacts of urbanization.

Methodology

The present study was carried out mainly through preliminary survey and observations of the areas in and around Shillong and collection of data from secondary information through literature search.

Effects of urbanization on Environment

Human settlements have brought drastic change in the natural environment. Depending upon the size of the population, area, industrial and cultural growth, each settlement has its own subsystem. The pace at which these settlements emerge and take shape is much faster compared to the natural evolutionary processes. Tremendous growth of human settlements compounded by an unplanned manner and faster rate of urbanization has resulted in environmental disturbances and ecological imbalance in a number of ways such as :

1. Encroachment of agricultural lands/forests for housing, construction of roads, factories etc. leading to change in land pattern
2. Depletion/decrease of water resources
3. Pollution
4. Emergence of slums which deteriorate the surrounding areas

Urbanization has devastating effects on environment and changed the whole composition of the environment. This is evident from the changes in Land use whereby as towns and cities grow with economic growth of human societies they invade the productive crop lands and rich forests. Both intercity and regionally open lands are connected into built-up area.. Thus, the land with all its biological resources is irreversibly lost. Construction of houses and other structures need large quantities of building materials which come from long distance areas comprising fertile land thus causing further damage to good agricultural land and with industrial development the demand of natural resources increased heavily which caused a serious threat to the environment.

A few of the impacts of urbanization can be enumerated as under :

a. Impact on Forest Covers/Ecosystem
b. Impact on Water Resources
c. Impact on Air and Water Pollution
d. Increased of Solid Waste Production
e. Increase in number of Urban Slums

Table 11.1: Trend of Population 1901-2011 in Meghalaya

Years	Population in Numbers	Decadal Variation in Percentage
1901	3,40,524	-
1911	3,94,005	15.17
1921	4,22,403	07.21
1931	4,80,837	3.83
1941	5,55,820	15.59
1951	6,05,674	08.87
1961	7,69,380	27.03
1971	10,11,699	31.50
1981	13,35,819	32.04
1991	17,74,778	32.88
2001	23,06,069	29.94
2011	29,64,007	27.82

Source : Census of India,2011

From the table it would appear that the highest percentage variation of growth by 32.88 % was observed during 1981-1991. However, the decadal growth dropped to 29.94% after 1991 this might be due to the classification of new District/Civil Sub-Divisional/ Headquarters and some other suburbs as urban areas.

Table 11.2: Population and Its Growth Rate (%) in The Major Urban Centres of Meghalaya

Urban Centres	Population	Growth Rate (1991-2001)
Class I (=100000 population)		
Shillong		
Urban agglomeration	267881	19.98
Municipality Area	132876	0.88
Class II (=50000 population)		
Tura	58391	26.76
Class III (=20000 population)		
Jowai	25023	21.46
Nongstoin	22003	53.45
Pynthorumkhrah	22108	61.58
Nongthymmai	34209	27.00
Mawlai	38241	23.50
Class IV (=10000 population)		
Madan Riting	16700	85.82
Shillong Cantonment	12385	11.82
Cherrapunjee	11086	42.55
Williamnagar	18251	52.04
Resubelpara	17652	-
Mairang	11517	-
Nongmynsong	11362	-
Nongpoh	13165	-
Class V (<10000 population)		
Bagmara	8643	46.64

Sources: Census of India 2001

From the table it appears that the urbanization pattern has a marked change during the decade 1991-2001.As per the standard classification of city, Shillong,the capital town with a population of more than 400,000, is the only Class 1 city in the state. Tura, the next populous city, has Class-II city status. The other urban centres are much smaller ibn size in terms of population and they fall under Class-III, IV & V categories. Shillong urban agglomeration has witnessed about 20 % increase in population during 1991 to 2001. This is the lowest growth rate in comparison to other cities of the State. This highlights the fact that urbanization in the smaller towns of the State is faster than in Shillong. Within the Shillong city (urban agglomeration) area, Madanriting is the fastest(85.82 %

increase) growing area followed by Pynthorumkhrah (61.58 % increase). The Shillong Municipality Area is growing at the slowest rate (0.88 %) (Table-2)[9].

Table 11.3: Classification of Towns on the Basis of Population

Class	Population
I	1,000,00 and above
II	50,000-99,999
III	20,000 - 49,999
IV	10,000-19,999
V	5,000 -9,999
VI	Less than 5,000

Table 11.4: All Cities and Towns Trend of Population 1991-2011 in the State of Meghalaya

Name	Status	District	Population census 1991-03-01	Population census 2001-03-01	Population census 2011-03-01
Baghmara	Municipal Board	South Garo Hills	5,894	8,643	13,131
Cherrapunjee	Census Town	East Khasi Hills	7,777	10,086	11,722
Jowai	Municipality	Jaintia Hills	20,601	25,057	28,430
Lawsohtun	Census Town	East Khasi Hills	...	6,386	8,214
Madanriting	Census Town	East Khasi Hills	8,987	16,318	29,194
Mairang	Town (Area) Committee	West Khasi Hills	...	11,492	14,363
Mawlai	Census Town	East Khasi Hills	30,964	38,303	55,012
Mawpat	Census Town	East Khasi Hills	...	4,663	6,184
Nongkseh	Census Town	East Khasi Hills	...	4,931	4,846
Nongmynsong	Census Town	East Khasi Hills	...	11,371	15,017
Nongpoh	Town (Area) Committee	Ribhoi	...	13,180	17,055
Nongstoin	Town (Area) Committee	West Khasi Hills	14,339	23,106	28,742
Nongthymmai	Census Town	East Khasi Hills	26,938	34,292	38,004
Pynthorumkhrah	Census Town	East Khasi Hills	13,682	22,115	27,219
Resubelpara	Municipal Board	East Garo Hills	...	17,660	19,595
Shillong	Municipal Board	East Khasi Hills	1,31,719	1,32,867	1,43,229
Shillong Cantonment	Cantonment (Board)	East Khasi Hills	...	12,396	11,930
Tura	Municipality	West Garo Hills	46,066	58,978	74,858
Umlyngka	Census Town	East Khasi Hills	...	...	7,381
Umpling	Census Town	East Khasi Hills	...	...	8,529
Umroi	Census Town	Ribhoi	...	5,014	8,198
Williamnagar	Municipal Board	East Garo Hills	12,004	18,247	24,597

Source: Office of the Registrar General and Census Commissioner (web), Delimitation Commission of India (web), Rand McNally International Atlas 1994, School of Planning & Architecture (web).

From the Table it appears that in 1991 there were 11 towns in Meghalaya. The number rose to 20 by the year 2001 and to 22 by the year 2011. The urbanization pattern has witnessed a marked increase in the number of population in most of the cities and towns in Meghalaya (www.city population.de/php/india-meghalaya.php)[10]

Impact on Forest Covers/Ecosystem

As cities expand and sprawl outward most of the forest covers in the surrounding areas are destroyed to make way for buildings, roads, factories etc. This activity decreases/degrades the earth's Biodiversity. The unabated and unchecked cutting of the trees though out Khasi, Jaintia and Garo Hills for commercial purposes in spite of the existing ban on this operation by the Supreme Court and the prevailing laws and Rules framed for protection and conservation of the green cover and the Environment as a whole and for the protection of the human species and all forms of life on this land.[1] High demand of charcoal puts pressure on the forest cover and felling of trees for charcoal is on the rampage; this is evident from the present of huge quantities of charcoal in urban, sub-urban and villages; in market places and in various localities of Shillong. The charcoal business runs almost through out the year as can be witnessed in many parts of Shillong like at Stand Jeep, Garikhana, Madanriting, Nongthymmai, Polo area, Mawlai, Barapathar and many parts of greater Shillong where about 50 to 80 trucks in a day is consumed in Shillong alone. Further, it was estimated that about 1000 trucks of charcoal per day is produced from Meghalaya and most of this find ways to the industrial units situated at Byrnihat or its perephery. This means that forest cover destruction every day is colossal and if allowed to continue all perceptible green cover will disappear.

Destruction of forests and encroachment of agricultural lands for urban expansion also posed a serious problem. Journeying towards adjoining part of Shillong through Mawkasiang, Mawiong, Mawpdang, Laitkor, Lumparing, Nongrah, Umpling, Mawlynrei, Mawblei, Upper Shillong, Lummawbah etc. one can see thousands of tree stumps which prove that not long time ago these areas were covered with rich forests and vegetation. High demand of building materials for construction of new buildings and houses also create more pressure on the ecosystem.

Impact on Water Resources

Water is an important/essential element on earth and without it there would be no life. Water requirement of the urban population also increases many times and almost all of it has to be met through the water supply system. With the rapid increasing urban population and limited resources it is becoming difficult to meet the requirements of the Municipal water supply. Due to extensive built-up areas, dry climate as experienced in most parts of Meghalaya followed by authropogenic activities near the water bodies, the local ground water recharges decline and the

existing sources of water becomes polluted making the water unfit for drinking purposes. As such, water scarcity exists and this is more grim in dry seasons where urbanites do not have regular access to an adequate and affordable supply of clear water. In urban areas of Meghalaya people depend on the PHE and Municipal water supply but due to urban expansion, the adjoining areas face acute shortage of water as there is no supply of water from the Municipal and the problem is more grim when natural sources dry up during dry season as experienced in Umpling, Nongrah, Mawlynrei, Mawlai, Umrynjah etc. The problem of acute shortage of water also exists in the town area like Pynthorumkhrah which was reported recently [2]. Unwanted and uncontrolled human activities also caused depletion on many of the water resources Our pride of umiam lake which has picturesque scenic beauty is now a shocking sight where instead of seeing water we see small covered patched of land over. Also most of the rivers and streams in and around Shillong e.g., Umkhrah, Umshyrpi, Umjasai, Ummulong etc. have been polluted making the water unfit for human use.

A huge threat of water shortage is also awaiting for the Shillongites if the Umiew river which is the main source of water for the main Dam at Mawphlang which supplies water to the entire Shillong city and its suburbs through Greater Shillong Water Supply Scheme (GSWSS) is undergoing rapid depletion because of rampant mining activities.

Impact on Air and Water Pollution

High population densities and high resource consumption, urban dwellers of Meghalaya produce most of air pollution, water pollution and solid and hazardous wastes. Pollutant levels in urban areas are much higher than in rural areas because pollution is produced in a smaller area and cannot be dispersed and diluted easily.

Air Pollution

These last few years, the Khasi and Jaintia Hills and the city of Shillong in particular have seen an unprecedented growth in the number of automobiles. The smoke emitted from these vehicles has done much harm to the environment and according to some expert, has been responsible for the drastic change in the climatic condition of the place [3]. The enormous amount of heat generated by cars, workshops, furnaces, heating & electricity generation, burning of garbage etc. create an "**urban heat island**" in Shillong city surrounded by cooler suburban and rural areas. As the city grows the air pollution increases. The explosive growth in the number of vehicles is the major problem in city and urban centres of Meghalaya which create chaotic automobile traffic. The traffic jams/ snarls are extremely bad and the pollution is high due to constant traffic and causes respiratory diseases, as supported by the World Health Organisation (WHO)

findings where one of every six people on the earth(more than 1.1 billion people) lives in urban area where the outdoor air is unhealthy to breathe. As traffic increases on a sunny day, photochemical smog (dominated by O_3) usually builds up to peak level by early afternoon causing irritation on eyes and respiratory tract[4]. Moreover, unplanned and narrow roads with the increase in urban population also posed a serious threat to human life.

Water Pollution

Unplanned urban developments combined with increasing population have resulted in degradation of water bodies in or near them. Entry of domestic wastes as well as effluents from minor industries like automobile garages and service centres, solid waste disposal etc. have been responsible for this degradation except in a few mining and factory towns where mine wastes and industrial effluents have polluted the aquatic environment[5]. Observations made on certain water bodies of Shillong (Roy and Tandon,1990; Nath and Gupta, 1992) revealed that the water of these streams are totally unfit for human use and pose serious health hazards. High concentration beyond the permissible levels of certain metals like iron. Manganese and lead in Umkhrah stream of Shillong indicate a serious threat to the aquatic biota as well as human users of this stream water.

Table 11.5: Concentration of Metals in Umkhrah Stream, Shillong, Meghalaya

Metals	Umkhrah	Indian Standard
Iron (µg/l)	2.12	1.0
Lead (µg/l)	0.3	0.1
Manganese (µg/l)	3.35	0.5

After Abhik Gupta 1992

Streams and local water bodies pollution from discharges of untreated water from urban areas and solid waste disposal is a serious and growing problem in Meghalaya. According to a 2003 report by the World Commission on water in the 21st century, half of the World's 500 rivers are highly polluted; most of them running through developing Countries. This scenario is also evident in most of the streams flowing through Meghalaya like Wahumkhrah, Ummulong, Umjasai, Umshyrpi etc. and with mining activities in the nearby areas of greater Shillong city, Jaintia Hills, West Khasi Hills, Garo Hills the situation is more grim where most of the sources of drinking water and rivers are being contaminated and polluted making potable drinking water a costly commodity and in absence of proper water management and laws for controlling water pollution the degradation is more.

Solid Waste

With the increase of urban population followed with increased consumption of food and other resources, the waste has already increased. Usually, this waste is thrown in the areas in and outside the cities but this open disposal decreases the usable land and also pollutes the environment. Urban waste mainly consists of medical wastes, domestic waste, industrial waste, commercial wastes etc. Much in the news these days is the fallen of city Shillong from grace as "the Scotland of the East" because of its stinking garbage, clogged drains and poor garbage disposal. In Shillong, a good number of high-rise buildings have come up during the last two decades with all sorts of modern internal facilities but without proper planning for the discharge of used water which has been the cause of water logging in a number of areas. Most of the rivers flowing through the urban areas has become a dumping ground for garbage and sewerage. With the houses constructed along the banks of river Umkhrah and their release of septic tanks directly into the rivers increases the pollution. Haphazard dumping of garbage on roadsides and forests in and around Shillong is also a common sight. Indeed we do live in an unclean city and Shillong has turned into a garbage pit especially in the market areas. Though house to house collection of wastes has been done by Shillong Municipal Board in most part of Shillong and from Community Bins in commercial area but the generation of wastes per day is very high (about 104 M.T) and with the manpower which the Board has, only 78 M.T. could be collected and in the absence of many landfills and lack of civic sense of the public, the menace of garbage continues.

Urban Slums

Shillong an unplanned city has steadily grown in size over the years. It is the 330th most populous city in India with a population of 1,43,007 according to the 2011 census. The growth of urban population is primarily due to migration of rural people from adjacent villages in close proximity to the towns[6] and the migrants from inside and outside India. As the urban centres become more crowded the facilities in urban areas become expensive and distinction between rich urban areas with high rise buildings and modern facilities and slum areas with lack of basic amenities exists. The slum areas represent one of the worst type of environment degradation which have become concomitant to urbanization. Rapid urbanization in Meghalaya has led to the development of slum areas whereby 23 slums were identified in the greater Shillong area. According to Meghalaya Slum Area (Improvement and Clearance) Act, 1973 a "slum" is an area unfit for human habitation or by any reason of dilapidation overcrowding, narrowness or faulty arrangement of street, lack of ventilation height or sanitation facilities or any combination of some or all of these factors is detrimental to safety health or moral of the people of the area. The notified slums were located in Qualapatty,

Lumparing, Malki, Laitumkhrah, Upper Mawprem, Lower Mawprem, Madan Laban, Riat Laban, Wahingdoh, Barapathar, Wahthapbru, Laban, Ghoraline (Laitumkhrah), Harijan Colony (Mawlong Hat), Pynthorumkhrah-1, Pynthorumkhrah-II, Naspatighari (Mawbah), Polo Bazaar, Demseiniong, Keating Road, Jhalupara, Paltan Bazaar(Cantonment) and Nongmynsong.

Growth of slums in Shillong is an environmental concern which needs to be addressed and to curb its spread to adjoining areas at the earliest before further deteriorating of surrounding regions takes place.

Suggestions and Recommendations

Seeing the impact of urbanization effective strategies have to be formulated to tackle the problems on a time bound basis, so that the quality of life in urban areas will not deteriorate further. Some of the measures may include:

1. Rural-urban migration trend should be checked by establishing the rural industries and by increasing the agricultural activities in rural areas.
2. To improve the solid waste management in the entire city of Shillong segregation of waste at source, scientific disposal of waste through waste processing facilities and sanitary land filling should be carried out immediately with the help of local durbars, the Shillong Municipal Boards and the Urban Affairs Department, Government of Meghalaya. Recycling and reuse of waste should be implemented under the provisions of Municipal Solid Waste (Management & Handling) Rules-2000, Government of India. Community participation should be promoted during planning and implementation of the project on environment.
3. Conduct educational awareness to the citizens to improve civic sense and polluters should be penalized.
4. Number of public toilets with proper maintenance should be constructed especially in public areas to avoid open defecation.
5. A water use policy needs to be adopted and the practice of "User Pay" concept should be introduced.
6. The existing water supply system should be upgraded for better conservation and management.
7. A people-friendly policy needs to be developed by the Government that would ensure a favourable environment for government and community participation in conserving the community and private forests and checking of sources of water and air pollution in urban areas.
8. Proper planning for development of wide roads and other urban infrastructure should be undertaken now.

9. To prepare a land-use map based on aerial photography with the help of remote sensing technique. The cartographic work for planning should be completed within a specific time-frame so that undertaking of development work of the State should be possible in phase manner.
10. To improve the conditions of slum dwellers and simultaneously to reduce their further growth, various slums up-gradation programmes have to be effectively implemented besides educating them to maintain their localities.

Conclusion

Rapid and uncontrolled urbanization generates a series of negative environmental and social effects. These include lack of infrastructure and civics services, congestion, health problems, housing problems etc. With unplanned urbanization man gets divorced from **"Mother Nature"** and is forced to live in **"Artificial and Synthetic"** habitations. Despite the economic performance of cities, urbanization has not remedied the problems of the urban poor. Current trends of rapid urban population indicate that the demand for the urban services and infrastructure will increase and this will give rise to more responsibilities of city administrations to cope with the financial demands. To conclude urban development should be in the hands of local governments since they are closer to the problems and are more concerned with local development as supported by the Habitat Agenda adopted by the 2nd United Nations Conference on Human Settlement in June 1996. Although the Government has been undertaking several initiatives to solve the problems, the challenge is immense. Ultimately, it is not only through Government policies and actions but also through the committed actions and initiatives of the Communities and the individuals to resolve the problems such that urbanization proceeds in the right path causing minimum negative impact on the environment, then our cities can become clean, livable and sustainable.

References

Marwein Philip, *The Youth Today*, Living in an insecure environment Aug-September, 2013 Vol.16.

Shillong Times, Pynthorumkhrah localities hit by water crisis, Friday, March 21,2014.

Mawrie L Barnes., *The Khasis and their natural Environment*, Don Bosco Publication, Shillong 2001, p.167.

G. Tyler Miller, Jr. *Environmental Science*, eleventh Edition, Akash Press,2008 p.347, p.350.

Ganguli B J, *Urbanization & Development in North East India* edn 1995, Deep & Deep Publication p.80, Impacts of Urbanization on fresh water systems, with special reference to North-East India.(Abhik Gupta)

Ganguli B J, *Urbanization & Development in North East India* edn 1995, Deep & Deep Publication, Process of Urbanization in Meghalaya : Evidence of Rural to Urban Migration" Danny D. Nengnong, Debendra K. Nayak and A.C. Mohapatra.

The Telegraph, Slum blot on scenic Shillong. Saturday March 15,2014.

Dhaliwal S.S. , *Urban infrastructure Development in small and medium towns* edn 2004, Deep & Deep Publication, p. 149.

State of the Environment Meghalaya, 2005.

w.ww.city population.de/php/india-meghalaya.php.

12

Eco-Tourism: A Road to Sustainable Social and Economic Development in Meghalaya

Ibakitbok Shisha Kharkongor

Introduction

The concept of eco-tourism has been defined in many ways including the most ambiguous to the most specific. Clearly the word *'eco-'* in the name does denote **ecology or ecosystem**, which would specify that this concept is essentially linked to the environmental science. As such, the most preferred description of the terminology is *that form of tourism*, which is *environmentally focussed and responsible.* Tourism basically is a social activity between man and environment which integrates life on earth and love of nature. As for a precise definition, the word ecotourism would be defined as a form of tourism that is nature-based and ecologically sustainable, which consist of travel to relatively undisturbed and uncontaminated natural areas with the specific objective of enjoying and admiring in its infinite variety, the nature and any existing cultural manifestations found in those areas.

"Tourism has tendency to become something like a steamroller wherever it goes. It can completely destroy natural places. Ecotourism is about trying to stop that". Ecotourism is low impact nature tourism which contributes to the maintenance of species and habitats either directly through a contribution to conservation and indirectly by providing revenue to the local community sufficient for local people to value, and therefore protect their natural and wildlife heritage area as a source of income. Ecotourism focuses on the environment in such a way that the conservationists and tourists see a mutual advantage in working together and preserving the environmental quality while mutually protecting tourism.

Hence ecotourism implies an enjoyment of nature's bounty as well as understanding of the cultural and natural history pertaining to the environment. It also implies the need of taking utmost care not to alter the integrity of the eco system while tapping the economic benefit from the resource of nature and environment. Ecotourism is led by motives like spirit of enquiry, love of beauty, search for knowledge, and respect for nature. It aims at quality tourism, which creates minimal damage to the natural, social and cultural environment.

Features

The essential features of Ecotourism may be understood from the following highlights:

- Eco-tourism projects the concept of sustainability in tourism. That is, the needs of today's visitors should not be met at the expense of future generations.
- It is a purposeful travel to natural areas to understand the cultural and natural history of environment, taking care not to alter the integrity of the ecosystem, while producing economic opportunities that make conservation of natural resources beneficial to local people.
- Eco-tourism represents a very powerful means to develop the biodiversity.
- Eco-tourism is aimed at making the visitors aware of the protective, productive and regulatory functions of the environment.
- Eco-tourism consists of ecological tourism whose principal objective isbenefitting from nature, landscapes or specific species of the area.
- Eco-tourism should have low visitors impact and should contribute to the well-being of local population.
- Responsibility for both travellers and service providers is the genuine meaning of ecotourism.

Eco-tourism in Meghalaya

Meghalaya is a land of lovely hills with abounding sylvan beauty and favourable climatic conditions. Its hilly terrain with varied elevation and heavy rainfall accounts for a rich variety of flora and fauna. It is famous for its waterfalls, caves, rivers, lakes and sanctuaries, living roots bridges, secret grooves, Nongkhnum river island- the second river island in Asia next to Majuli Island. The State is also enriched with rich cultures and festivals. However, the race for becoming an advanced and developed State, has led the people of Meghalaya to destruct the natural resources in our stock and our biosphere. Unfortunately, exploitation of natural areas for instant profit is a common mistake motivated by

the local people's shortsightedness. Today, most of the underground and above the ground resources are on the verge of finish, resulting in abrupt climate, natural disaster and more. Now, the State is facing two very extreme dangerous conditions - 'Global Warming' and 'Greenhouse Effect', both of which will lead to the total destruction of our natural environment.

It is now high time, that the people of the State should start their bit of job to save the natural environment from destruction. Everyone in the State is a stakeholder in the process and need to avoid their past shortcomings and negative impact.

There is a great scope for development of eco-tourism in Meghalaya because of the scenic beauty it offers and the human potentials it has got for generating employment. Eco-tourism in the State can pave the way towards a sustainable economic development with objective of protecting our fragile ecosystem. Ecotourism can assist in the battle to protect the ecosystems of the State by providing alternative sources of employment, which limits the damaged caused by over-mining, logging, cattle grazing and land clearance for farming. It thus provides an economic incentive to conserve natural environment and habitats, which otherwise were allocated to more environmentally damaging land use and, thus, help to maintain bio-diversity.

Sustainable development in relation to tourism development in Meghalaya is very important as it can be viewed as developing the tourism product in such a way that it contributes to the economic, social and environmental growth rather than destroying or degrading the resource on which it is based.

As tourism attractions are seen in its natural ambience and local resource and technology are used in consonance with culture and tradition, eco-tourism necessitates practically no use of imported equipments and technology. This philosophy brings the local people of Meghalaya more close to tourism industry and they can work as guide and guidance of tourism. The interest of locals in ecotourism definitely adds to conservation ethics and principles of sustainable development of the State.

Meghalaya's visibility on the world tourist map can be increased. Additionally, improved connectivity to Meghalaya through roads and airways can fuel the growth of tourism in the .state. The marketing campaign can work wonders. A major chunk of forex can be earned through eco-tourism, provided proper publicity is given to foreign tourists and agents. The resources generated may be redeveloped for preservation and conservation of natural resources to augment travel tourism and generation of employment among local men and women. Funding for conservation work can be generated through sources such as park entrance fees, camping fees, local taxes and safari tours.

Steps to be taken by the State

The necessary steps that Meghalaya needs to take up in this direction are:

1. To develop more attractive tourist destinations for which adequate potential exists in the State.
2. To pay increased attention to other infrastructural aspects such as development and modernisation of airports and road transport in the State.
3. To integrate and involve the private sector, Meghalaya Tourism Development Corporation for holistic development of ecotourism.
4. To develop the single window system where all the information and data of the tourist centres in the State can be made available through data base to the tourists at various tourist information centres and with the registered tourist agents.
5. To access the existing standards and facilities and to improve them to increase the inflow of tourists.
6. To integrate the planning and development of tourism with each tourist area having a development authority. Master plan for appropriate number of years for each place or spot can be prepared and while doing so the carrying capacity of various centres need to be determined and detailed urban planning with land use planning need to be undertaken.
7. To venture on large scale afforestation programmes and soil conservation measures to enhance the aesthetic beauty and environment of the state.
8. To increase the room capacity of Guest Houses and Hotels and to develop eco-tourism centres to cater to the needs of the tourists. There is the need in stabilising the price of rooms and the building up of low-priced accommodations.

Sustainable tourism is based on four key objectives

1. Social progress reflecting the needs of everyone.
2. Effective protection of environment.
3. Prudent use of natural resources.
4 Maintenance of high and stable levels of economic growth and employment.

The eco-tourism demands and commands the fulfillment of objectives of sustainable development of tourism in our State. According to the James Macgregor (Encyclopaedia of Hospitality and Tourism) there are seven principles that constitute sustainable tourism development.

1. Limit human impact on the planet (global) and on the region (local) to a level that is within its carrying capacity.
2. Maintain the stock of biological wealth in the region.
   - Conserve life support services,
   - Conserve the diversity of nature, and
   - Ensure that all resource impact are sustainable.
3. Minimise the depletion of non-renewable resources.
4. Promote long-term economic development that increases the benefits from a given stock of resources and maintains natural wealth.
5. Provides for an equitable distribution of benefits and costs of resource use and environmental management.
6. Provide for effective participation of communities and interest groups in the decision that most affect them.

The benefit of tourism industry, which is designed and managed to grow in a sustainable manner, is that, it can contribute to the state's prosperity in ways that are felt by everyone.

It is right time that all eco-tourism in Meghalaya should adhere to the above principles in letter and spirit so as to ensure sustainable socio-economic development.

Policies and Guidelines for Development of Eco-tourism Destinations in Meghalaya

It is necessary to lay down appropriate policies and guidelines for development of eco-tourism destinations in Meghalaya. Eco-tourism policy and legislation need to be supported by research in the following areas:

- Environmental impact of ecotourism projects
- Carrying capacity
- Baseline surveys to facilitate the monitoring of change
- Visitor surveys
- Evaluation of impacts on the community of the State.

Tourism and recreational use always lead to some level of impairment to natural systems. The question is: how much change is acceptable? Hence there is the need to develop an ecotourism policy that is holistic, practicable, and provides sensible linkages of social and natural environments by encompassing all relevant parameters. An ecotourism policy should have the following components in its framework

- recognition of the interface between tourism and the environment, involving primarily social questions as opposed to technical ones;
- provision of better understanding of how tourists value and use natural environments;
- identification of the social and environmental impact of tourism; and
- implementation of systems to manage these impacts.

The State of Meghalaya should also have proper policies to identify the ecotourism resources available. It is also necessary to define the role of stakeholders in the development of eco-tourism programmes. The policies also need to stipulate the location specific strategies for this purpose. There is also a need for clear-cut policies on local empowerment. Since management of sensitive ecosystems need a *multi* sectoral approach, ecotourism programmes envisaged in such ecosystems need an institutionalised co-ordination mechanism among various Departments, local bodies and local communities in the State.

The broad policies can lead to the planning process for ecotourism destinations. It is necessary to have meaningful dialogues with all stakeholders. These stakeholders may include natural resource managers, tour operators, local communities, conservationists/NGOs working in the field, environmentally conscious local media personnel, local bodies, private sectors, etc. It may also be necessary to understand the profile of the tourist in order to plan for appropriate programmes. For a broader understanding, the tourists may be grouped into the following categories even though there may not be any clear-cut distinction in practice. But this will help in planning the programme in order to reduce the impact on sensitive ecosystems.

(i) ***Dedicated Eco-tourists:*** They travel to an area for a highly specialised purposes such as butterfly or bird watching. They will not require much facility but they require tour guides with expertise in natural history to educate them.

(ii) ***General Eco-tourists:*** They seek special attraction such as diving, rafting, trekking, etc. Here also the principal attraction is unaltered nature. They do not require a great deal of infrastructure but expect a high standard in the quality and nature of the educational information that is supplied to them.

(iii) ***Casual Eco-tourists:*** They visit special nature attractions as a part of their holidays. But these are not their primary focus of visit. They are not much concerned about the unique quality of the places.

(iv) ***Recreation Eco-tourists:*** They normally use natural areas for relaxing. They are not eco-tourist but appreciate the greenery. They prefer some level of infrastructure development.

Based on the existence of the different types of eco-tourists, the destination

and types of nature tours should be diverse, as a diversified nature tour industry is more economically viable and stable. Moreover, for eco-tourism to be sustainable in theState, environmental planning and management of natural areas is necessary. The management plan for an area should specify objectives for tourism and natural resources managementand determine how sufficient income can be provided to the area as an incentive for improved management.

It is also necessary to plan for partnership with the following entities for eco-tourism development. This may include

1. Partnership with private sector, which can contribute for sustainable management.
2. Partnership among various Government Departments especially in the field of local infrastructure development.
3. Partnership with Non Governmental Organisations especially in the field of developing strategies for local empowerment.
4. Partnership with academic institutions, in order to provide continuous training for those involve in the management of eco-tourism resources.
5. Partnership with research institutions will help monitor the scientific parameters of sustainability developed for a particular eco-systems.
6. The most important partnership is to be developed with the local communities sincecommunity based ecotourism enterprises has to do a lot in environmental sustainability of the destination.

Unless these issues are addressed to in proper perspective at the stage of master planning, there may be problem at the time of implementation.

Although planning is not a panacea for all, in its fullest process-oriented sense, planning may be able to minimise potential negative impacts, maximise economic returns to the destination, and hence encourage a more positive response from the local community of the State towards tourism in the long run. Planning may be regarded as a crucial element in ensuring the long-term sustainable development of tourists destination in the State.

Strategic Planning to Supersede Conventional Approaches

Strategic eco-tourism planning in the State facilitated a greater involvement of the local communities in the decision-making process. Such an approach requires willingness on the part of decision-making agencies to actively solicit and take account of the local community attitude if genuine public involvement in planning is to be achieved.

Strategic tourism planning in its fullest sense is proactive, responsive to community needs, perceiving planning and implementation as part of a single ongoing process.

It is a means of achieving a desired end, e.g. the objectives identified for the management of tourism resources. In the case of sustainable tourism planning and development, 'the strategy' is the use of appropriate visitor management, marketing management and planning practices to achieve three basic strategic objectives:

1. Ensuring the conservation of tourism resource values,
2. Enhancing the experiences of the visitors who interact with tourism resources, and
3. Maximising the economic, social and environmental returns to stakeholders in the state.

(i) ***Environmental Analysis*** which assist planners and managers in anticipating short and long term changes in the operational environment.

(ii) ***Resource Analysis*** which helps the tourism planners to understand the significance of the sites, physical and human resource bases to successful ongoing environmental adaptation.

(iii) ***Aspirations Analysis*** which identifies the aspirations and interest of the major stakeholders in the destination or tourism development and assist management to formulate their own strategic objectives in the light of the desires and interest of others.

Environmental Impact Assessment (EIA)

Success and consequence of development projects are influenced by the ecological and social factors. So an initial assessment of ecological and social limiting factors becomes mandatory for impact assessment. The underlying assumption is that the project impact is the sum total of two factors viz. sum of all environmental impacts without project and sum existing environment inorder to develop an in-depth understanding of the ecological, environmental and social situations and processes in the total scale.

Studies related to environmental impacts of tourism have to be undertaken inorder to assess the carrying capacity of the areas. In eco-tourism context, carrying capacity means the maximum level of visitor use an area can accommodate with high level of satisfaction for visitors and few negative impact on resources. Ecologically tourism impact can be determined by human-data on frequency of tourist visit, tour group size, length of stay and activity pattern are required to develop appropriate management strategies.

EIA is very much needed to ensure the sustainability of the ecotourism resources. Bruntland Commission on Environment and Development has conceptualised the term sustainability as "the development that meet the needs of the present without compromising the ability of future generation to meet their

needs". Here, in tourism this can be - "the needs of today's visitor should not be met at the expense of future generations". The idea of sustainable economies in this context is to search for a balance among three elements viz. the tourist, the ecosystem and the host community.

Various social and environmental attributes of the destinations have to be analysed in detail. Environmental attributes may include flora, forest cover, fauna, water cover, air quality, etc.

Social attributes include employment, mobility, health, infrastructure and service, culture, traditional livelihood, social security, access to basic resources, knowledge/awareness, quality of landscape, etc. All these attributes have to be weighted properly by construction of proper matrices.

Appropriate criteria for measurement of parameters of environmental sustainability to be developed and to be monitored periodically and corrective measures are to be taken in the right time.

Physical Design and Infrastructure Development

It is important to determine the types of facilities available in the proposed destination of the StateS and the future need based on the EIA parameters. The infrastructure facilities include trails, picnic areas, visitor's centres, restrooms, waste management facilities, etc. The designs for infrastructure developments should respect the local culture and architecture. The local age-old practices for house-building, soil conservation, waste management, development of potable water systems, etc. should be used while designing infrastructure.

Use of locally available materials for construction and other purposes will help to retain the original nature of the destination intact. It may be necessary to evolve regional landscape planning guidelines with the support o the local bodies to regulate the uncontrolled physical infrastructure development that may be likely to take place.Inorder to bring about development in this context, the following measures are suggested:

(i) ***Development of Trails:*** Trails are the most common type of facility in an eco-tourism destination. There can be problems when trails get overcrowded. The problem can be avoided by having appropriate strategies such as providing information to visitors at pre-determined places. Periodical maintenance of the trails may also become necessary in tune with the traffic position.

(ii) ***Visitors Centres:*** Visitors centres are necessary in order to provide proper information for the visitors. It is necessary to have a well developed centre that conform to the local culture and architecture and will be able to provide all information about the ecosystem local art and culture forms.

(iii) ***Waste Management:*** The waste management system is one of the important aspects in this context. As far as possible the waste should be treated outside the protected areas/ecosystem. There can be different methods such as incineration, landfill, recycling, etc. or a combination of these. It is very important to see that the most appropriate technique of waste disposal is put to practice.

Waste disposals and treatment mechanism is one of the most important areas where innovative eco-friendly technologies can be employed. This is very important in the case of trash removal, providing facilities for recycling, utilising appropriate technologies for the treatment of organic waste such as composting, septic tanks or biogas tanks, etc.

Eco-technology

It is very important for the State to develop an appropriate technology, which reduces pollution, uses local knowledge and materials and facilitate recycling. The transportation sector is one, which causes air pollution, especially when large vehicle traverse through the destination. It is possible to reduce the harmful effects of these by introducing battery-operated vehicles at least within the protected areas. It may also be necessary to use renewable resources of energy such as solar power panels in remote areas and tapping of wind energy wherever appropriate.

It is always better to give special attention to the development of new and eco-friendly technologies suited to the particular location and monitor the effectiveness continuously.

Benetits to The Local Communities of Thestate

The cumulative value of this sector is very much apparent, as is its potential to facilitate employment generation in the State. Eco-tourism enterprises which planned and managed at the local level where community members stay involved at all stages of the process, empowering them while encouraging travellers to their areas. Such projects can create jobs locally, reducing the desire for young people to leave home to look for jobs in the cities. Ecotourism diversifies the local economy, particularly in rural areas where agricultural employment may be sporadic or insufficient. Ecotourism provides a longer-term solution to poverty than the "quick fix" of charitable handouts.Organised efforts to impart training to the local youth for self employment opportunities as guides, trekking and other tourists activities managed by groups of local people and establishment of sales units for handicrafts, souvenirs, etc. can assist in harnessing the vast economic potentialities of the State. Almost everyone in the locality can become involved by working as guides, selling crafts, providing food and accommodation, or taking part in cultural performances.As a result ecotourism can bring a better standard

of living through improved facilities, such as clinics, drinkable water sources, new roads and electricity.

This economic potent to generate revenue is not limited within the geographic boundaries of the destination alone, but even theperipheral areas and even other remote areas of the State do benefit from the activity. Though not limited to ecotourism alone, but spread over to all other forms of tourism as well, the activities involve the expenditures from part of the visitors, which could contribute significantly to the income and wealth of the local community. Economically depressed areas of the State can be better served by this activity. Moreover, in Meghalaya where local economies traditionally depended upon mainstays like logging and mining for being the revenue earner, ecotourism could be introduced to stimulate development when depleting natural resources and pressure from the environmental lobby pressurises the economy. Much of the areas could be well protected and enhanced to support tourist activity. Of the amounts spent by the average visitors within the destination - that is to exclude the airfare - commission to agents and guides and profits to the companies and other business establishments account for the largest share, which is followed by wages to staff of these establishments and other incidental activities. Even in cases where the capacity to generate direct revenue and employment is not as substantial as would reasonably be expected, other inflows that can be generated can have a significant bearing upon the wealth and living standards of the local community. For example, a lower magnitude of direct tourist expenditure could well be supplemented by tourism-related sales of handicrafts and similar artefacts, which by itself could support the indigenous economy of the state, thereby contributing substantially to the household revenues.

The major economic cost of ecotourism includes the start-up and operational expenses. Start-up expenses include the site acquisition and provision of infrastructure facilities and other services. Operational expenses include the maintenance, labour costs and the marketing expenses. The size and outlay of these expenses would depend upon many factors.Just as is the case with any other business, the concept of ecotourism does suffer from revenue uncertainties that are associated with the inherent demand - supply relations and risks. As on the demand side, it is purely a discretionary activity of expenditure, which the customers or tourists would not hesitate to control during slack periods. As on the supply side, it depends upon the capability of the economy and the adequacy of the administrative policies to provide support to the activity itself. In this context, it should be stressed that these cannot be considered as *negative effects* of ecotourism since it is natural that businesses should incur financial outlays as a necessary expense. These can be treated as a negative only if these are incorrectly allocated. These outlays would translate into economic benefits in due course of

time, not just to the investors, but to others as well including the local community, tourists, government, etc.

Economic benefits of ecotourism can also include a multiplier effect, where the benefits of direct income and employment are internally circulated within the economy to generate additional benefits that in turn could create related income opportunities. In contrast to the other forms of tourism, the multiplier effect of ecotourism is even more substantial since eco-tourists are expected to be not only environmentally conscious, but aesthetically responsible as well. As is the case, they are supposed to prefer local food and other products, where their payments are subsequently circulated internally for the payment of wages to hotel staffs, etc., which itself induces another chain of economic activity where indigenous products are purchased by these staffs with their wages. It is not a rarity that eco-tourists do exhibit a sort of responsibility where they conscientiously try to support the local economy of the destination they visit.

Conclusion

In Meghalaya, ecotourism must encourage patterns of sustainability, which benefits local communities of the State, protect the environment and can be economically viable. Social equity and environmental responsibility must be pushed to the forefront of the policy agenda inorder to maximise ecotourism's potential to promote sustainable development in the State. One has to keep in mind the ultimate goal of sustainable development as to maintain a rising trend in the welfare of the people of the present and the future generations. Attempts are to be made to achieve sustainable development by minimising the trade-offs between economic gains and environmental damages. There has to be a balance between short term gains and long term survivability of the bio-diversity, including man, his institutions and culture. The success in this direction for Meghalaya can be achieved only through strong policy prescriptions. Strong political will and change in the attitude of the people related to environmental aspects is the need of the time. Besides, an ethical commitment and social consensus for sustainable development are critical. Once they are present only then policy recommendations towards environment conservation can help attain the goal of sustainability with less pain and less cost. The scientific community, the tourist industry, the development fields, the tourists who visit the State and the local population impacted by ecotourism must continually be educated and informed about ways to promote successful ecotourism policies and practices. Important social, economic and environmental imperatives must be in place in order for ecotourism to meet its potential to promote sustainable development and benefit local communities.

References

Mohan Lal K.G. *Planning and Development of Sustainable Eco-tourism Destinations* in Sarngadharan M.& Raju G. (2005). Tourism and Sustainable Economic Development, Indian and Global Perspective. New Century Publications, New Delhi, India.

Anbalagam M., Amudha R. and Selvam V. *Eco-tourism: A Boon for Sustainable Socio-Ecconomic Development* in *ibid.*

Makesh K.G. *Eco-tourism: A Cost-Benefit Evaluation of its Economic Prospects* in *ibid*

Nagendran G.R. and Raju G. *Demystification of Eco-tourism with Reference to India* in *ibid.*

13

Unlocking Green Opportunities with Healthy Governance for Achieving Sustainable Development

Bremley W. B. Lyngdoh

Sustainable Village Development Programme (SVDP)

Based on the Clean & Green initiative undertaken by the Government of Meghalaya, Community and Rural Development Department vide letter no CDD. 44/20130/15, where 56 villages from all 39 Blocks in the state were awarded with the Clean & Green Village Award vide letter no CDME.67/2013/135 dated 5th March 2014, the Sustainable Village Development Programme (SVDP) was created after a series of consultations with the Shangpung Mission village council as a unique mechanism for Unlocking Green Opportunities with Healthy Governance for achieving Sustainable Development at the community level. To test the SVDP Model the Shangpung Mission village council is working in partnership with Worldview Impact, a social enterprise for guidance, monitoring and evaluation in project implementation at the village level.

Objective of the SVDP

1. To assess, develop and implement projects related to the environment such as water resource management, waste management, afforestation / reforestation and sanitation and their impacts on rural well-being and prosperity.

2. To enhance the capacity of the community through sustainable livelihood opportunities for the distinctive local population and in keeping with the character of their surroundings, with a full range of good quality local services, also to enhance their local landscapes and biodiversity while meeting the challenges of socio-economic and environmental/climatic changes.
3. To provide crucial services like market linkage between communities, businesses, non-profit organisations, academics and policy leaders to facilitate the implementation of best sustainable practices.

Introduction

Shangpung Mission is a village under Laskein Block of West Jaintia Hills District of Meghalaya. It is situated approximately at 25°28'29.7" N and 92°20'58.4" E with an area expanding to about 40 ha. From Shillong, the distance of the village is 80.5km while the aerial distance is 49 km approximately at an elevation of 1285 metres above mean sea-level. It is 20 km away from Jowai, the district headquarters of West Jaintia Hills.

The history of Shangpung Mission village dates back to 1877 when Kiang Chulet, the first Christian from Elaka Shangpung, and Griffif Huges, a missionary from Wales, negotiated with the local administrators for a plot of land as a settlement area for the Christians of Shangpung. Later on, Reverend Robert Evans (from 1878-1891) expanded the settlement area through a barter exchange system between a rifle and the piece of land with the Doloi of Elaka Shangpung.

Shangpung Mission has a very rich heritage and legacy left behind by its ancestors. The Welsh Mission English School was started in 1865 and was later renamed as the Welsh Mission Middle English School Shangpung in 1924 with Frank M. Pugh as the first headmaster of the M.E. School and Soso Tham as one of its teachers in the early 20th century. It was recognized later in 1925 and presently stands as The Government Upper Primary School Shangpung.

There is also an ancestral burial ground known as Langbang Moobasa located at the heart of the village. This sacred ground is maintained and cleaned regularly and rights of admission are reserved.

At present, the number of households is 302 with an overall population of 1203 where 575 are males and 628 are females (Census 2011).

Methodology

In a rational approach towards programme implementation, it was felt necessary to conduct surveys and participatory rural appraisal (PRA) at the outset.

Such activities will bring to the limelight the immediate needs of the community, thereby improving the efficiency of the sustainable livelihood programme. Therefore, a 30% response rate of the total number of households in the village is considered as the threshold level for the surveys.

1. **Questionnaire**: A questionnaire was prepared covering the fields of intervention i.e., Water & Sanitation, Environment, Capacity building, Health and Training & Education to understand the respective present situation of the community on a locality wise Cluster Sampling approach. Youth volunteers (Std X & XII) from the village were engaged in conducting the survey after prior explanation of the survey contents. The survey was completed in the first two weeks of April 2014.
2. **Mapping of the Village**: Mapping of the periphery of Shangpung Mission village and the important landmarks and infrastructure present in the village was also carried out. This gives an outline of the exact location of the village and its assets on the map. It was carried out in the third week of April 2014.
3. **Secondary Data Collection from other Sources**: For data verification and validation, secondary data relating to social and economic infrastructure were collected from various sources such as the Block Development Office, MRDS, Village Council, EFCs of the MBDA.
4. **PRA**: A Participatory Rural Appraisal meeting was conducted on the 26th April 2014 in the Rev Anthony Crockett Memorial Complex. About 90 persons attended where 46 were male and 45 were female.

Results

The following observations were obtained from the activities mentioned above.

A. Capacity Building

i. Shangpung Mission village has four localities namely, Pohlyngdoh, Umban, Umsahep and Thohlakumah. Thohlakumah locality is the biggest while Umban is the least populated.

ii. The village expands to an area of about 40 ha with 60-65 % under private forest.

iii. Government and Non-Government institutions in the village and its vicinity include the Shangpung PHC, Veterinary Dispensary, Agriculture Go down (warehouse), Public Works Department office

(PWD) and inspection bungalow of the Assistant Executive Engineer (Roads), Meghalaya Rural Bank Shangpung, Shangpung Branch Post Office, Khasi Jaintia Presbyterian Assembly Dispensary and the Office of the Shangpung Presbytery.

iv. The village institutions present are the Village Council Dorbar Hall (located at Coira village), an Aganwadi Centre (handicraft), the Rev Anthony Crockett Memorial Complex (Community Hall) and the Bharat Nirman Rajiv Gandhi Seva Kendra (Shangpung Area Employment Council).

v. There are five schools in the village namely The Shangpung Presbyterian Higher Secondary School (LP, UP, Secondary and Higher Secondary), Clearwater Secondary School Shangpung, Albert Iakai Memorial LP & UP School, Shechem English LP & U.P. School and Umsahep SSA LP School.

vi. There are a number of wells and underground water seeps that serve as the sources of drinking water for the villagers since the new PHE water supply has not yet started functioning since 2006. These sources are Umsayoo, Umbalang, Umsahep and others constructed by the Soil and Water Conservation Department and through the MNREG Scheme respectively.

vii. Umiurem, a small perennial stream, runs along the boundary of the village on the South-Western side. This stream serves as the only source of water for washing & cleaning of clothes and utensils respectively. It was observed that there are a number of washing platforms constructed by the community and the Soil & Water Conservation Department, Government of Meghalaya.

viii. Till date, there are no social institutions such as SHGs, Youth Club or Co-operative Societies operating in the village. However, there is the Shangpung Mission Welfare & Cultural Organisation with 15 members in it (all males).

ix. There is a football ground, basketball court and badminton court in the Dorbar Hall.

B. Environment

i. There is a small patch of forest land which is an ancestral burial ground for a number of clans known as the Moobasa (Kpep).It is a restricted area with reserved rights for access. It is regularly cleaned once a year.

ii. There are many patches of Pine forests and other tree species as well

as agricultural / arable land that are privately owned within its boundary. There is a community forest (about 150 ha) managed by the villagers known as the Khlaw Balang about 10-11 km on the outskirts of Shangpung Mission.

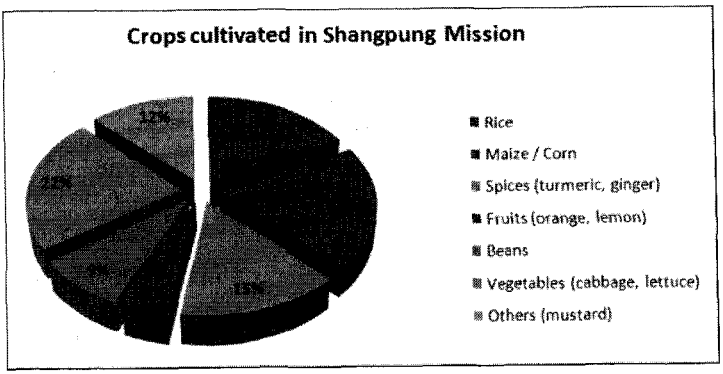
iii. The village has a cemetery and a crematorium for the whole village within its boundary.

iv. **Forest Management**

- The community manages the Khlaw balang throughout the year by weeding and construction of fire lines to control forest fires in immature patches at least once a year. Besides, a few villagers have been delegated to safeguard the trees from illegal felling and other accidents. The forest resources are used for timber mainly in coffin making. About 10 trees are felled in a year.
- There is no community nurseries because natural regeneration is been used as a remedy. There is no JFMC either to increase their management efficiency.
- Another imminent threat is the uncontrolled burning of immature forests.

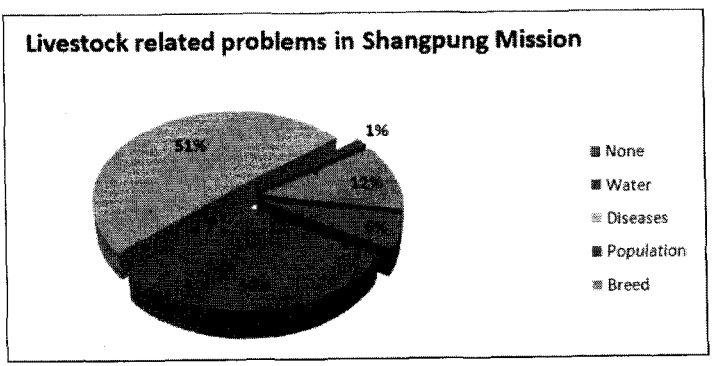
v. **Vegetation**

- Common crops grown are paddy, turmeric, maize, fruits, and vegetables (cabbage, lettuce, pumpkin, carrot, potatoes, peas, cauliflower, garlic, cucumber, beans). Intercropping between rows of citrus trees is very common. Most of these crops are for their own consumption except for mandarins and turmeric (Lakadong variety) which is sold to local and regional markets in Meghalaya. The average yield of turmeric from Shangpung Mission is recorded at 10 tons / year collectively (area not known as they do not follow the acre/hectare unit of acreage). With regards to citrus, the variety from Shangpung has a market that extends as far as Silchar and other markets in Assam.
- Yield of crops has considerably dropped down in recent years due to increased infestation of pests and incidence of diseases. For instance, turmeric yield went down by 30 % due to reduction in rhizome size while there is yellowing of leaves and fruits in citrus orchards. In forest lands, it was understood that Pine trees were grown as timber and fuel wood only because there was no tapping activity observed during the visits.



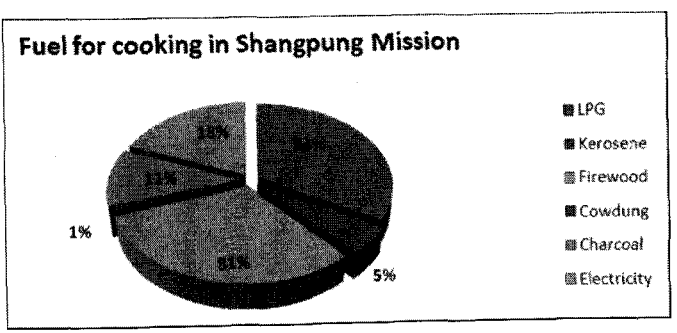
i. **Livestock**

- Common livestock is poultry, pigs and occasionally cows.
- Substantial problems with livestock diseases.

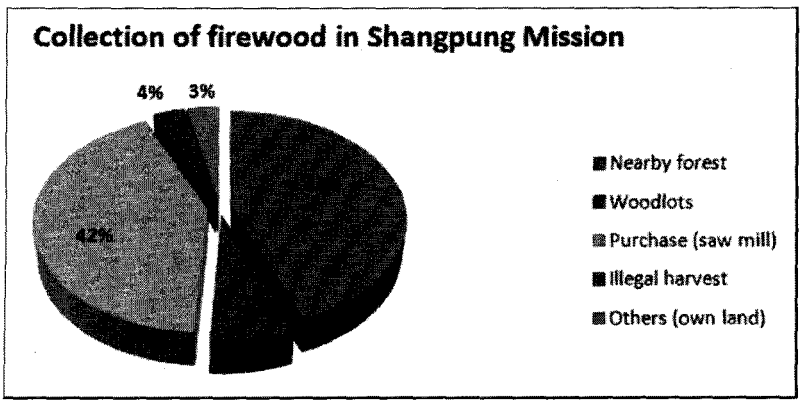


Fuel

- From the sample population, analysis reveals that 34 % of households use LPG and 31 % utilize firewood for cooking. The use of charcoal is limited and only for heating.

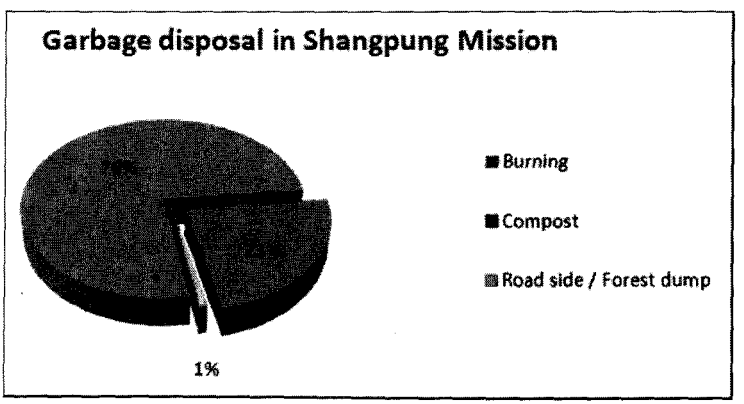


- Every house is connected with electricity (except one person).
- LPG is procured from local supplier (Rs. 550 per cylinder per month) and firewood is purchased from local private saw mill (forest waste, logs, timbers of pine trees (approx. Rs. 7,000 per house annually) and charcoal - from nearby suppliers (Rs. 1,500 per house during winter season only, i.e. from Nov / Dec to Feb / March).



C. Water & Sanitation

i. The Village Health and Sanitation Committee (VHSC) play a major role in maintaining sanitation of Shangpung Mission. It was observed that at every regular interval, small refuse bins were kept for the residents to dispose off their household wastes. However, a proper waste management system does not exist especially with disposal of bio-degradable and non-degradable waste. Waste burning is the only method adopted towards waste management.



i. Village cleaning 2-3 times / per year, occasionally during various events.

ii. Schools are worst affected since they don't have water supply to their latrines / urinals.

iii. Car washing ponds / streams, coal tailings, sludge waste are the main causes of water pollution in the Umiurem stream that flows on the periphery of the village.

iv. There is no proper drainage system for sludge water coming out from households and livestock sheds.

D. Health

i. The Shangpung PHC serves as the Health Centre catering to the localities under Shangpung and Shangpung Mission Village. It regularly conducts Awareness campaigns and Health Camps (vaccination programmes) in schools.

ii. The PHC also has a Homeopathic Dispensary besides Allopathic stream of Health Care.

iii. The nearest CHC from the village is the Ialong CHC which is 14-15 km away.

iv. There are also a number of traditional healers towards hepatitis, burns and blisters, abdominal ailments, bone injuries, etc. Some of them are Smt. Thiewiaidlang Sungoh, Smt. Ruhi Paia Iakai, Shri. Olando Suchiang, Shri. British Chullet & Shri. Bartle Suchiang respectively.

v. Most of the adults complain of joint pain and kidney stone formation.

E. Training& Education

i. The quality of elementary education is good, eminent from the fact that a number of highly qualified professionals have emerged from it.

ii. Training on farming, animal husbandry, waste management, and other vocational activities have never been conducted in the village and only elders are engaged in such activities while youths are choosing other alternative means of earning.

SWOT Analysis

Environment

Strengths	Weaknesses	Opportunities	Threats
Pro active in management and conservation of their community forest	Primitive approach lacking in scientific advancement No JFMC registered	Scientific intervention. Formation of a JFMC	Adoption of technology may be slow Community forest located far
Has sufficient water resources	Resource tapping is minimum in schools	Enhancement of water availability through rain water harvesting	Maintenance (especially in schools)
Has sufficient water resources	PHE water supply project not completed since 2006	-	Upstream river pollution
Clean and Green approach	Unscientific waste management system	SVDP Intervention	Localization
Farming Community	Youths not engaged in agriculture and livestock rearing	Different Training Programmes for realisation of scope, skills development and sustainable agricultural practices	High cost input and economic financial management at the individual level
Variety of energy sources for cooking	The increasing consumption of firewood as a major source, almost equal to LPG usage	Adoption of clean and green energy Saving trees for other alternative economic utilization	Market situation and price policy

Social

Strengths	Weaknesses	Opportunities	Threats
Average social infrastructure	No Youth club No Co-operative Society No SHGs	Formation of Co-operative Society	Leadership and Management
PHC in the village	PHC caters to a large area Villagers complain of joint pain and stone formation (kidney)	Traditional healers present in the village whose intelligence can be recorded and passed on	Willingness to share trade secrets
Good elementary education	Only one higher secondary school with Arts stream only and it is private	Science and Commerce stream till XII standard	Funds and management
Strong strength of Young population	Migration for higher studies to other areas	Creation of sustainable livelihoods after completion of studies	Interests in pursuing farm intensive occupations Brain drain

Economic

Strengths	Weaknesses	Opportunities	Threats
Educated Workforce	Less opportunities for exploitation of potential	Skill development through training	Migration of workforce to other locations like coal industry, urban areas, etc.
Good connectivity for transport of goods and services	Lack of information upon distribution channels and market linkage	Value addition and Direct selling Identification of potential markets (Shillong and Assam) for higher returns	Gaining interests of potential buyers Competition from other counterparts Market influenced by demand and supply
Natural assets (water, forest, agriculture variety)	Under-utilization	Attracting investors for agro-based industries Increase of productivity via new technology	Capitalization of investment returns Environmental degradation
Eco / Agro / Adventure tourism potential	Capacity building Marketing	Attracting investors for tourism development Creating jobs Additional income	Publicity for tourism Capitalization of investment returns Environmental abuse

Identified Problems

1. No community nurseries and JFMC support to increase the management efficiency.
2. Uncontrolled logging and burning of immature forests.
3. Deforestation and emerging problems with soil erosion and natural protection from the sun.
4. Improper and unhygienic latrines / urinals of schools due to no water supply system / rain water tapping for this matter.
5. No wasteland / dump in the village – the common practice for garbage disposal is by burning.
6. Rampant disposal of non-degradable waste as useless wastage and emerging health hazard.
7. Car washing ponds / streams, coal tailings, sludge waste are the main causes of water pollution in the Umiurem stream.
8. Yield and profitability decline due to the use of chemical fertilizers and pesticides, infestation of pests and incidence of diseases.
9. Lack of awareness about recycling, composting, reclaiming of waste and organic farming.

10. Paradigm shift in livelihood activities – agriculture is no longer the main economic practice as Shangpung Village used to be known for.
11. Youth is not engaged in agricultural and livestock rearing at all.
12. No social institutions such as Youth Clubs, Cooperative Societies or SHGs in operation.
13. No participation of youth and women in decision-making processes in the village.
14. Less job opportunities for exploitation of potential of youth and prevention of brain drain.
15. Under-utilization of natural assets and no value addition of export items.

Recommendations

The following recommendations for interventions and facilitations were obtained from the research activities mentioned above and proposed for implementation by the Shangpung Mission village council with the support of the Community and Rural Development, Government of Meghalaya.

1. Formation of a Multi-purpose Cooperative Society being one of the most effective ways to engage people from all walks of life in shared cooperative ownership and investment giving every member a stake regardless of income or standing.
2. Provisioning of incinerators for non-degradable waste (plastic and glass bottles) at the four localities of Shangpung Mission (Pohlyngdoh, Umban, Umsahep and Thohlakumah) including bins / containers for garbage collection by the Village Health & Sanitation Committee (VHSC).
3. Training and workshops on waste management (recycling, domestic solid waste management, composting of bio-degradable waste), organic farming, animal husbandry and other agro-based activities.
4. Setting up of a Community nursery comprising of various species such as fruit trees, local timber species and Nitrogen fixing tree species as a source of additional income and environment amelioration.
5. Installation of roof top rain water harvesting systems for two selected schools in the village (The Shangpung Presbyterian Higher Secondary School and Albert Iakai L.P. & U.P. School) to address sanitation and hygiene issues with toilets.
6. Low-cost / small scale Biomass briquettes making facility from household and agricultural waste enabling them to be self sufficient and sustainable on cooking fuel.

7. Value addition of turmeric and suggestion of new direct distributional channels and selling methods for additional capital generation.

Commitment

Based on the interviews and focused group meetings it was found that the Shangpung Mission village councils committed to unlocking green opportunities with healthy governance by working together with relevant bodies to gain information and advice which can be used by their households to understand the immense potentials and viabilities while implementing the recommendations mentioned above. Handholding, training and capacity building programmes would be conducted in partnership with Worldview Impact to map out long-term goals on the range of rural community ownership models and interests.

Collaborating with Worldview Impact the Shangpung Mission village council will provide guidance and training to its young members on registration and management of the Multi-purpose Cooperative Society for the village also serving as a business platform for income / employment generating activities like briquettes making, turmeric value addition, handicraft, agricultural produce and animal husbandry.

The Shangpung Mission village council would further consult on ideas and engage all stakeholders in vigorous debates, to draw up and present shared policy agenda for their households. This would propose urgent, implementable changes that respond to the concerns already stated that they wish to address.

The plans outlined in the recommendations for informed local planning, community involvement, training programmes, encouragement of affordable techniques and business opportunities and provision of basic facilities; need to be seen not as separate issues but as interdependent parts of the necessary whole.

Conclusion

Successful implementation of the feasible interventions will help in creating and maintaining strong rural economies offering those living in rural areas with green employment opportunities which will retain skilled graduates and reduce the outmigration. This will enable local communities to live and work closer to home, also helps to deliver national sustainability objectives by reducing the need to commute long distances to work thereby minimising harmful vehicle emissions.

The Shangpung Mission Multi-purpose Cooperative Society will, hence, serve as the machinery for such a purpose. For intensive livelihood creation, it is felt that the society undertakes the form of a multi-purpose society for targeted and skilled members to contribute respectively. On a need based approach, handholding them by providing information, organising training programmes and guidance in management are our prime responsibilities throughout the implementation period of one year.

The installation of incinerators for solid and non-degradable waste management is another felt need for intervention on a 'Clean & Green' concept. The only method followed by the villagers for treatment of waste is by burning or open air combustion which is hazardous due to emission of toxic and green house gases into the atmosphere. Solid waste, on the other hand, is collected from the localities of the village and is dumped into areas outside of the village. The incinerators can therefore reduce both effects of environment abuse (GHGs emission and solid waste disposal).

There is a forest located on the outskirts of the village which is managed by the church members (all villagers are members of the church). It was known that there has been no Joint Forest Management Committee (JFMC) registered with the Forest Department till date. A suggestion for such a move has been made to the villagers for aid in scientific forest management in line with the concept of sustainability. Setting up of Community nursery for artificial regeneration in deforested areas of the village and the community forest would be an impactful intervention in this field.

Training on improved agricultural techniques and practices need to be tailored according to the challenges faced by the village farming community. For this purpose, resource persons in respective fields would be brought in from governmental departments, NGOs or other institutions.

For training on Briquettes making machines, an expert would be invited to the village to conduct an intensive workshop where the community will be able to learn to make their own machines and briquettes out of locally available raw materials, hence enabling them to start using them within a few days time.

Value addition of the much acclaimed Shangpung turmeric can be branded and marketed using the Multi-purpose Cooperative Society as a strong support system and business entity.

In the end, the Community and Rural Development Department and the Shangpung Mission village council makes final decisions to implement projects and programmes that are in the context of sustainability and a green future.

Acknowledgements

The author is very grateful to the following bodies and instititions for providing immense support in conducting this research.

1. The Community and Rural Development Department.
2. The Shangpung Mission Village Council and volunteers.
3. The officers from the BDO office, Laskein, West Jaintia Hills.
4. The District Commissioner of Jowai, West Jaintia Hills.

5. The Meghalaya Rural Development Society.
6. The Meghalaya Basin Development Authority.
7. The District Health and Medical Officer, West Jaintia Hills.
8. The Soil and Water Conservation Department.
9. The Forest and Environment Department.
10. The North East India Drugs and AIDS Centre, Shillong.
11. The Jaintia Hills Autonomous District Council, Jowai.

14

Teacher and Environment

Rimanbor Judah Cunville

The process which brings a change in the behavior of human being or a change in behavior in a desired manner is education. Hence education plays a very important role in the life of man. The early life of man which is approximately around twenty years is mainly spent in getting education notably from the age of six years onwards which is more generally taken as the time that a desired change is planned. In order, to give the child proper and successful education, it is essential to plan the learning environment properly and for this the teacher plays a major role in achieving this goal. In fact, even though a teacher spends the majority of the day in the classroom, the actual teaching component is only part of the job. An effective teacher understands that teaching involves wearing multiple hats to ensure that the institution run smoothly and all students receive a quality education. Creating a positive learning environment in classroom will allow the students to feel comfortable, safe and engaged which is something that all students very well and much deserve. In a classroom where values and roles remain constant and focus is placed on the positive aspects of learning, students will be more open to actively participate in class. A Teachers role involves more than simply standing in front of a classroom and lecturing to the students. If they are given the opportunity to become responsible for their own learning, students will be more likely to benefit from the lesson and thus more likely to be self motivated. This should be the primary goal for all teachers, since lack of motivation is often the root of all disciplinary issues which create a negative environment in the teaching, learning process in the classroom.

Recognizing the importance of a positive classroom environment it can be stated that teachers first and foremost need to relate to their students at their level,

secondly be someone they could confide in, thirdly make students feel comfortable through active interaction and participation and lastly to avoid labeling students or categorizing them.

Many educators have agreed upon the following steps to build a supportive climate or environment for learning they are:-

1. It will call for a strong involvement and initiative from the teacher's part by engaging the students to know, to assimilate and to a direct transfer of the teacher's expectation in connection with glaring fundamental learning issues like:
   a. Learning of content
   b. Achievement
   c. Social behavior
2. Other related issues. In classroom situation and in classroom environment the role of the teacher is to mainly focus on prevention rather than punishment.
3. The teacher therefore should invariably secure an inviting, mutual, reciprocal, open and a free classroom.
4. The teacher's part is thus to ensure a respect for the dignity of the student by
   (a) Understanding the student's interest
   (b) Understanding the student's aspirations
   (c) Understanding the student's aptitudes
   (d) Understanding the student's attitude
   (e) Giving personal and individual attention for every student.
5. After understanding and establishing a fundamental knowledge of the student's interest, aspirations, aptitudes, attitudes and other related dimensions of the student's psyche the role of the teachers is therefore crucial in establishing an effective learning environment by creating purposeful activities which will prevent major discipline problems.
6. The objective should always be kept in mind by the teacher to instill inner self control, self confidence, responsibility, motivation and interest in students and not merely to exert the teachers control over them. However this is a sure clarion call for teachers to be established and confident of their ability to maintain order, to motivate, to generate interest and to inculcate a sense of security, belongingness, openness, willingness, positive self esteem in every student as valued individuals.

   It must be kept in mind and remembered that teachers should be aware

that children with positive self esteem are more likely to achieve academically. Thus by endeavoring to patiently implement and follow the above given and mentioned steps teachers will thus:-

a) Foster self esteem in each student, to get a more positive and better result in their achievements and overall attitude towards education.

b) The teacher will create an open environment where every student is free to experiment and develop according to the students speed and personality.

c) There will be successful learning centre's, effective classroom management and properly planned pronounced rules. Classroom environment and classroom situation will therefore encompass a broad range of educational concepts including physical setting, psychological environment that will be created through social contexts and numerous instructional components related to teacher characteristics and behavior.

d) Thus there will be an open understanding by the teaching community that the most frequently focused aspect in classroom environment or classroom situation is also the significance of physical environment which has to be incorporated in all classroom environment. This is because the significance of physical environment has been researched through many contemporary studies and findings have shown that physical environment has always been the major and fundamental influence on all behavioral and academic outcomes.

e) The students will thus be confident in themselves through the appreciation, acceptance and security that are being transmitted inculcated and conditioned to them by their teachers.

f) Enthusiasm, energy, motivation and co-operation will then be transmitted to the students where both students and teacher operate in the teaching - learning process of any given classroom situation with an open, reciprocal, family, mutual and friendly atmosphere.

g) An enhancement of promoting tolerance and respect will be created in the different classroom situation which will again enhance social relationship, student motivation and engagement in productive work.

h) Thus the teacher will indirectly and directly provide opportunities for students to work both collaboratively and independently in order to further improve the student's intelligence.

To Quote Rabindra Nath Tagore:-

> "A teacher can never teach unless he is still learning himself. A lamp can never light another lamp unless it continues to burn its own flame. The teacher who has come to the end of his subject, who has no living traffic with his knowledge but merely repeat his lessons to his students, can only load his mind. He cannot quicken them".

The significant role of teachers in the society can be briefly seen in the following:

1. Teachers are nation builders whereby nation building first and foremost starts in the classroom or more precisely in classroom situations.
2. Teacher's education is a must and an unavoidable requirement for every teacher or for anyone for that matter, who wish to invest, explore the unlimited resources, benefits contributions and "impact" of teaching.
3. Teacher's education is so necessary and a pre requisite for every teacher towards their progress, advancement, benefit, sanity, adjustment and coping with the ever changing time in terms of technicalities, technologies and modernization.
4. Teacher's education is the basic fundamental discipline with regards to public instruction.
5. Teacher's education is instrumental in providing effective teachers so that they can tackle various issues arising from imparting daily instructions to their pupils.
6. Trained teachers are of obvious importance to fulfill the requirements and challenges of education in the "present world"

The traditional role of teachers has undergone a considerable change and innumerable responsibilities have been entrusted to them. Teachers today are overloaded. Their traditional functions of instructions, socialization, evaluation and classroom management are not regarded sufficient anymore to make them as efficient and effective teachers. The present time poses challenges that were never faced by traditional school teachers in the past. These situations relate to the social and economic patterns where students from different religions, languages, socio economic status and cultural values interact in the present day.

As in everything in life now educational or education has become fast paced. Gone are the days where things were being taken for granted and teaching taken leisurely. Today we can see a new breed of pupils. These young and impressionable pupils are constantly subjected to the barrage of information, from consumer goods to philosophies, politics, globalization and many other situations.

A teacher is supposed to be well equipped with the ongoing changes, progresses, advancement with the changes in different technologies, teaching aids, teaching skill and other development in effective teaching strategies and practices. The National Policy of Education (1986 modified in 1992) has given the signal for the quality by developing in clear terms that if quality improved, "Teacher will have multiple roles to perform in (a) Teaching (b) Research and (c) Management..."

With profound concern for training teachers and teacher education the Association of Teachers Education (IATE) organized its 44th Annual conference on "Excellence in Teachers Education : Trend, Challenges and Prospects." in December 2010 at the Department of Education, MJP Rohilkhand University Bareilly (U.P).

Stressing on the significance of communication skills Hurt, Scott and Mc. Crosckey (1978) noted that there is a "difference between knowing and teaching and that difference is communication in the classroom."

In the light of the need, significance and relevance of teacher is therefore important to shed a further light or to get a glimpse of some of the innovations that is taking place in the teaching and education. Let us get a glimpse and a quick glance on 'just some' of the main and important innovation in teacher education. They are-

(1) Pre – service training
(2) In – service training
(3) Induction training
(4) Professional meetings
(5) Seminars
(6) Conferences
(7) Panel discussions
(8) Other study programmes
(9) Computer Enriched Instructions (CEI) – which is a rapid gaining concept in instructional technique. The focus is on individuality. Individually tailored programs make it possible to compose a lesson and customize it to the needs of the student. The flexibility afforded by Computer Enriched Instructions (CEI) permits learners to choose both the time and place of their learning. The individual controls the instructional time, speed of information transmitted. CEI software can be instruction-centered, practice and assessment-centered.
(10) Internet /websites
(11) Visual aids - which is mainly the use of Pc based projectors and presentation software such as MS Power point.

(12) Used of DVD (digital versatile disc)/audio tapes.

(13) Presentation software - Presentation software is a special computer program which allows you to design a format, draft / text and includes illustration which can then be projected and magnified on to a screen for the class to watch while the speaker make his/her presentation. The equipment configuration varies but usually there is a desktop computer or laptop linked to the data projector.

It may be noted that the Presentation software has many features which can be briefly mentioned in the following:-

i. Apple keynote, coral presentation, custom show, google Docs (Web-based), Harvard graphics(obsolute, Hewlett Packard, Bruno Software, IBM Lotus Freelance Graphics (Obsolete, King soft Presentation, Libre office Impress (open source), Microsoft Power point,Slide Rocket etc.

ii. Features of work station in a significant model manufactured by Trollman.

iii. Easier to make last minute changes compared to traditional type setting and paste up.

iv. Requires small amount of time.

v. Normally requires skilled operators

vi. Originally these programmes was used for generating thirty five mm slides using slide projectors.

vii. 1980 - Translated to tranparent copies

viii. 1990 - Translated to LCD based screen that can be placed on the projectors.

ix. 1979 - First commercial computer software was developed by Hewlett Packard called Bruno Software later called H.P

x. First software displaying a presentation on a personal computer screen was in 1982 by "VCN Execu Vision"

These features can be easily displayed on screen and navigated through the command of the presenter.

Use (I) Pre-Designed images or

(II) Imported images from Google, flicker etc

Can use Adobe Photoshop, Apple's iphoto, Adobe Illustrator etc.

Can be used easily shared through PDF documents or as in a Flash animation.

(14) Distance Education

(15) The Concordia University Portland, Oregon has introduced three innovative methods for the teaching and learning processes basically through Organization and Visualization, Technology and Brain Gym

(16) Interactive integrated hardware element to engage an audience or commonly known as "Audience response system". Other integrated hardware devices ease the job such as "Laser Pointers" and "Interactive White Board".

(17) Apart from the above mentioned innovative strategies it may be of interest to note that the Indiana University (USA) has set up a proper centre for innovative teaching in learning. In order to enable innovation in different educational fields like implementation of power full technologies, pedagogies, curricular, analytical/researched skills, service training, writing instruction and in many other related fields. This is being done through different reflective teaching/learning programs and professional growth programs.

It has therefore been suggested that one major driver for maintaining high quality education system on that significantly improves the students outcome and performance is 'the quality of teachers who teach them'. Many reports and initiative to enhance and empower teachers and reform teaching have emerged during the past decade.

The purpose of this Paper is to make policy makers, administrators, educationist and leaders aware of the complexity surrounding the training of teachers from initial teacher preparation to continual professional development. There should be an acknowledgement "rather an implementation" of teachers as "wisdom workers" and "knowledge workers" of the twenty-first century.

References

Agnew, P.W. Kellerman,A.S. and Meyer.J.(1996)

Teo R. and Wong.A.(2000)

www.oecd.org/.../..

www.merriam-webster.com/.../innovation·

Learning.tki.org.nz/Teaching/Innovative

www.colby.edu/environmental studies/.../...

Superpod,ml,duke,edu/inteam/

www.education.vic.gov.ac/.../teacher/.../

15

Go-Green: An Approach through Green Banking in Meghalaya with Special Reference to Shillong City

R.Geetha
K. K. Elizabeth

Introduction

In the Indian banking and financial sector, there is a growing thrust on sustainability and social responsibility. Banking industries play a great role in economic development and in the conservation and preservation of the environment through Green Banking Technology. This technology which can be called as a **Silent Revolution** is highly relevant in today's world as it can bring about many changes in various fields without much noise in the environment. Global warming is a global issue which requires global response, support and cooperation from every corner to mitigate its effect. Banks and other financial institutions play a major decisive role in financing the developmental activities of any economy. They can also contribute towards the global efforts to make our planet a better place to live in by helping to preserve our environment. While performing this role as the major financier, they assume a huge responsibility towards the society in which they operate.

Green Banking (**GB**) can be defined "as the banking which promotes eco-friendly activities, practices ethical banking with least impact on the environment, prefers sustainable development, and helps those projects leading to the preservation and conservation of environment while financing the developmental activities in a nation." This Silent Revolution can bring about change without much hue and cry. GB ensures the use of resources at our hand keeping in mind

the conservation and preservation of the environment and its biodiversity. For example, the discharge of carbon dioxide from diverse human activities can be mitigated by the use of Green Technology in our daily lives. Banks are presently financing developmental projects which cause discharge of carbon in the atmosphere. To arrest this devastation to some extent, banks may finance **G**reen **T**echnology projects as part of their "**C**orporate **S**ocial **R**esponsibility"(CSR).

Every economy needs progress and growth in all respects. In India the banks are encouraging the customers to use e-banking instead of branch banking. They promote e -payment system in all their dealings to contribute towards environmental protection. Banks are taking up this as a challenge in performing CSR while financing developmental projects. Government and other regulatory bodies are supporting environmental sustainability efforts and promoting eco-friendly products and services to control ecological exhaustion. Environment friendly products and services are being promoted by different development agents of the economy and environment protection is given top priority in the developmental efforts. Otherwise living beings all over the world will experience and react negatively to changes in climatic situations leading to the damage of biodiversity and ecosystem. Banks may help mitigate the negative impact of climate change on the environment by taking suitable measures.

Literature Review

By adopting GBT, the banking industries as a whole, play a very decisive role in the preservation and conservation of our habitat while financing projects. The present use of natural resources should not deprive future generations of access to these resources. Jeucken (2001) stated that banking and other financial institutions are having Environmental Risk and Liability Guidelines on Development of Protective Policies and Reporting for each project they finance or invest. The State Bank of India (SBI) has enunciated a 'Green Banking Policy', in 2007 with a view to reduce its carbon footprint by urging its branches and other establishments to adopt several measures to this end. It has also introduced awareness modules in all its training programmes run in the various learning facilities all over the country. SBI became the first Bank in India to install and use green power to reduce carbon footprints and a torch bearer and role model for other entities to emulate.

Banks should encourage environment friendly investments while lending (Sahoo and Nayak, 2008). Another recent study(in 2008) revealed that the world's top 3,000 companies, by market capitalization, were responsible for environmental damages worth US $2.15 trillion, covering water and air pollution, greenhouse gas emissions, general waste and depleted resources. These external costs will reduce returns to investors: Bai Y (2011) stated GB is similar to normal banking, which considers all the social and environmental factors to protect the

environment and conserve natural resources. Thombre (2011) stated that banks' external activities have an immense impact on its environment. Verma (2012) stated that Indian banks have gradually realized that the priority order should be 'planet, people and profit'. GB should help protect the environment by encouraging green investments. Habib (2012) stated that NGOs and civil society organizations should help strengthen the initiatives for creating green awareness and encouraging green business. Md. Maruf Ullah (2013) made a comparative analysis of the GB issue among various public and private sector banks operating in Bangladesh. Indian banks should adopt GB as a business model for sustainable banking as their survival is inversely proportional to the level of global warming. GB refers to the banking business conducted in a selected area and manner that helps the overall reduction of external carbon emission and internal carbon footprint (Ravi Meena, 2013). Past researches show that some companies like Suzlon help GB by developing wind power energy. All these point to the importance of the preservation of biodiversity.

Banks, the artificial persons operating as socially responsible corporate citizens, need to adopt GB practices to achieve environmental protection and sustainable development. SBI became a signatory investor to the Carbon Disclosure Project (CDP) to promote the global fight for sustainable development. It has initiated the concept of generating green power to substitute the polluting thermal power. Some companies (Suzlon) have visualized a mission to make all Indian banks go green through wind power development. Of the 11,000 MW installed wind energy in India, 6,000 MW has been installed by Suzlon. In India, many institutional investors including listed companies have also become signatories to CDP.

As a socially responsible financial entity, SBI has initiated "Community Services Banking" such as "Save the Tiger" Project, Tree Plantation, Adoption of a Girl Child, Save the Girl Child Projects, etc. The bank together with the involvement of various NGOs facilitates education, provides medical & other services to the underprivileged and installed wind mills in the selected offices of banks.

The private banks like ICICI Bank are looking at different ways to make the best use of the digital opportunity for growth. The bank is doubling the number of cities it covers with 'Tablet Banking' and offering its customers services such as net banking, Video Conferencing. The Bank of India launched its card-less cash withdrawal facility in March 2014, so that a customer can transfer money to anyone, using the bank's ATMs or through net banking. The sender has to provide the beneficiary's mobile number, a center code, and the amount through internet banking or text message. The beneficiary, after receiving a code from the bank can visit the ATM with instant money transfer facility and withdraw the money within a fortnight of the transfer. All the banks strongly endorse the view that

healthy mind and healthy body in a healthy environment is essential for overall healthy growth of society and the nation.

Information Technology and Green Banking

The technological revolution in the banking field is helping the banks to function efficiently with high speed dealings at a minimum time. Today banks are turning their focus basically to serve their clients, by amplifying the technology infrastructure so as to improve the customer experience and gain a competitive edge. The reputation and status of e- banking is higher than ever before. Banks promote GB by encouraging their customers to transact online and help them get incentives in the form of more credit points for shop online or for making various e- payments. They are encouraging the maximum use of debit cards and/ credit cards by the clients.

Environmental protection, safety and security are often the natural consequences of GBT. With the help of GBT, the banking activities can be performed more accurately in less time in a convenient way. Online banking is a part of GB. It is more accurate, safer and easier. It can be called as paper- less banking or convenient banking as banking activities can be done at the convenience of the customers anywhere without much paper work. Hunting for records in the cupboards is a thing of the past in offices. The IT revolution has given us the most cutting edge technology and solutions not only to keep the records safe and confidential but also in environment protection.

Green Finance

Banks supply finance for environment friendly green technology projects and schemes. Such type of finance is called **G**reen **F**inance (GF), which is given preference while devising appropriate lending policies. GF may be promoted and encouraged by adopting concessional rate of interest on loans and by giving priority over other types of finances. GB practices can save and protect the environment with the active cooperation and support of bank clients. Sustainable development is being achieved through GB by performing this social responsibility of banks. GB will ensure fair treatment of the bank customers and other stake holders and the corporate entity proves that "it does the right thing in the right way with a defined objective".

Government and Green Movement

With the increase of population, an emerging trend of significant reduction of 'Green Cover' is being noticed in Meghalaya. Protection and enhancement of road-side 'green cover' is necessary to safeguard the roads from landslides, to maintain the aesthetic beauty of nature and to reduce land, water, and air pollution. The banks along with the government and local agencies may take up the lead to implement "**G**reen **M**ission with a **G**reen **D**rive" focusing on the following:

- Sensitize the public about Green Technology by promoting Green Mission.
- Initiate Green shrubbery and Genetic diversity by planting indigenous trees and herbs.
- Mass afforestation along the roads and river basins.
- Develop 'Village Nurseries' in collaboration with local entrepreneurs.
- Create a Clean Green Blanket with aesthetic & recreational eco- parks in urban areas.
- Support eco friendly tourism.

The policy of 'Mission Green Meghalaya (MGM) was envisaged on a convergence platform where all the concerned government departments, agencies and traditional institutions work in close cooperation. The Meghalaya Basin Development Authority (MBDA) which is implementing the Integrated Basin Development & Livelihoods Promotion Programme (IBDLP) is the nodal implementation agency for MGM. Banks appoint local people as Business Correspondents and Business Facilitators (BC/BF) for improved reach to meet the local needs and requirements. Still there is lack of awareness among the people and suitable implementation of the concept of sustainable development is needed in the State.

Implementation of GB in Shillong

The process of implementing GB practices is a time consuming and lengthy one, which can be implemented step by step in each and every bank branch. For example, ICICI bank has already set up fully electronic branches to the advantage of saving more than 60 tonnes of paper by sending e-statements to over 6.5 million bank accounts and 300 thousand credit card customers in one quarter itself. The process and procedures identified for its implementation are given below:

- Banks may sponsor and impart banking related e-learning programmes for the public which will help them to appreciate the use of online banking.
- Set up ATMs with computers and internet facility under the care of trained staff for facilitating e-literacy to the rural masses.
- Encourage the clients for e-statements, e-correspondence and e-payments.
- Introduce digital deposit accounts and solar powered ATMs.
- Keep records in Cyber Space to avoid physical deterioration and theft.
- Popularise e-cheques and M-cheques instead of paper cheques for transactions.

- Encourage the clients to adopt the policy of "Act Globally, and Eat Locally".
- Maintain soft copies instead of hard copies of transactions to prevent manipulation.
- Endorse recycle and refill ink cartridges of printers.
- Tree planting, setting up wind mills, solar projects, etc in the selected feasible areas.
- Endorse green products and services like Insta-banking, e-Banking, i-Mobile Banking, Tab banking, Anytime Banking, Anywhere Banking, Green Credit Cards, etc.
- Provide incentive schemes for the use of green debit cards and credit cards.
- Promote low emission technology projects and green loans.
- Endorse the policy to adopt "shop from the seat and not from the feet".
- Utilise green buildings for office and employee accommodation.
- Enforce Carbon Tax on firms causing environmental pollution.
- Endorse a wave of e-drive in banking and e-payment system mandatory for all bill payments.
- Banks to develop Environmental Framework Manual or Equator Principles and specific Green Policy Guidelines.

Thus it is observed that GB contributes towards greener environment by encouraging paperless banking, core banking solutions and e- correspondence. It promotes eco-friendly projects and helps reduce environment pollution and adds to environmental sustainability. It also promotes the use of renewable energy which will reduce pollution level. Through the implementation of GB in the State, it can create more employment opportunities by setting up rural ATM centers with trained personnel.

Suggestions

The rural areas need to have more branches and these branches may be converted in to e-facilitation centers with added ATMs and trained staff to give training to the masses in online banking. The following are some of the suggestions which can be encouraged to implement GB practices among the public:

- Transactions which can be made through online may be done in the respective portals.
- Mandatory for all the customers to have email id so that e-correspondence is possible.

- Promote e-payment of all utility bills.
- E- Literacy to be encouraged and facilitated at every institution.
- New accounts may be opened by all banks only through online.
- All banks may conduct frequent awareness programmes on GB.

Conclusion

Banking sector also knowingly or unknowingly contributes towards environmental damages through its various activities. There is a general lack of adequate awareness on the side effects of global warming, environmental damage, or distortion in ecosystem. Banking institutions can help promote GB as a part of their CSR and this will help in the sustainable development.

References

Hayder, M M, 2012, *'Green Banking and its practices in Bangladesh'* International Monthly Refereed Journal of Research in Management & Technology ISSN –2320-0073 Volume II May '13.

Jeucken, M (2001), *"Sustainable Finance and Banking, The finance Sector and The Future of the Planet"*. London, Earthscan. © Research India publication.

Leslie D Monte, *'It's Times for Green Banking', Business Standard,* May 21, 2010.

Pravakar, S and Nayak, B P 2008, *'Green Banking in India'*, Institute of Economic Growth, University of Delhi, Delhi-110071

Ravi Meena, *Green Banking: As Initiative for Sustainable Development, Global Journal of Management and Business Studies.* ISSN 2248-9878 Volume 3, Number 10 (2013)

Ray Vareen, *'A Green Dream'*, 4P's Business and Marketing, 21 Nov to 4 Dec 2008

The Indian Banker-monthly journal published by Indian Banks Association, February- May 2010.

UNEP Finance Initiatives, 2002, Financial Institution Initiative Signatories, http:/ unepfi.net/fii/signatories_country.htm

Verma, M K 2012, 'Green Banking: A Unique Corporate Social Responsibility of India: Banks' International Journal of Research in Commerce & Management, Vol.3, Issue 1

V. Kumar& R. Arora, Green Bank Report, 2000

Voice of Research, Vol. 2 Issue 4, March 2014, ISSN No. 2277-7733

www.deccanherald.com/content/./major-banks-should-lead-way.html Alice Mani, Dec 6, 2012

www.greenbank.com

http://www.ibef.org/industry/banking-india.aspx

http://www.idrbt.ac.in (IDRBT publication August 2013)

http://www.preventclimatechange.co.uk

http://www.wwfindia.org

16

Role of Media in Environmental Issues: A Case Study of the Role of Vernacular Press on Environmental Issues

Bobby D. Majaw

The present decade will in all likelihood be remembered as the time when people will have actually become concerned about the environment. Most of us now realize that Nature's treasures must be used more discriminately than they have been in the past for man to continually prosper or indeed survive.

The Earth's resources are as finite as the blades of grass in a meadow. There is only so much acres of land, gallons of water, cubic feet of air, the basic requirements of life, which cannot be augmented nor manufactured by man himself.

Our survival depends on protecting the environment and its resources. It is this concern that needs a practical aspect of Environmental management. The approach that Green Economics: the road to a balanced and healthy economy adapted in this International Conference is timely and relevant.

The concern and aspiration of this conference has to reach the target groups, the stake holders and all those who share our concern. The medium which carry the message from the four walls of this conference is the medium, both Print and Electronic. But from experience and conviction, I firmly believe that in the context of our state Meghalaya, the Vernacular Press can, to a large extent, help act as a courier of our ideas and concern to the public who will be the main recipients.

However, in order to understand the impact of VERNACULAR Press on the

readers, the history of its evolution has to start from the arrival of Christianity into the Khasi and Jaintia Hills.

The history of the Khasi script, literature and the press dates back to an evangelical revival of the 18th century sweeping Wales. It was associated with the name of Griffith Jones described as "one of the greatest Welsh men of the century "and "one of the greatest benefactors of the Welsh people". Besides the Ecclesiastical calling, Jones was also a well known evangelist of literacy. He established a network of circulating schools and made Wales the most literate country in Europe during the 18th century. By 1777, three fifth of the total population of half a million had been taught in these schools. But Jones not only taught reading, so sorely needed then, but laid a solid foundation of virtue, justice temperance, industry, truth, wisdom and honesty. The impact of Jones' ministry weave through the history of the Wales and one of the recipients of this legacy was Thomas Jones, the first Welsh missionary to Khasi Hills. It was in 1835 that Thomas Jones found himself under deep religious convictions, and soon after, he made known his desires to become a missionary among non Christians overseas. Nigel Jenkins's article in the souvenir of the Khasi Authors Society published in 1992, mentioned that when Thomas Jones was offered a missionary posting in South Africa, he turned it down; it was in India and only India-he was quite adamant if not stubborn about it-that he wished to serve. Might he not have been fulfilling an ambition expressed in 1713 by Griffith Jones to travel to India as a missionary? But eventually decided that his own benighted countrymen were in greater need of his energies than people elsewhere

The Welsh missionary society formed in June 1843 was yet to decide where in India they should send their missionary. We may call it coincidence or providential, but if it had not been for a shipwreck in the Bay of Bengal on 17 January 1837, there might never have been a missionary to the Khasi Hills. Homeward bound aboard the S.S Gregson, after more than ten years service in the Far East, was the English missionary Jacob Tomlin. With his wife and three little girls working at first under the London missionaries society and then on his own account, Tomlin had travelled widely visiting Singapore, Java, Siam, and Malacca where he had been a fellow laborer of the Welsh missionary Josiah Hughes. He left Malacca for Calcutta in 1836, intending to take his family with him to the Khasi hills, and crossed from there to China. But, none of his family being in good health, the Rev. Tomlin was persuaded by friends in Calcutta to return to England, until his family's health has improved before embarking on any further missionary ventures. They set sail, therefore, on 10th January 1837 hoping to arrive back in England sometime on early May. After a week's sailing the pilot left the S. S. Gregson at the mouth of the river Hooghly, and at 11 o'clock at night, when all asleep in their bunks, they were awaken by shouts of "Fire! Fire! The ship is on fire!" Attempts to put the fire out proved fruitless, and passengers and

the crew had abandoned the ship; they watched their vessel being consumed in flames as they rode through the night towards the mouth of the river. It were two night and a day before they were rescued by a ship which, although sailing for London, turned around and ferried them back to Calcutta

Now having survived the shipwreck and being delivered safely to Calcutta, he decided that bit was undoubtedly God's desire that he should proceed after all with the original plan. So, he and his family set for Cherrapunjee in February and nine months altogether in the Khasi hills, during which time he learnt the language and "had the pleasure of testifying to the people, in the various villages the good news of Salvation through Jesus Christ ". He travelled widely in the hills and gathered knowledge he could of the people and their way of life.

The Tomlins eventually sailed for England in January 1838, and soon after arriving home, the missionary received from one of the Methodists in north Wales a request for advice as to where an independently constituted Welsh missionary society, were one to be formed, might establish a field. Rev. Tomlin's reply, which represents probably the first mention of the Khasi hills in connection with the Welsh Methodist, was published in the Trisorfa in 1839: "It would be good to see two of the Welsh brothers being sent to the Khasia mountains, a place where you might soon gather into Christ's orchard many of the wandering sheep on the distant and until lately unfamiliar mountains, who have at present no shepherd to watch over them. They would have considerable assistance with the language, which can be learned in a year or two".

Two other possibilities were suggested by Tomlin namely the Manipor valley and the central province of Malour. By 1840, when the semi –official committee of the fledgling society round itself faced with making a serious choice, their inability to decide was compounded by the additional suggestion from Dr. John Wilson in Bombay that Gujarat might proved a fruitful area. The choice was, at this stage somewhat academic because they did not have the money to send anyone to India.

But Providence once more seemed to guide their hand. While the directors were hesitating as to their choice of a suitable field, a generous offer of a considerably reduced passage to Calcutta was interpreted as a sign from God that the Khasi hills should be adopted as their chosen field. Collections were taken, bags were packed and opposition to the new society melted away as church members and elders, even the Rev. John Elias, rallied around to wish bon voyage to the Calvinistic Methodists' first missionary to India. Thomas Jones and his new bride Anne set sailed for Calcutta on the S.S.Jamaica on 25th November 1840.

Thomas Jones' arrival in Cherrapunjee on 22nd June 1841, heralded a new dawn. It was the beginning of Christianity in the Khasi hills. It is an accepted fact that the Bible is the bedrock of Christianity and it was with this conviction that

Thomas Jones also started the educational mission not only to make people literate but to be able to study the Word of God. Thomas Jones opened three schools at Mawsmai, Mawmluh and Sohra village in the Khasi hills and it is certain that Thomas Jones learned invaluable lesson from the extraordinary success of Griffith Jones circulating schools. But, in his yearning to reach people, he made one momentous step i.e. the conversion of spoken Khasi to written form by using acceptable and intelligible Roman script in place of the Bengali script used by William Carey in his translation of the gospel of Matthew. In 1842, Jones published the first Khasi primer which contained only six pages. It was a small step for him but a giant leap for the Khasi community. Other publications of Thomas Jones include"Ka Kot Tikir"(Christian catechism), "ka jingai ka kumi iala ki koon"(a mother's gift),"ka kitab nyngkong ban hicai pule ci citin cassi"(1846), The Gospel of Matthew, ka gospel u Mathaios(1846) besides other literary works. It was his dedication and innovation that made the present generation to hold him in high esteem and rightfully called the Father of Khasi Alphabet.

From a six pages book in 1842, Khasi language entered a new phase when recognition was granted by the Calcutta University in 1900upto Matriculate standard. In 1919, both Khasi and Assamese languages were given recognition to degree level. But the crowning glory for Thomas Jones was the opening of the Khasi department at the post graduate level by the North Eastern Hill University, Shillong on 29th September, 1981.

During the 90's Shillong witnessed a dramatic change in the area of Media and Journalism. It was caught up in the new world of information order-an era of instant information. There was an upsurge for the latest news and information and these opened new avenues for newspapers and other news delivery systems to make their appearance in the market. Amongst the news media, newspapers are still considered as the basic means of information, although they have been outdistanced by television in speed and visual punch, but they still provide greater depth and variety of reporting than televisions, with more lasting impact. Maybe it was this criteria and other considerations that led to the growth of dailies in Shillong during this decade.

After the adoption of the Sohra dialect as a written language of the Khasis by employing the Roman script, there was a tremendous growth in education among the Khasis. It was quite obvious, in the new scenario; journalism will also find a niche in the myriads of literary life of the community.

The pioneers of journalism in these hills were the Christian Missionaries, who published their first Khasi journal "U Nongkit Khubor" in 1889. It was an ecclesiastical publication which also covered some other subjects of interests. But the distinction for the first ever Khasi secular newspaper went to Hormurai Diengdoh, who published a Khasi Newspaper "U Khasi Mynta" in 1836. These

early initiatives were the beginning of a new dawn in the history of Journalism in Khasi and Jaintia hills. Since then, there are about more than 90 Khasi weeklies who hit the newsstands. However most of the weeklies are out of circulation due to various constraints.

In spite of the substantial growth of journalism in the pre and post independent period, it took almost one hundred and fifty years for the Shillong based daily newspaper to make their appearance in the newsstands. It was only in April 19, 1991 that the people of Shillong were given the opportunity to savor its own broadsheet daily newspaper-The Meghalaya Guardian. Apart from it are The Shillong Times, The Meghalaya Times and Highland News

However, it must be mentioned here that Shillong times holds the credit for publishing the first tabloid size English daily on June 1957, but the circumstances forced the publishers to revert to its precious weekly periodicity in December the same year. It was only a gap of thirty years that the Shillong Times switched over to a broadsheet daily.

One of the most interesting developments in the last few decades was the growth of vernacular dailies, an episode which has a wider impact on the growth and development of the Khasi language, besides acting as a courier of news and information to the Khasi speaking population of the state. Among the Khasi dailies which hit the newsstand include "U Mawphor", "Rupang", "U Nongsain Hima", "Peitngor","Dienjat", "Jingshai", and "Kynjatshai". But the credit for heralding the era of vernacular dailies goes to Leilieh and Pateng Mynta, which were published as tabloid size dailies, during the late 80's, though both have ceased publication.

A very interesting interlude in the history of journalism in Shillong we found, was the conversion of the Khasi weekly to an English daily, as in the case of Apphira, launched as English daily on 24th June 1994 which is however presently no longer in circulation.

Another inference we may make as regards the historical evolution of the Khasi script and growth of the vernacular press is that, it exhibits a collateral outlook on the moderately pacing albeit overall rise in the interest of readership amongst the khasi speaking population alternatively rendering the Khasi people as more active audiences and participants in an ever changing ever integrated society.

Now, one key note aspect from the preceding paragraph we can alternatively draw out is the population structure of the Khasi speaking population in the state of Meghalaya, which can be seen as per the following Table:

Table 16.1 Showing the Population by Language in Meghalaya

Languages	Population by Language			
	1971	1981	1991	2001
1	2	3	4	5
Khasi	457064	629640	879192	1091087
Garo	328613	399069	547690	728424
Assamese	23410	23356	34118	36576
Bengali	93967	119571	144261	185692
Gorkhalee/nepali	44445	61259	49186	52155
Hindi	17220	29728	38930	50055
Koch	13520	16150	18698	20834
Rabha	10841	13888	20455	22395
Other languages	22619	43158	42248	131604
Meghalaya	**1011699**	**1335819**	**1774778**	**2318822**

(Source: Census of India)

In the administrative divisions of the state also, out of the 11 constituting districts, 6 districts i.e. East Khasi Hills, West Khasi Hills, South West Khasi Hills, Ri-Bhoi, East Jaintia Hills and West Jaintia Hills, the medium of instruction is the Sohra dialect. In these districts majority of the population are the Khasi speaking people. Therefore, in light of the above-mentioned facts, it would be imperative that the receiving end of news and information would prove highly productive and beneficial if it were to devolve through the vernacular language of the target people who we have seen constitutes as a major stake holder as regards the state of the environment.

As far as the literacy rate is concerned, the following table will help us to gauge the percentage of literacy in the districts under study. The following data shows that the rate of literacy in both the rural and urban areas of the districts mentioned earlier is quite substantial:

Table 16.2 Showing the Percentage of Literacy by Area

District	1981			1991			2001			2011 (P*)		
	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban
1	2	3	4	5	6	7	8	9	10	11	12	13
Jaintia Hills	24.51	20.77	66.01	35.32	30.35	81.37	51.87	48.16	89.42	63.26	60.75	91.78
East Khasi Hills	43.73	31.95	65.26	60.04	46.36	83.68	76.07	66.85	87.66	84.70	78.64	91.55
West Khasi Hills	31.97	31.47	52.35	50.52	49.06	71.82	65.10	62.75	82.66	79.30	78.01	89.36
Ri-Bhoi	-	-	-	-	-	-	65.73	65.08	74.38	77.22	76.26	85.71
East Garo Hills	33.51	33.05	47.41	48.38	46.99	68.78	60.62	57.04	81.37	75.51	72.71	91.84
West Garo Hills	25.91	21.69	61.27	39.32	34.34	78.29	50.67	45.82	86.05	68.38	65.06	92.58
South Garo Hills	-	-	-	-	-	-	55.00	52.16	83.84	72.39	70.41	91.52
Meghalaya	34.08	27.45	64.12	49.10	41.05	81.74	62.56	56.29	86.30	75.48	71.15	91.33

(Source: Census of India)

P:- Provisional

Therefore it is safe to conclude that the vernacular media will find a niche in the literate population and serve as a medium not only to further the Khasi language in general, but particularly further the cause of environmental issues.

On a personal observation in and outside Shillong, during my tenure as a Public Relations Officer of a media department of the Government of Meghalaya, it is noted that the coverage of the newspaper is very wide. It is a practice, especially in rural areas that a newspaper is shared by many individuals thereby increasing the percentage of readership. Apart from this, the publishers have a wide network of vendors in all the important junction of the 6 districts.

Another factor which has to be kept in mind while considering the reach and impact of vernacular newspaper, is the number of Khasi dailies and weeklies in circulation, vis-a-vis the state based English papers. A conservative estimate puts the circulation of the Khasi newspapers in a very advantageous position.

Therefore it is a sound and rational idea that we need to reach out if we want the people, especially in the rural areas to get involved with the concept of Environmental Conservation and Preservation, we should enlist one of such medium i.e. newspapers, although they have been outdistanced by television in speed and visual punch, but they still provide greater depth with more lasting impact. This fact is substantiated by the growth of newspaper in the state of Meghalaya.

The conclusion regarding the role of the vernacular media as a vehicle to spread awareness to any area of concern holds good not only in Khasi language but would have done the same as in the case of Garo language, since local language is the medium of communication not only here but elsewhere.

Bibliography

- Jenkins, Nigel (1992) "*Thomas Jones and Wales*" in *'150 Years Souvenir of Khasi Literature (1842-1992)'*, Khasi Authors Society, Shillong, pp 1-8.
- Census of India quoted in *'Statistical Abstract Meghalaya 2012'*, Govt. of Meghalaya, Directorate of Economics & Statistics, Shillong.
- Khongwar, Francis, A. (1998) *'The Essence of Journalism'*, Shillong.
- K. J. P. Synod (1991) *'Sesquicentennial Jubilee Souvenir of the Presbyterian Church in Khasi & Jaintia Hills (1841-1991)'*, Labanya Press, Guwahati.

17

Food Security in India, Challenges and Recommendations

Bhupesh Doda
Kishore Kumar

Introduction

India is the home to more than 1.27 billion people distributed across the length and breadth of India. It is the second most populous country in the world and will overtake that of China by 2028. An already large population with high growth rate means addition of more mouth to feed year after year and a serious challenge for India. As per the Global hunger index, which measures the hunger situation of a country, India ranks 63. It is the worst performer among all the BRICS nations. The index score describes India's food security status as extremely alarming. The score has remained in the alarming category since 1995 and has only slightly improved. Table 17.1 shows Global Hunger Index of India and other BRICS nation. Countries with a GHI score of less than 5, implying they are doing very well, are not included in the ranking.

Table 17.1: Global Hunger Index 2013: BRICS Countries

Country	Rank (2013)	1990	1995	2000	2005	2013
Brazil	---	8.7	7.6	6.4	<5	<5
Russia	---	----	<5	<5	<5	<5
India	63	32.6	27.1	24.8	24.0	21.3
China	5	13.0	10.4	8.4	6.7	5.5
South Africa	4	7.2	6.5	7.4	7.7	5.4

Source: *2013 Global Hunger Index, IFPRI*

An Indian version of the Global Hunger Index is India State Hunger Index (ISHI) 2008. Table 17.2 presents the India State Hunger Index (ISHI) as well as its underlying components for the 17 major states in the country. It is to be observed that states like Madhya Pradesh, Uttar Pradesh and Maharashtra with very high population have performed poorly on this score, this highlights the severity of the problem.

Table 17.2: India State Hunger Index scores with its underlying component for various states

State	Prevalence of calorie undernourishment	Proportion of underweight among children <5 years	Under-five mortality rate, reported as deaths per hundred	India State Hunger Index score	India Hunger Index Ranking
Andhra Pradesh	19.6	32.7	6.3	19.54	3
Assam	14.6	36.4	8.5	19.85	4
Bihar	17.3	56.1	8.5	27.30	15
Chhattisgarh	23.3	47.6	9.0	26.65	14
Gujarat	23.3	44.7	6.1	24.69	13
Haryana	15.1	39.7	5.2	20.01	5
Jharkhand	19.6	57.1	9.3	28.67	16
Karnataka	28.1	37.6	5.5	23.74	11
Kerala	28.6	22.7	1.6	17.66	2
Madhya Pradesh	23.4	59.8	9.4	30.90	17
Maharashtra	27.0	36.7	4.7	22.81	10
Orissa	21.4	40.9	9.1	23.79	12
Punjab	11.1	24.6	5.2	13.64	1
Rajasthan	14.0	40.4	8.5	20.99	7
Tamil Nadu	29.1	30.0	3.5	20.88	6
Uttar Pradesh	14.5	42.3	9.6	22.17	9
West Bengal	18.5	38.5	5.9	21.00	8
India	**20.0**	**42.5**	**7.4**	**23.31**	

Source: *Menon, Deolalikar, Bhaskar, India State Hunger Index, Comparisons of Hunger Across States*

Both the index shows a very dire state of India. Considering the importance of this topic for the country it becomes imperative to study the current state of food security in India and key challenges that the country has to overcome. This research attempts to analyze the food security of India from a very comprehensive definition laid down by the World Food summit in 1996. The study will also look at the current macroeconomic factors and trends which directly or indirectly affect the food security status of the country. The later part of this research is focused on identifying the key challenges and recommendations for the same.

1. Elements of Food Security

In 1996, 180 nations including India participated in the World Food Summit at Food and Agriculture (FAO) headquarter to discuss ways to end hunger. One of the most important outcome of the summit was the emergence of a comprehensive definition of Food security. It says that food security "exist when all people, at all times have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences of an active and healthy life."

From the definition four main dimensions of food security can be identified, this is depicted in the figure 17.1:

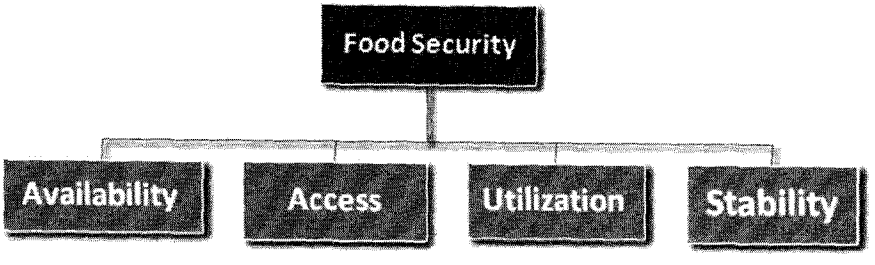


Figure 17.1: Four Pillars of Food Security

Availability of food refer to the supply side of food encompassing production, distribution and net trade. A country's food production is dependent on a number of factor such as land productivity, availability of labour, government agricultural policies, technology, climate, monsoon etc. But an adequate production of food does not necessarily means that the country is food secure which is generally the preconception. In most of the countries food production is concentrated in certain regions, it require a large and efficient distribution channel to transport food grains across the length and breadth of a country. In case of inadequacy of food due to varied reason, countries also engage in trade with other nations.

Adequate supply of food does not mean that all people will have economic and physical access to food. Income level of the people is the major factor affecting the access of good nutritious food. This is true in case of India where despite large production of food grain people don't have access to nutritious food, poverty being one of the major factor.

Utilization of food refers to the metabolism of food by the individual. Food preparation, diversity of diet, nutritional value of food, allocation of food to

household member etc. affects the health of the individual despite sufficient availability and adequacy of food.

The last pillar is the *Stability* which refers to the stability of all the above three dimensions over time. Inadequacy of food on a periodic basis due to weather conditions, economic condition, loss of breadwinner of family etc. affect the food security status of a family.

2. Current situation of Food Security in India

We will analyze the current situation of the food security in terms of the three pillars as defined in the earlier section on 'Elements of food security' namely availability, accessibility and utilization. The four pillar checks the stability of the other pillars over a period of time, we will go through this pillar as we analyze each of the other remaining pillar, and thus a separate section is not dedicated to this element of the food security. In each of the elements we will go through the major parameter which will more or less provides a best representation of the element under consideration.

Availability of Food

Table 17.3 shows the growth rate and yields of food grains, oilseeds and pulses (percent per annum). It can be observed that both food production and yields change in percentage forms for rice and wheat are higher in 1980-81 to 1989-90 time period than 1990-91 to 1999-2000 period, this might be due to the green revolution of 1970s but in the next decade, production and yield have not increased at the significant rate. Increase in the production of rice and wheat in the last decade is not a good story when compared with a significant growth in the population of the country. It can also be observed that cotton a significant cash crop have both increased in terms of production and yield in the last decade, this because of switch from food grain to farming to cash crop by farmer. Introduction of Beta cotton is also responsible for remarkable success of cotton production in India but this also endangers the production of food grains. Population is ever growing in India but production of food is not growing with the same speed and putting pressure on agricultural demand. The reason attributed for lower increase in productions of rice and wheat can be vulnerable conditions of farmers, farmers' suicide due to improper revenues from the farm yields, changing climate conditions, deteriorating soil quality etc. due to which crop productions is not increasing as desired/demanded.

Table 17.3: Growth Rate and yields of Food Grains, Oilseeds and Pulses (Percent per annum)

Crop groups/crops	Production			Yields		
	1980-81 to 1989-90	1990-91 to 1999-2000	2000-01 to 2013-14	1980-81 to 1989-90	1990-91 to 1999-2000	2000-01 to 2013-14
Rice	3.62	2.02	1.82	3.19	1.34	1.82
Wheat	3.57	3.57	2.65	3.10	1.83	1.29
Coarse cereals	0.40	-0.02	2.96	1.62	1.82	2.70
Pulses	1.52	0.59	3.72	1.61	0.93	2.10
Sugarcane	2.70	2.73	2.10	1.24	1.05	0.75
Oilseeds	5.20	1.63	4.71	2.43	1.15	2.31
Cotton	2.80	2.29	13.53	4.10	-0.41	9.99

Source: Department of Agriculture and Cooperation, GOI

Table 17.4 shows per capita availability of food grains in India. From the table it is evident that net availability of rice, wheat, cereals have increased from

Table 17.4: Per capita Net availability of Food grains Gin grams (Per Day) in India (1951 to 2010)

Year	Rice	Wheat	Other Cereals	Net Cereals	Gram	Pulses	Food Grains
1951	158.9	65.7	109.6	334.2	22.5	60.7	394.9
1961	201.1	79.1	119.5	399.7	30.2	69.0	468.7
1971	192.6	103.6	121.4	417.6	20.0	51.2	468.8
1981	197.8	129.6	89.9	417.3	13.4	37.5	454.8
1991	221.7	166.8	80.0	468.5	13.4	41.6	510.1
1992	217.0	158.6	58.9	434.5	10.1	34.3	468.8
1993	201.1	140.2	86.6	427.9	10.7	36.2	464.1
1994	207.4	159.5	67.1	434.0	11.8	37.2	471.2
1995	220.0	172.7	64.9	457.6	14.9	37.8	495.5
1996	204.4	176.0	62.0	442.5	11.3	32.7	475.2
1997	214.0	179.1	72.9	466.0	12.4	37.1	503.1
1998	200.3	151.5	62.4	414.2	13.4	32.8	447.0
1999	203.4	162.3	63.4	429.2	14.6	36.5	465.7
2000	203.7	160.0	59.0	422.7	10.8	31.8	454.4
2001	190.5	135.8	56.2	386.2	8.0	30.0	416.2
2002	228.7	166.6	63.4	458.7	10.7	35.4	494.1
2003	181.4	180.4	46.7	408.5	8.5	29.1	437.6
2004	195.4	162.2	69.3	426.9	11.2	35.8	462.7
2005	177.3	154.3	59.4	390.9	10.6	31.5	422.4
2006	198.0	154.3	60.5	412.8	10.7	32.5	445.3
2007	194.0	157.8	55.5	407.4	11.9	35.5	442.8
2008	175.4	145.1	54.1	394.2	10.6	15.3	436.0
2009	188.4	154.7	63.9	407.0	12.9	37.0	444.0
2010	184.8	167.9	54.3	401.7	13.5	35.4	437.1

Source: *Ministry of Agriculture, Govt. of India. (11349), (ON116), (13153) & (14268)*

post-independence period to pre- reforms period (1991). But post reform the net availability of these food grains per day had declined till 2007 with marginal increase in between. Availability of pulses which is major source of protein in Indian diet has significantly decreased after post-independence era. Figure 17.2 and Figure 17.3 shows the trend line of per capita net availability of cereals (rice, wheat and other cereals) and pulses from 1991 to 2010

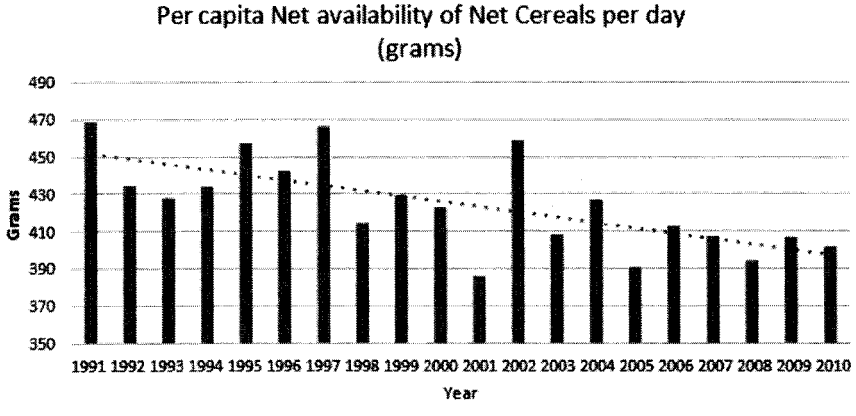


Figure 17.2: Per Capita availability of Net Cereals per day (grams)

Pulses are the major source of proteins in Indian food. Table 17.5 shows the alarming situation in case of availability of pulses in comparison to demand in 2015 and 2020. Besides Gram, India will have the deficit of all other pulses in future and for that India has to take some strategic steps.

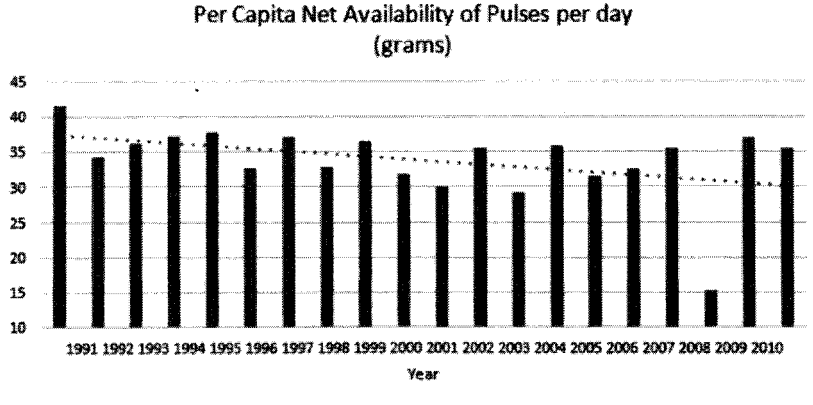


Figure 17.3: Per Capita availability of Pulses per day (grams)

Pulses are the major source of proteins in Indian food. Table 5 shows the alarming situation in case of availability of pulses in comparison to demand in 2015 and 2020. Besides Gram, India will have the deficit of all other pulses in future and for that India has to take some strategic steps.

Table 17.5: Supply- Demand Gap Projections of major pulses in India (Million tons)

Pulses	Moderate GDP growth scenario		High GDP growth scenario	
	Year-2015	Year-2020	Year-2015	Year-2020
Arhar	-2.47	-2.76	-3.18	-3.90
Gram	3.04	2.81	2.55	1.96
Masur	-1.25	-1.37	-1.50	-1.81
Moong	-0.98	-1.10	-1.28	-1.57
Urad	-0.64	-0.78	-1.01	-1.36
Other pulses	-0.37	-0.62	-0.89	-1.67
Total pulses	-2.67	-3.80	-5.32	-8.35

Source: *D.R. Singh, Demand Projections for food commodities, IASRI*

Table 17.6 shows the per capita availability and deficit of Milk and egg. India is still not self-sufficient in the non-cereal based food and has to increase the production significantly to meet the rising demand due to increase in the disposable income of major population of India.

Table 17.6: Per capita Availability and Deficit of Milk and Egg in 2012

Food items	Per capita availability	ICMR dietary guidelines for Indian	Per capita deficit
Milk	281 grams/day	300 millilitre/day	34 grams/day
Egg	53 eggs/annum	180 eggs/annum	150 eggs/annum

Accessibility

Table 17.7 shows food inflation in India from 2006-07 to 2010-11. It can be observed that the food inflation in the country is in the double digits. This creates an economic barrier for the poor class and middle class family to get access to good nutritious food. Food inflation was highest in 2010, came down significantly in January 2012 but again rose to double digit in no time.

Table 17.7: Food Inflation in India

Year	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Food Articles	7.78	7.78	9.1	15.3	15.6	7.29	9.89	12.76

Source: *India Wholesale price index (WPI), until Jan 2014*

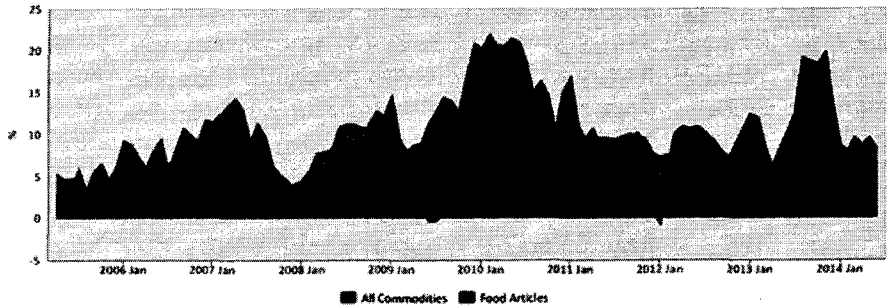


Figure 17.4: India's Inflation Rate and Food Inflation

Over the years there has been a significant decline in the poverty rate in India. In 2005, 41.6% of total Indian population were earning below the poverty line of $1.25 a day (PPP) and this proportion was 32.7 % in 2010. This estimates depends on the definition of poverty used. The estimates based on Rangarajan committee is 29.5% percent in 2011-12, earlier it was estimated to be 21.9% by Tendulkar committee. The sheer difference just from the evaluation is evident from this estimates.

Table 17.8: Growth of Rural Employment

Sector	1972-73/77-78	1977-78/83	1983/87-88	1987-88/93-94	1993-94/99-2000	1999-00/2004-05	2004-05/2009-10	1972-73/83	1983/93-94	1993-94/2004-05	1999-00/2009-10
Primary Sector	1.66	1.49	0.28	2.17	0.20	1.29	-1.65	1.60	1.35	0.69	-0.19
Mining & Quarrying	5.82	6.11	5.58	1.09	-1.25	2.11	5.21	6.09	2.99	0.26	3.65
Manufacturing	5.36	3.50	4.33	0.35	1.62	4.09	-2.74	4.47	2.04	2.74	0.62
Utilities	17.17	1.66	11.12	5.15	-8.29	1.83	1.19	8.95	7.66	-3.82	1.51
Construction	0.92	6.32	18.45	-3.50	6.44	10.50	13.61	3.79	5.36	8.27	12.04
Secondary Sector	4.71	4.08	7.57	-0.53	2.55	6.03	4.65	4.47	2.87	4.11	5.34
Trade, Hoteling etc.	7.62	3.19	4.06	3.37	3.76	6.23	0.66	5.38	3.67	4.88	3.41
Transport & Communication etc.	6.77	8.07	5.13	3.79	6.75	6.33	2.58	7.60	4.36	6.56	4.44
Financing, Insurance, Real estate & business services	10.62	15.32	-7.21	4.45	4.27	8.41	2.07	13.33	-0.72	6.13	5.20
Community, social and personal services	4.08	2.26	0.40	5.99	-0.99	1.38	0.16	3.19	3.56	0.08	0.77
Tertiary Sector	5.72	3.58	2.13	4.64	2.12	4.52	0.90	4.69	3.56	3.20	2.70
All Non-Agricultural	5.23	3.82	4.91	1.98	2.32	5.25	2.83	4.58	3.22	3.64	4.03
Total	2.21	1.89	1.19	2.12	0.67	2.29	-0.34	2.08	1.72	1.40	0.9

Source: *based on NSS data on employment and unemployment*

Table 17.9: Growth of Urban Employment

Sector	1972-73/ 77-78	1977-78/83	1983/ 87-88	1987-88 / 93-94	1993-94/99-2000	1999-00/ 2004-05	2004-05 /2009-10	1972-73/83	1983/ 93-94	1993-94/ 2004-05	1999-00/ 2009-10
Primary Sector	5.01	3.27	0.42	1.99	-3.48	4.47	-1.17	4.18	1.32	0.05	1.61
Mining & Quarrying	1.54	9.23	4.88	2.79	-3.69	3.00	-1.87	5.61	3.68	-0.70	0.53
Manufact uring	5.51	2.65	5.01	-0.26	1.63	6.05	0.45	4.08	1.97	3.61	3.21
Utilities	-8.86	24.12	4.73	3.77	-4.16	4.05	0.93	7.29	4.18	-0.51	2.47
Construction	2.90	7.62	5.91	6.26	6.29	4.68	6.60	5.45	6.11	5.56	5.64
Secondary Sector	4.86	3.80	5.13	1.04	2.32	5.60	2.01	4.39	2.77	3.80	3.79
Trade, Hoteling etc.	5.50	2.61	3.88	3.82	8.08	2.53	1.43	4.05	3.85	5.52	1.98
Transport & Communication etc.	5.96	4.02	1.78	3.59	3.94	4.36	1.77	5.04	2.81	4.13	3.06
Financing, Insurance, Real estate & business services	5.73	4.45	5.43	5.49	5.59	9.96	6.67	5.16	5.47	7.55	8.30
Communi ty, social and personal services	2.52	3.66	0.24	7.24	-1.87	3.75	1.58	3.17	4.18	0.65	2.66
Tertiary Sector	4.23	3.38	2.10	5.32	3.37	3.78	2.06	3.86	3.93	3.56	2.92
All Non-Agricultur al	4.47	3.54	3.33	3.61	2.99	4.44	2.04	4.06	3.49	3.65	3.23
Total	4.55	3.50	2.91	3.40	2.30	4.44	1.78	4.08	3.19	3.27	3.10

Source: *based on NSS data on employment and unemployment*

Table 17.8 and Table 17.9 shows that overall growth in employment in urban area is more than the growth in the rural area. In rural area, employment in the non-agricultural sector growth is significantly higher than the growth in employment in same sector in the urban area. Aggregate employment in rural areas grew at a rate of 2.1 per cent during 1972-73/83, but saw a decline to 1.7 and 1.4 per cent in the two subsequent periods. It has declined in absolute terms during 2004-05/2009-10 at a rate of 1.65 per cent per annum. Urban employment growth has been higher in all periods, but saw decline in growth rate from 4.1 during 1972-73/83 to 3.2 per cent during 1983/93-94 recovering slightly to 3.3 per cent during the next period.

Employment in all non-agricultural activities together grew at 4.58 percent per annum in rural areas and 4.08 per cent per annum in urban areas during 1972-73/1983; growth rates for rural and urban areas were similar at 3.65 during 1994-2005. Only during 1983/93-94 urban growth rate was higher at 3.5 as compared to 3.2 for rural areas. Again, during 2005-10, rural areas did better than the urban areas in growth of non-agricultural employment.

After going through the parameters representing the economic accessibility of food, we will now go through the parameters affecting the physical accessibility of food. Public Distribution system in India plays a very important role in combating food insecurity by providing basic food articles at affordable price at very convenient locations in the form of fair price shops.

The percentage of food grains accessed through PDS shows the effectiveness of this system. The overall share of rice and wheat consumption through PDS has increased significantly, but this increase in share is not consistent in each state. Andhra Pradesh, Chhattisgarh, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Odisha and Tamil Nadu are the states where share of PDS has increased significantly more than the other states. In these states the PDS seems to be functioning very well.

Table 17.10: The Share of the PDS in Rice and Wheat Consumption in Different States, 1993-94 to 2009-10

State	Rice		Wheat		Rice and Wheat	
	1993-1994	2009-2010	1993-1994	2009-2010	1993-1994	2009-2010
Andhra Pradesh	20.6	29.7	9.1	4.0	20.4	28.5
Assam	3.2	10.4	2.7	1.3	3.1	10.0
Bihar	0.2	4.7	0.3	4.8	0.3	4.7
Chhattisgarh	2.2	38.8	2.4	28.7	2.3	37.7
Gujarat	20.1	13.7	0.4	10.5	6.6	11.4
Haryana	4.3	0.5	0.0	12.4	0.4	11.4
Himachal Pradesh	32.5	43.3	0.3	44.3	12.3	43.9
Jammu & Kashmir	5.5	53.4	0.3	32.5	2.2	46.9
Jharkhand	0.3	12.7	1.9	15.4	0.7	13.5
Karnataka	14.5	34.5	1.4	26.1	12.5	32.9
Kerala	44.4	26.2	13.7	27.1	41.8	26.3
Madhya Pradesh	3.6	17.2	0.2	19.7	2.0	19.2
Maharashtra	13.4	22.4	0.3	21.4	7.2	21.8
Odisha	0.8	22.9	5.1	12.6	0.9	22.3
Punjab	2.3	0.1	0.1	12.7	0.3	11.5
Rajasthan	7.4	0.3	0.1	9.3	0.3	9.0
Tamil Nadu	17.9	47.6	2.8	51.8	17.1	47.9
Uttar Pradesh	3.2	16.1	0.0	6.8	0.9	10.0
Uttarakhand	45.9	19.6	0.2	13.2	20.6	16.0
West Bengal	1.7	5.3	2.0	28.3	1.7	8.3
All India	**9.9**	**21.7**	**0.4**	**12.7**	**6.0**	**17.8**

Source: *Estimates of Anjani Kumar et al., 2012, using NSS data*

From Table 17.10 it can be seen that PDS has not performed well in the states of Assam, Bihar and Uttar Pradesh. This limits the access of food grains to this region. PDS need to be made more effective in these states as large proportion of population in this region are poor and requires affordable food grains.

Utilization

Now we will go through the third pillar of food security. The data provided by the National Family Health Survey (NFHS) as shown in Table 17.11 indicates that the proportion of underweight children declined marginally from 47 percent in 1998-99 to 45.9 percent in 2005-06. Although it has declined but still the percent is too high and very dangerous for the country. But the percentage of children reported to be wasted in 1998-99 was 15.5 percent and increased to 19.1 percent in 2005-06.

Table 17.11: Trends in Child Malnutrition (0-3 years) (%)

Nutritional Parameter	1992-93 NFHS-1	1998-99 NFHS-2	2005-2006 NFHS-3
Stunted	52.0	45.5	38.4
Wasted	17.5	15.5	19.1
Underweight	53.4	47.0	45.9

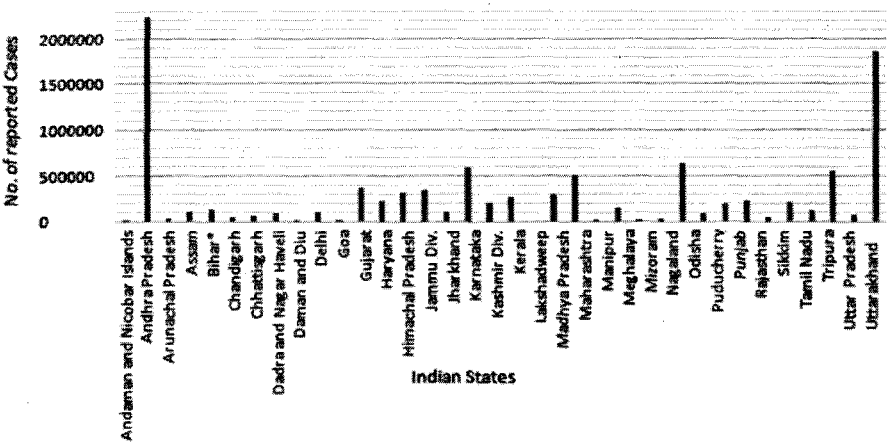
Table 17.12 shows per capita energy supply and prevalence of under-nutrition in total population. It can be seen that dietary energy supply (Kcal/day) for each individual has increased from 2370 in early 90's to 2550 in 2008 in India and also the undernourishment has also came down from 25% for total population in early 90's to 20% in 2008. But India is still home to 1/5th of the world's undernourished population. This huge undernourished population can be ascribed to increasing population where 16million people being added annually to already huge population of India which is exceeding 1.2 billion. Distribution problems and not having proper economic access to food also aggravate the problem of hunger and malnutrition in India.

Table 17 .12: Per Capita Dietary Energy Supply and Prevalence of under-nutrition in Total Population

Year	Dietary Energy Supply (Kcal/day)	Undernourishment in the Total Population (%)
1990-92	2370	25
1995-97	2450	21
2002-04	2450	20
2006-2008	2550	20

Source: *FAO, RAP, 2007/15 and FAO Year Book 2012*

Utilization and absorption of food and nutrients depends on the overall health of the country as well. Figure 17.5 shows total number of reported cases of diarrhoea in 2011, out of this reported deaths were 1269. Andhra Pradesh and West Bengal have very high number of such cases. It is to be noted that this are the reported cases, unreported cases are much higher. 88 % of diarrhoeal deaths are due to lack of sanitation facilities, inadequate availability of water for hygiene and unsafe drinking water. Table 17.13 shows some of the sanitation statistics of the country. As per the Baseline Survey 2012, 54.28% of households don't have toilets, 4.72% of the government schools don't have toilets. As per the Census 2011, 82.4% of the population comes under National Drinking water coverage and only 46.9 comes under National Sanitation Coverage. Literacy rate of India in 2011 is 74.04% which is lower than the world average of 84%. A huge gap exit between the literacy rate of male and female, male literacy rate is 82.14% and female literacy rate is 65.46%. Women empowerment, literacy being most powerful tool, directly affect the nutrition of their children and also that of the family. Access to clean drinking water, lavatory, sanitation facility, education of the mother are some of the other parameters which directly or indirectly affect the utilization of food by the household.



Source: *Ministry of Health & Family Welfare, Govt. of India*

Figure 17.5: Reported cases of Diarrhoea in 2011 for Indian States

Table 17.13: Sanitation Statistics of India

As per Baseline Survey 2012- All India Abstract Report	
Category	**Percentage**
Households not having Toilet	54.28
Govt. Schools without Toilet	4.72
Govt. Schools without water facility	12.15
Private Schools without Toilet	10.08
Private Schools without water Facility	9.89
As per Census 2011	
National Drinking Water Coverage	82.4
National Sanitation Coverage	46.9
Open Defecation (National)	49.2
Rural Sanitation Coverage	30.7
Urban Sanitation Coverage	81.4
Rural Drinking Water Coverage	77.9
Urban Drinking Water Coverage	91.9

2. Policies and Measures by Government of India

A large section of the Indian population is still under the shackles of poverty and hunger. Food security is still a major concern for the government of India, this has led to various schemes and measures targeted toward agriculture sector and aims to increase the agriculture output of the country. Indian government has taken varied measures and policies to combat the issue of food insecurity in the nation.

One of the most important measure taken by the government is the *National Food security Act 2013*. It is the most controversial and hotly debated act in India. It aims to provide subsidized food grains to two third of India's population. Beneficiaries can purchase 5 kg food grain per month at very nominal price (rice at 3Rs per kg, Wheat at 2Rs per kg, coarse grains at 1Rs per kg). Opponent of the act argue that this will increase the food inflation, fiscal deficit and restricts private players in the agriculture sector. Considering the dire state of food security in India, despite a negative impact on the economy, this act is essential for the country. Other schemes include *National Food Security Mission* (NFSM) which was launched on October 2007 with the aim to increase annual output of essential food grains. The mission during the 12th Fiver year plan targets production of 10 million tons of rice, 8 million tons of wheat, 4 million tons of pulses and 3 million tons of coarse cereals. *Rashtriya Krishi Vikas Yojana* is another program by the GOI which aims to increase the overall growth of agriculture sector by taking into

account agro-climatic conditions, natural resources issues and technology and integration of livestock, poultry and fisheries. *Rainfed Area Development Programme* focuses on improving farm returns and overall agriculture produce of the country. *ISOPOM* was launched to increase the production and productivity of oil seeds and later pulses, oilpalm and maize were included in the scheme. *Graming Bhanadran Yojana* provides support to an individual, farmer, company, local government, NGOs if they build or renovate rural godowns. As per the yojana government will provide 25% of the total capital investment in such cases. Apart from this scheme which focuses on improving agriculture output, GOI has introduced provisions to provide more protection to farmer through measures such as easy availability of farm credit, Farmer's debt waiver scheme, loan waiver in certain cases, crop insurance schemes, subsidized fertilizers, enhanced production and distribution of quality seed etc.

Public distribution system in India is the major food security system which provides subsidized food and non-food items through a wide network of public distribution shops also known as ration shops. Food Corporation of India is the body responsible for maintaining the PDS system. Beneficiary can procure wheat, rice, sugar and kerosene a very nominal prices. Despite its mammoth structure PDS is suffering from loopholes such as corruptions, efficient supply chain and poor storage facility.

Integrated Child Development Services (ICDS) is a social welfare scheme especially targeted towards children under the age of six to tackle malnutrition and health problems. Pregnant and lactating mother and adolescent girls are also the beneficiary of the scheme. The scheme provides services such as Immunization, medical checkup, supplementary nutrition and health information to mothers. Another such scheme targeted towards children is the *Mid Day meal scheme*. Under this scheme children under government aided schools and educational centers receive free lunches on working days. It is the largest such program in the world.

We have covered in this section some of the major policy measure by the government of India, apart from this there are other initiatives both by the central and state government which directly or indirectly affect the food security status of India.

3. Macro-Economic Factor Analysis:

Food security of a country is dependent on many macroeconomic factors. PESTLE Analysis is one of the widely used framework used in management to analyze macroeconomic factors affecting a business. PESTLE is a mnemonic which in its expanded form denotes P for political, E for Economic, S for Socio-Cultural, T for technological, L for legal and E for Environment. We will use this framework here to analyze the factors affecting the food security in India. This analysis more or less covers all the factors affecting food security in India.

Political

1. India is a democracy where public plays a major role in deciding the government at the center. The issue of food security is very often raised by all the political parties to gain public sentiments which may be positive or negative but the point is that the issue of food security is always given due importance. Government plays a major role in affecting the food security status, this is also evident from some of the recent policy such as Midday meal and national food security act 2013.
2. Corruption is one of the major ill affecting the economy and common man. Most of the public sector enterprises are plagued by corruption, this is true in case of public distribution systems as well. India ranks 94th out of 177 countries in terms of corruption perception index.
3. Indian government controls what will be subsidized, how much will be subsidized and who will be the beneficiary. Some of the subsidy program affecting food security includes PDS (Public Distribution system), Fertilizer, ICDS (Integrated Child Development Scheme), Maternal and child malnutrition program etc.

Economic

1. Food inflation is still high in the country. Despite many government checks and control it remains a major concern for common man. It reached an all- time high of 14.72 percent in November 2013
2. With the rise in GDP of India, per capita income is also on the rise. But significant disparity exit among Indian states in terms of average income.
3. Unemployment rate in India is on the decline over the last few year. It is 5.2% in 2012 from 6.3% in 2011. Unemployment rate averaged 7.58% from 1983 until 2012, reaching an all-time high of 9.4 % in 2009 and a record low of 5.2% in 2012
4. Cost of labour is low in India, this has encouraged many businesses to set up their operation in India
5. Gini coefficient, a well-accepted measure of income inequality, of India is 0.33 in 2010. But as per the National sample survey data for 2011-2012, the coefficient rose to 0.28 in 2011-12 from 0.26 in 2004-2005 and to an all-time high of 0.37 from 0.35 in urban areas

Socio- Cultural

1. India has the second highest population in the world with 50% of

the population below the age of 25. About 72.2% of the population lives in villages and rest 27.8% in towns and urban agglomerations

2. Poverty rate in India has declined over the year but this is subjected to the definition of poverty used. As per the data released by planning commission in 2012, poverty has declined from 37.2 % in 2004-05 to 21.9% in 2011-12. A revised definition of poverty by Rangarajan committee estimate poverty rate of 29.5% in India
3. Literacy rate of India has increased to 74.04% in 2011 from 65.38% in 2001, an increase of 9% in the last 10 years. But it worst of all the BRICS nation (Russia: 99.6%, China: 94.3%, Brazil: 90.3%, South Africa: 88.7%)
4. Migration of people from villages to urban city is very high in the country. It is estimated that almost a third of Indians (some 325 million people, out of a population of 1.14 billion in 2008) are migrants. This puts a huge pressure on the urban cities and town. A migrant cannot access subsidized food through PDS.
5. High rate of migration from rural to urban areas also adds to the slum population. As per the Ministry of Housing & Urban poverty alleviation, India's projected slum population will be 12% higher than its 2011 figure
6. About 65% of the population relies on agriculture for employment and livelihood

Technological

1. India ranks second worldwide in farm output this has been achieved thorough the green revolution of 1970s. But considering the future requirement of growing population, agriculture output need to be increased substantially. Agriculture sector need to adopt newer technology and new farming skill. Productivity of Indian farm is below that of Brazil, US, France and other nations.
2. IT/ITES firm are on a high growth trajectory in India. The industry grew at a CAGR of 13.1% during FY08-13
3. Use of Genetic modified crops in India and in other nation have always grabbed the attention of public, NGOs and activist. Use of Beta cotton have tremendously increased the cotton yield. Government have time and again employed restriction in this field
4. The number of mobile phone users in rural is increasing at a substantial rate. As per TRAI, total number of rural subscriber as of March 2014 are 377.73 million (wireless customers: 371.78 million, wireline users: 5.96 million)

Environment

1. Agriculture sector is highly dependent on monsoon which is becoming highly uncertain year after year. About 64% of cultivated land in India is dependent on monsoons
2. As with any other country, India is also facing the problems of climate change

Legal

1. Government of India passed National Food Security act in 2013 to combat the dire state o food security in India
2. Apart from the act, Mid-Day meal scheme have made it obligatory for the government aided schools and educational centers to provide free lunch for children on working days
3. Movement of agricultural produce within India is heavily regulated, with inter-state and even inter-district restrictions on marketing and movement of agricultural goods

5. Key Challenges

In this section we will go through some of the key challenges in the food security we have identified from our research. Each of the mentioned challenges directly affect one or more of the more elements of the food security, i.e. Availability, Accessibility, Utilization and Stability. Following are the key challenges affecting food security status of India:

Heavy Dependence on Monsoon and Climate Change

Indian agriculture is heavily dependent on monsoon, around 60% of the irrigated land is cultivated by the annual rainfall. Any changes in the monsoon pattern will directly affect the agriculture output and availability of food grains to the public. Around 60 per cent of the total foodgrains and oilseeds produced in India are grown in the kharif season. This increases the vulnerability of the farming output as kharif crops are sown in the monsoon season, thus the harvest depends on the success of monsoon. Indian Meteorological Department (IMD) have recorded significant warming of temperatures, lower mean rainfalls and higher rainfall variability over successive plan periods. Three of the 5 years of the Eleventh Plan period had annual rainfall less than 95 per cent of the long period average (LPA), as compared to 5 in the previous 15 years (Twelfth Five Year Plan, Vol. II: 2-3). The LPA of the season rainfall over the country as a whole for the period 1951-2000 is 89 cm. Table 14 shows a very high rainfall departure in the current year.

Table 17.14: Category-wise Rainfall Distribution in Subdivisions and Districts and All India Rainfall Departure from normal 2009-14 (cumulative rainfall since 1 June)

Category	11.6.2014	12.6.2013	13.6.2012	08.6.2011	09.6.2010	10.6.2009
Number of subdivisions						
Excess/normal	8	30	23	3	11	2
Deficient/scanty	28	6	8	19	19	18
No rain	0	0	5	14	6	16
Rainfall departure from normal (%)	**-44**	23	-42	17	-6	-39
Percent Distribution of Districts						
Excess/normal	20	62	15	48	33	25
Deficient/scanty	50	32	63	34	39	47
No rain	30	6	22	18	28	28

Source: *IMD, Weekly Report dated 11.06.2014*

Notes: Excess: +20% or more; Normal: +19% to -19%; Deficient: -20% to -59%; Scanty: -60% to -99%; No rain: -100%.

One of the most important kharif crop, rice is affected by the inadequacy of rainfall in 2014. Although overall rice yields have increased, rising temperatures with decreasing rainfall have caused significant loss in India's overall rice production. Rice yields could have been 6% higher if these adverse climate change were not affecting the production. Other important crop which is affected by climate change in wheat. Before 2001, India was enjoying a good production of wheat because of increase in the yield of wheat but after 2001 yields have not increased with the same rate. The main reason attributed to this is the rising temperatures in northern India, a region heavily employed in the wheat production.

Growth Rate of Productivity

Another important trend which will severe consequences on the availability of food in the country is the decline or stagnant growth rate in the yield of major crops. Productivity of India farm are far below the global standards. It is observed that the productivity levels of rice and wheat have declined after the green revolution of the 1980s. Although the growth in terms of production and yield of pulses have increased in the last decade, it is still inadequate considering the current rise in population.

Increase in Cash Crop

There is also a change in the cropping pattern have taken place in the last decade. Food grains and less remunerative crops are replaced by cash crops. This

directly affect the annual food production and security of farmers (home consumption) in case a cash crop fails.

Increase in Economic Barrier to Access Foodgrains

As seen in Table 17.7 food inflation has increased very rapidly in the last decade, due to which in spite of good annual production of foodgrains and increase in the per capita income, malnutrition rate among women and children have not reduced significantly. India's GDP has grown at 6 to 7 per cent per annum during 1992-93 to 2005-06 and with a decent rate during the last four years, but the per cent of underweight children in India declined only one percentage point from 47 per cent in 1998-99 to 46 per cent in 2005-06 in spite of high economic growth. Table 15 shows under nutrition by wealth categories (as per NFHS-S)

Table 17.15: Under Nutrition by Wealth Categories: Proportion of Children Undernourished

Wealth Category	Children Undernourished (%)
Lowest	56.6
Second	49.2
Third	41.4
Fourth	33.6
Highest	19.7
All Categories	42.5

Source: NFHS-3

Physical Barrier to Access Foodgrains

As much as 1,94,502 metric tons of food grain worth crores of rupees was wasted in India due to various reasons between 2005 and March 2013. The main reason for this loss is the poor storage facility. This drastically reduces the amount of food available in the supply and enhances out of stock situation in ration shops. India's public distribution system aimed to provide access to food grain to the large population of India especially population below poverty line is plagued with poor infrastructure and corruption. About 61% of population who use PDS have a perception that the system is corrupt.

Improper Utilization of Food

As mentioned in the figure 5 above, there are huge number of diarrhoea cases and deaths mainly in Andhra Pradesh, Tamil Nadu and Uttar Pradesh which shows the huge deficiency of sanitation condition in these states. Not only these,

but many other states have high number of unreported cases of diseases arising from improper sanitation conditions. These unhygienic conditions make it more difficult to utilize the food which is being made available to poor families at subsidized rate to alleviate the food insecurity in the country.

6. Recommendations

From the research it is quite evident that strengthening of the agricultural sector is very important for the proper availability, accessibility (both economic and physical) and utilization of food and alleviation of food insecurity in India.

On one hand India is largely self-sufficient in food with high food inflation on other hand which is due to the fact that government is the largest buyer. Therefor role of government becomes very important in tackling the problem of food insecurity in India with respect to availability, accessibility and utilization of food in efficient manner.

Following are the some recommendations regarding the availability, accessibility and utilization of food.

For Availability of Food

1. NBS policy is the recommendation of the Task Force for Direct Transfer of Subsidy under the chairmanship of Nandan Nilekani. Urea, which is a major portion of fertilizers can be brought under this scheme and fertilizers subsidy can be extended to farmers directly without interventions of any middle agents. This will help in proper use of fertilizers and increased productivity of the food articles.
2. Under the effect of Bali package and pressure from WTO regarding reducing the subsidy on food, India is in dilemma which way to go. India has introduced Food security Act 2013 and for proper implementation of which, it has to increase the subsidy on food and will take the burden more than 10% on food subsidy which has been set as limit by WTO for any country. Under this situation India can introduce Red subsidy and extend the concept of Direct Cash Transfer to farmers as an alternative to MSP.
3. Agriculture should be seen as combination of many industries not as single industry. Agriculture industry is supplier of many big industry and without agriculture all the dependent industries will suffer very badly. It has to be viewed as main component of value chain in all the big dependent industries comprising of farming, wholesaling, warehousing, logistics, processing, and retailing including exports. Creating private markets for all these agriculture dependent value chain activities will bring in more competition and promote efficiency and growth.

4. According to Census 2011, around 10.4 percent of total households in rural area are being headed by woman. Some agricultural policies should be formed keeping in view the productive role played by women in all the segments agricultural sector. Also it has been seen in the BRICS countries that enhancing agricultural industry by 1% is at least two to three times more effective in reducing poverty than the same growth happening in non-agricultural sectors.
5. New and innovative solutions for water management and improving soil fertility is the another way for reducing the burden on environment for food production. Self-sufficient village with rain water harvesting can solve the problem of over-dependency on rain for agricultural production and increase the overall productivity.
6. Government should invest in R&D for the better availability of genetically modified seeds, improved fertilizers and high tech machinery which will further increase the productivity for the already shrinking agricultural area.

For Accessibility of Food

1. The concept of decentralized procurement (DCP) should be extended to all the states. This would save transport costs, transit losses, and other leakages and simultaneously increase food availability, reduce food prices in the open market, and ultimately reduce the food subsidy.
2. Next is the Improvement of income of poor. Per capita income has increased over the years but this increased income is not properly distributed. Poor people are still poor and don't have the economic power to access the required amount of food. To improve the income levels among the bottom of the pyramid, more schemes like NREGA should be implemented with more efficiency and better control over corruption. Encouraging rural people in non-farm sector is another good way to increase employment level for rural people who are mostly dependent on agricultural jobs for livelihood.
3. Creation of cooperative like AMUL for selling of agricultural produce is the recommendation for farmers so that they can fetch deserving price for their work.
4. Organic farming should be encouraged among the farmers to increase the income level in rural area.
5. Fair price shops in each state should be reviewed for proper functioning, storage conditions and availability of proper equipment required for the distribution of foodgrains.

For Utilization of Food

1. Focus more on nutrient rich foodgrains such as Ragi. These foodgrains are easy to cultivate, non-expensive and highly rich in nutrients which can help in alleviating the problem of malnutrition among children.
2. Implementation of ICDS more aggressively in the states and regions where cases of malnutrition among children are not in control.
3. Proper assessment and monitoring of mid-day meal schemes in schools and periodic checkups of children for any signs of malnutrition and work on the results.
4. For proper utilization of food government should also take care of the sanitation conditions in the states where conditions are not good. Providing even more aggressive health facilities to these states can improve the condition of utilization.

References

FAO, (Nov. 1996). *Report of the World Food Summit.* Available at < http://www.fao.org/docrep/003/w3548e/w3548e00.htm#AnnexIV >. [Accessed 9 July 2014]

FAO. *Food Security Information for Action, Practical Guides.* Available at < http://www.fao.org/docrep/013/al936e/al936e00.pdf > [Accessed 9 July 2014]

Karhad, B.D. (2014). *Food Security in India: Issues and Measures.* Available at <http://www.theglobaljournals.com/ijar/file.php?val=April_2014_1398841226 14a59_30.pdf > [Accessed 10 July 2014]

Ministry of Agriculture, Government of India. *National Food Security Mission.* Available at <http://www.nfsm.gov.in/ >. [Accessed 9 July 2014]

Department of Agriculture and Cooperation. *Rashtriya Krishi Vikas Yojana..*Available at <http://rkvy.nic.in/# >. [Accessed 10 July 2014]

Department of Agriculture and Cooperation. *Farmer's access to agriculture credit.* Available at <http://agricoop.nic.in/imagedefault/credit/Agriculture-Credit-Overview.pdf >. [Accessed 11 July 2014]

Press Information Bureau, Government of India. *Farmers'Debt WAIVER Scheme- Text of the FM's Statement* .Available at <http://pib.nic.in/newsite/erelease.aspx?relid=39122 >. [Accessed 11 July 2014]

Department of Fertilizers, Government of India. *Fertilizer Policy.* Available at <http://fert.nic.in/page/fertilizer-policy >. [Accessed 12 July 2014]

Department of Agriculture and Cooperation. *SEEDS.* Available at <http://agricoop.nic.in/AnnualReport06-07/SEEDS.pdf >. [Accessed 12 July 2014]

Ministry of women and child development. *Integrated Child Development Scheme.* Available at <http://icds.gov.in/ >. [Accessed 12 July 2014]

Ministry of Human Resource Development. *Mid Day Meal Scheme.* Available at <http://mdm.nic.in/ >. [Accessed 12 July 2014]

UN World Food Programme. Available at < http://www.wfp.org/ >. [Accessed 18 July 2014]

UN World Health Organization. *Global Database on Child Growth and Malnutrition, 2006.* .Available at < http://www.who.int/nutgrowthdb/en/ >. [Accessed 13 July 2014]

UN Food and Agriculture Organization. *SOFI 2006 Report.* Available at < http://www.fao.org/3/a-a0750e/ >. [Accessed 13 July 2014]

Ministry of small scale and medium enterprise. *National Commission for Enterprises in the Unorganized Sector (India).* Available at < http://nceuis.nic.in/ >. [Accessed 13 July 2014]

Ministry of Health and Family Welfare, GOI. *National Family Health Survey 2005 Â– 06 (NFHS-3) (India).* Available at < http://dhsprogram.com/pubs/pdf/SR128/SR128.pdf >. [Accessed 14 July 2014]

Centre for Environment and Food Security (India). Available at < http://www.cefs-india.org/pressrelease.html >. [Accessed 14 July 2014]

Rural 21, The International journal for rural development. Available at < http://www.rural21.com/english/opinion-corner/detail/article/empowering-rural-women-in- india-its-high-time-00001054/ >. [Accessed 15 July 2014]

Transparency International. *Corruption Perceptions Index 2013.* Available at < http://cpi.transparency.org/cpi2013/results/ >. [Accessed 15 July 2014]

Trading Economics. *Unemployment rate in India.* Available at < http://www. trading economics.com/india/unemployment-rate >. [Accessed 15 July 2014]

Business Standard. *Rich-poor gap widens in India.* Available at < http://www. business-standard.com/article/economy-policy/rich-poor-gap-widens-in-india-113081000072_1.html >. [Accessed 17 July 2014]

Ministry of Home Affairs, Government of India. *2011 Census.* Available at < http://censusindia.gov.in/ >. [Accessed 18 July 2014]

United Nations Development Programme in India. Available at < http://www.in. undp.org/content/india/en/home.html >. [Accessed 20 July 2014]

Confederation of Indian Industry. *Agriculture.* http:/ www.google.co.in/url?sa= t&rct=j&q =&esrc=s&source=web&cd=11&ved=0CFMQFjAK&url=http%3 A%2F%2F www.cii.in%2Fsectors.aspx%3FSectorID%3DS000000018&ei=zXzgU7eg JIe_uATUpICoBA&usg=AFQjCNGR8xVPaft- 8a2NZ0IcVpAgUkgaog&sig2= O8ph8FUpUnpbw8t8dH_EWg&bvm=bv.72197243,d.c2E >. [Accessed 26 July 2014]

India Brand Equity Foundation. *IT & ITes Industry in India* Available a <http://www.ibef.org/industry/information-technology-india.aspx >. [Accessed 22 July 2014]

Mahadevan, Renuka. (Dec.2003). *Productivity growth in indian agriculture: the role of globalisation and economic reform.* Asia-Pacific Development Journal **10** (2): 57–72.

World Bank. *Poverty & Equity, India.* Available at: <http://povertydata. worldbank. org/poverty/country/IND >. [Accessed 22 July 2014]

THE HINDU. *FCI admits 1.94 lakh MT foodgrain wasted between 2005-13.* Available at < http://www.thehindu.com/news/national/fci-admits-194-lakh-mt-foodgrain-wasted-between- 200513/article5680994.ece >. [Accessed 26 July 2014]

World Bank. *India: Climate Change Impacts.* Available at < http://www.worldbank. org/en/news/feature/2013/06/19/india-climate-change-impacts>. [Accessed 22 July 2014]

Mishra, S.K. *Trends in Growth of Agriculture sector of the Indian Economy.* Available at <http://www1.freewebs.com/nehu_economics/agrigrowth.pdf >. [Accessed 25 July 2014]

Livemint. *Corruption Catalogue, Public Distribution System.* Available at <http://www.livemint.com/r/LiveMint/Period1/oldpdf/a348945b-1ec7-4808-8d72-e5ed35a26be2.pdf >. [Accessed 24 July 2014] Singh, D.R. *Demand Projections for Food Commodities. IASRI.* Available at < http://www.iasri.res.in/ebook/FET/Chap%2023_Demand%20Projections%20for%20Food%2 0Commodities-D.%20R.%20Singh.pdf >. [Accessed 24 July 2014]

18

Agricultural Productivity and Poverty Alleviation in North East India: Their Linkages

Ashutosh Dey

Introduction

The problem of poverty in India has been the focus of many debates and policies for decades. Most of this focus has been on rural poverty issues. Review of literature identifies the linkages between increases in agricultural productivity and poverty reduction. The evidence suggests that there are multiple pathways through which increases in agricultural productivity can reduce poverty. Increasing rate of poverty in rural areas particularly in the North Eastern Region (NER) in India has prompted debates on growth and productivity trends in the agriculture sector. The pattern of agricultural growth has remained uneven across regions and crops; however, over the last ûve years, agricultural growth has witnessed mixed trends. Agriculture provides livelihood support to 70 % of region's population. In spite of covering 7.9% of the country's total geographical area, NER produces only 1.5 % of the country's total food-grains production and continues to be a net importer of food-grains even for its own consumption. Consequently, the rate of poverty in the rural areas has reached 25.59 percent in 2011-12 (Tendulkar Methodology). Owing to increasing population, natural resources are gradually depleting, putting major constraints on the efforts to eradicate poverty. The complex and enormous problems include declining availability of agricultural land and workforce, marginal producers with small land holdings, decreasing *per capita* land availability, conûicting demand for scarce water resources, and urbanization. In the coming years, NER will require food production in a larger quantity for its existing growth of populations from less and less land. The biggest

challenge is how to increase output from the shrinking agricultural sector, while sustaining the productivity potential of the available natural resources.

Objectives and Methodology

The rising population, increasing demand for water resources, widespread land degradation and inadequate infrastructure appear to be major concerns of the agriculture sector in NER. Hence theobjective of this paper is to make an attempt to examine the agriculture growth–poverty alleviation linkage in the North Eastern states of India. The data obtained for this paper is mainly drawn from secondary sources. The methodology is both descriptive and analytical where the data so obtained will be tabulated and analyzed with relevant statistical tools and techniques.

Brief Profile of NER

The economy of Northeast India has got its definite identity due to its peculiar physical, economic and socio-cultural characteristics. Agriculture is the main economic activity in the region and despite major impact of green revolution in the irrigated areas of the country; modernisation of agriculture has escaped this region as evidenced by poor adoption of modern technologies, low consumption of fertilisers and other indicators of growth.

The extent of cultivable land in the NE region varies from state to state. Cultivable land is a critical resource in many of the NE State, and availability and management of land for agricultural activities are essential for raising the region's overall agricultural production and productivity.

The NER manifests two types of land tenure systems viz. (i) Government administered revenue system operates in the plains and valleys of Assam, Tripura, Manipur and in the hilly state of Sikkim (ii) Village level customary land tenure system operates in the hilly states of Arunachal Pradesh, Meghalaya, Mizoram and Nagaland and in the hilly parts of Assam, Manipur and Tripura. The land records system is outdated and farmers' access to it is time-consuming and expensive. Only in Assam the land records system is being maintained and computerized.

Role of Agriculture in Economic Development and Poverty Reduction

The role of agriculture in economic development is multifaceted. Food production and similar agricultural businesses have the potential to feed a nation, supply jobs, and contribute to the tax base revenue of local and national governments. Developing nations can dramatically reduce poverty through efforts to stimulate agricultural business growth. Studies indicate that regardless of whether a developing country is poor or wealthy, focused efforts to grow the agricultural sector have the same effects: reduced poverty, improved food supplies, and increased exports.

The early development theorists such as Rosenstein-Rodan (1943), Lewis (1954), Hirschman (1958), Jorgenson (1961), Fei and Ranis (1961) regarded agriculture only as a reservoir and source of abundant labour and transferable product and financial surplus. The role of agriculture was seen as ancillary to the main strategy of growth, which was accelerating industrialization. Hirschman (1958) theory in particular was negative on agriculture as a source of growth on the basis of its weak forward and backward linkages needed for development. By contrast Kuznets (1968) pointed out that in a successful development strategy, technological progress must support both industrialization and agricultural productivity. The revolution in agricultural productivity, according to Kuznets, is an indispensable base of modem economic growth. A similar view was expounded by Kalecki (1960, 1971), who based his position on the idea that balanced growth in both wage goods and capital goods forms the basis of sustainable long run growth. Since agriculture is the main sector producing food, the key wage good in a developing economy, agricultural development is essential for a successful industrialization strategy for developing countries.

Agriculture was seen as a low-productivity, traditional sector that only passively contributed to development by providing food and employment. In the late 1970s and early 1980s a major revision in development thinking contended that the role of agriculture as a leading sector especially in the early stages of industrialization was re-emphasized in the development literature by authors such as Mellor (1976) and Adelman (1984). These authors emphasized the importance of agricultural growth in generating demand for locally produced non-tradable products, and thereby stimulating overall production and growth. Such a strategy was termed Agriculture Demand Led Industrialization (ADLI) by Adelman (1984). The ADLI strategy stressed the central role of increased agricultural productivity in achieving industrialization through expanding demand for goods produced by domestic industry. Two key characteristics of agriculture during the early stages of development justiûed its place in early development thinking. First, agriculture produces goods that directly satisfy basic human needs. Second, agricultural production combines human effort with natural resources, such as land and agro-ecological assets. Since natural resources were assumed to be freely available, early development theorists believed that agriculture could grow independently of other economic activities. It was also recognized that traditional agriculture could be transformed rapidly into a modern sector through the adoption of science-based technology, thereby making a large contribution to overall growth. Beyond its direct contribution to growth, a number of features speciûc to the sector enhance its contribution to pro-poor growth, including the concentration of the poor in the sector, the large size of its growth linkages to other sectors, and the positive externalities from assuring food security and reducing food prices (Byerlee et al ., 2005).

The unprecedented fall in global poverty in Asia in the last three decades reûects a large contribution from successful agricultural transformation (Datt and Ravallion, 1998a, 1998b; Ravallion and Chen, 2004). In India, Agriculture accounts for nearly 12.2 percent (2011-12)(at 2004-05 prices) of national income (GDP), and most importantly, 68 per cent of the population living in rural areas is directly or indirectly dependent on agriculture for their livelihood.

Agriculture in North East India provides livelihood support to 70 % of the region's population. It produces only 1.5 % of the country's food grain production. Given the high percentage of people in NER who depend on agriculture for their livelihood, little progress can be made on poverty reduction if this sector languishes with a slow rate of growth. In addition to the direct impact of agriculture growth on poverty reduction, there is also a much larger indirect effect through the linkages between agriculture and non-farm growth in rural areas.

The Status and Dimensions of Poverty

There are several definitions of poverty, in India, both income-based poverty definition and consumption-based poverty statistics are in use. Outside India, the World Bank and the United Nations use a broader definition to compare poverty among nations, including India, based on purchasing power parity (PPP), as well as nominal relative basis. Each state in India has its own poverty threshold to determine how many people are below its poverty line and to reflect regional economic conditions. These differences in definition yield a complex and conflicting picture about poverty in India, both internally and when compared to other developing countries of the world.

Poverty is a socio economic phenomenon which defies any precise definition: its concept and contents vary from country to country depending upon what a particular society accepts as a reasonably good living standard for its people. In India, poverty manifests itself in its starkest form as a visual of semi-starved, ill clad, deprived millions of countrymen, thousands of them dying every day from malnutrition, ill-health and lack of basic amenities; a picture which is both appalling and agonizing from any standardof human existence. The concept of poverty is also multidimensional. A common method used to measure poverty is based on income or consumption levels. However, quantitative measurement of income to define poverty line on the basis of such a wide concept of poverty is not possible as this concept includes both material and non-material dimensions. Accordingly, while measuring a poverty line, the focus generally has been on the material dimensions and even in this respect, only on the minimum consumption requirement. A person is considered poor if his or her consumption or income falls below a minimum level necessary to meet his basic needs. This minimum level is called the poverty line. What is necessary to satisfy the basic needs varies across time and societies, therefore, poverty lines vary in time and place. Every country

uses lines which are appropriate to its level of development, societal norms and values. India's current official poverty rates are based on its Planning Commission's data derived from Tendulkar methodology. In India, the Planning Commission has defined the poverty line (based on 68th Round of NSSO (2011-12) data on household consumer expenditure survey) as '27.20 per capita per day in rural areas and '33.33 per capita per day in urban areas, this translates to '816 per capita per month in rural areas and '1000 per capita per month in urban areas. On this basis, 21.9 percent of the population was below the poverty line in India in 2011-12 which works out to 25.7 percent in rural areas and 13.7 percent in urban areas.

Poverty in the NER as per the Indian Planning Commission, during the year 2004-05 was 25.6% as against 37.2% at all India level. In rural areas in the same year, the BPL population was 22.3 % and in urban areas 3.3 % as against all India average of 41.8 % and 25.7 % respectively. As many as 131.81 lakhpersons live below poverty line in the North Eastern Region of India (2011-12) as against 2697.83 lakh persons in India (Tendulkar Methodology). The percentage of persons below the Poverty Line in NER in 2011-12 has been estimated as 28.9% as against 21.9% at all India level. In rural areas during that year, the BPL population is 25.59% and in urban areas 3.39 % as against all India average of 25.70% and 13.70 % respectively. The reduction of poverty in India is found to be encouraging (from 37.2% in 2004-05 to 21.9% in 2011-12). It accelerated to 2.18 percentage points per year during the 7-year period 2004-05 to 2011-12. However, it can be concluded that the rate of increase in the poverty ratio in NER during the most recent 7-year period 2004-05 to 2011-12 was about0.48% as could be seen from the following table:

It is important to note that although the trend declinedas documented above is based on the Tendulkar poverty line which is being reviewed and may be revised by the Rangarajan Committee, an increase in the poverty line will not alter the fact of a decline. While the absolute levels of poverty would be higher, the rate of decline would be similar. It was estimated in 1981 that approximately 52.6% of the population in rural areas of NER lived below the poverty line. However the incidence of rural poverty decreased in the 2004-05. But poverty in the rural areas of NER was increased from 22.3% in 2004-05 to 25.59% in 2011-12.The estimates of state wise poverty lines for rural and urban areas for 2004-05 and 2011-12 are given in Table 18.1. The table shows that by 2011-12 Sikkim has the lowest number of its population in the BPL category, while Arunachal Pradesh fares the worst. However, other States have different poverty lines based on *per capita* income. Sikkim, with only 8.19 per cent of its total population categorized as BPL, has the lowest poverty estimates in the North East. In rural Sikkim, 9.85 percent of the populations are BPL, while the figure for urban areas of the State is 3.66 per cent. High poverty ratios in rural areas are found in

Table 18.1 Number and Percentage of Population below poverty line by states-2004-05 and 2011-12 (Tendulkar Methodology)

States	Year 2004-05						Year 2011-12					
	Rural		Urban		Total		Rural		Urban		Total	
	No. of Persons (Lakhs)	% of Persons	No. of Persons (Lakhs)	% of Persons	No. of Persons (Lakhs)	% of Persons	No. of Persons (Lakhs)	% of Persons	No. of Persons (Lakhs)	% of Persons	No. of Persons (Lakhs)	% of Persons
1	2	3	4	5	6	7	8	9	10	11	12	13
Arunachal Pradesh	3.2	33.6	0.6	23.5	3.8	31.4	4.25	38.93	0.66	20.33	4.91	34.67
Assam	89.4	36.4	8.3	21.8	97.7	34.4	92.06	33.89	9.21	20.49	101.27	31.98
Manipur	6.7	39.3	2.3	34.5	9.0	37.9	7.45	38.80	2.78	32.59	10.23	36.89
Meghalaya	2.9	14.0	1.2	24.7	4.1	16.1	3.04	12.53	0.57	9.26	3.61	11.87
Mizoram	1.1	23.0	0.4	7.9	1.5	15.4	1.91	35.43	0.37	6.36	2.28	20.40
Nagaland	1.5	10.0	0.2	4.3	1.7	8.8	2.76	19.93	1.00	16.48	3.76	18.88
Sikkim	1.5	31.8	0.2	25.9	1.7	30.9	0.45	9.85	0.06	3.66	0.51	8.19
Tripura	11.9	44.5	1.5	22.5	13.4	40.0	4.49	16.53	0.75	7.42	5.24	14.05
North East	**118.2**	**22.3**	**14.7**	**3.3**	**132.9**	**25.6**	116.41	**25.59**	15.40	**3.39**	131.81	**28.98**
All India	3258.1	**41.8**	814.1	**25.7**	4072.2	**37.2**	2166.58	**25.70**	531.25	**13.70**	2697.83	**21.92**

Source: Ministry of Development of NER, Government of India

Population as on 1st March 2012 has been used for estimating number of persons below poverty line. (2011 Census population extrapolated)

Arunachal Pradesh (38.93%) followed by Manipur (38.80%), Mizoram (35.43%), Assam (33.89%), Nagaland (19.93%), Tripura (16.53%) and Meghalaya (12.53%) in 2011-12.

Agriculture Growth and Poverty Reduction

The evidence consistently shows that agricultural growth is highly effective in reducing poverty. Gallup et al. (1997) reported that every 1% increase in *per capita* agricultural output led to a 1.61% increase in the incomes of the poorest 20% of the population. Thirtle, et al. (2001) concluded from a major cross-country analysis that, on an average, every 1% increase in agricultural yields reduced the number of people living on less than US$ 1 a day by 0.83%. Increased agricultural productivity also brings strong benefits for the poor. Agricultural productivity growth raises incomes of poor farm households as well as households of landless labourers who primarily depend on agricultural wages. Agriculture makes important contributions to nutrition, food security, and macroeconomic stability beyond the pro-poor growth linkages (Timmer, 2002). At the micro level, inadequate and irregular access to food reduces labour productivity and decreases investment in human capital (Bliss and Stern, 1978; Strauss, 1986; Fogel, 1994).

The ways in which agriculture can affect the overall poverty level in a country can be direct and indirect. The direct way implies that agricultural growth lowers directly the degree of poverty in rural areas and the whole economy. The indirect way implies that the way agricultural growth contributes to overall poverty reduction is through the contribution of agriculture to overall growth, and through the latter's contribution to poverty reduction.

Agriculture is an important sector in the economy of the NER, with its share in State Domestic Product (SDP) ranging from 6.83 percent to 15.76 percent in different states in 2011-12. (See Table 18.2). The percentage growth of GSDP during 2010-11 was 23.73% in Arunachal Pradesh has come down to 15.76% in 2011-12. Except Meghalaya with a marginal increase (10.68% in 2010-11 to 11.04% in 2011-12), all other states of NE region show a declining trend. The growth of GSDP in the Region as a whole shows a declining trend (See Table 18.3). The GSDP growth rate in NER was 2.95% in 2004-05 which has decreased to 2.61% in 2011-12. The rural poverty levels in NER have also started to rise. Although poverty in India has come down significantly during last two decades, but poverty levels in the NER is increasing. In 2004-05, rural poverty was 22.3% against 25.59% in 2011-12 (See Table 18.3). The following table-2 shows the share of Agriculture and Allied Sector to GSDP of the States in the NER.

Table 18.2 Share of Agriculture and Allied sector in total GSDP for NE States during 2009-10 to 2011-12 at Current Prices

States	GSDP from Agriculture & Allied			% Share of Agriculture & Allied in total GSDP			% Growth over Previous Year	
	2009-10	2010-11	2011-12	2009-10	2010-11	2011-12	2010-11	2011-12
1	2	3	4	5	6	7	8	9
Arunachal Pradesh	206,634	255,671	295,961	29.16	31.06	31.63	23.73	15.76
Assam	2,418,411	2,840,274	3,219,097	26.08	27.31	27.89	17.44	13.34
Manipur	206,372	227,835	251,626	25.00	24.77	24.70	10.40	10.44
Meghalaya	246,927	273,298	303,468	19.00	18.08	17.38	10.68	11.04
Mizoram	105,525	113,798	NA	19.97	18.79	NA	7.84	NA
Nagaland	269,513	277,911	286,572	26.24	24.99	23.75	3.12	3.11
Sikkim	53,101	61,282	NA	11.00	10.84	NA	15.41	NA
Tripura	313,234	334,645	357,519	20.41	19.25	18.12	6.84	6.83

Sources: 1. Agricultural Statistics at a Glance 2012, Directorate of Economics and Statistics, Ministry of Agriculture.

2. Central Statistics Office, New Delhi.

Note: Agriculture and Allied Sector includes Agriculture, Forestry & logging and Fishing.

Except Assam, all other States in the NER have shown a declining contribution of Agriculture and Allied sector to the GSDP of each state which means almost zero growth rates over the previous years. Population dependent on agriculture remains very high in the Region. As a result, agriculture in the region has not been able to generate surpluses for investment and augment purchasing power, not to speak of employment generation. Moreover, factors like natural calamities, large number of smallholders, low intensity agricultural inputs and negligible seed/variety replacement are also threatening the livelihood-sustainability in the Region. The following table-3 shows the GSDP growth rate in the NER during the eight year period from 2004-05 to 2011-12:

Table 18.3 GSDP growth and Poverty in NER

Year	GSDP growth rate (%)	Population below poverty line (%)		
		Rural	Urban	Total
2004-05	2.95	22.3	3.3	25.6
2005-06	2.80	-	-	-
2006-07	2.71	-	-	-
2007-08	2.63	-	-	-
2008-09	2.64	-	-	-
2009-10	2.69	-	-	-
2010-11	2.62	-	-	-
2011-12	2.61	25.59	3.39	28.98

Source: Ministry of Statistics and Programme Implementation-2015

The above table shows the declining trend in the growth rate of the NER except for two years where slight increase is shown i.e. for 2008-09 and 2009-10. One of the most important reasons for this declining growth rate is the lack of location-specific and system-based technologies. Apart from this, the dwindling resources of soil, water, flora, fauna and increasing concern for environmental safety has drawn the attention of the planners and policy makers at regional as well national level. In view of these concerns and enormous opportunities, the National Academy of Agricultural Sciences (New Delhi) in collaboration with Indian Society of Hills Farming deliberated on the theme "Strategies for Agricultural Research in the North-East"at ICAR *Research* Complex, Shillong, Meghalaya on November 8-10, 2006.

The agricultural sector has had low production due to a number of factors such as illiteracy, insufficient finance; inadequate marketing of agricultural products, the average size of the farms is very small which in turn has resulted in low productivity. Further the Growth Rate of the Agricultural Sector in NER GSDP has declined due to the fact that the sector has not adopted modern technology and agricultural practices and insufficient irrigation facilities. As a result of this the farmers are dependent on rainfall, which is however very unpredictable. The Indian government must take steps to boost the agricultural sector for this in its turn will lead to the growth of Agriculture Growth Rate in the region.

As already observed the extent of cultivable land in the NE region varies from state to state. Land is a critical resource in many of the NE State, and availability and management of land for agricultural activities are essential for raising the region's overall agricultural production and productivity.

Strategies for Reducing Poverty

Over the past several decades, there has been increasing acceptance worldwide that rapid economic growth over a prolonged period is essential for poverty reduction. At the macro level, economic growth implies greater availability of public resources to improve the quantity and quality of education, health and other services. At the micro level, economic growth creates employment opportunities, increases the income of the people and, therefore, reduces poverty. Economic growth also beneûts the poor, but only if effective measures are taken focusing on and directly empowering them. Therefore, rapid growth is vital, but it has to be sustained and targeted for a meaningful reduction in poverty. Many developing countries have succeeded in boosting growth for a short period. But only those that have achieved higher economic growth over a long period have seen a lasting reduction in poverty, East Asian countries being a classic example.

It is clear that strategies to alleviate poverty and help the poor people must aim at improving the productivity and the living conditions of smallholder farmers and landless agricultural workers who constitute the majority of poor people. Furthermore, agriculture is seen as central to rural development in NER. It is the major economic driver, the hub of rural activities, and permanent estate (IRG, 2002). The improvement in agriculture productivity is based on agricultural research and improved technologies. In many developing counties government must play an important role in this sector. However poor people may benefit from agriculture productivity only if favorable macroeconomic and trade policies good infrastructure and access to credit, land, and markets are in place.

The Governments in developing countries must undertake land reform measures not only for a better distribution of land but also to create mechanism capable to define and enforce property right. Land reform can promote smallholder entry into the market, reduce inequalities in land distribution, increase efficiency and boost output.

The Access to markets (financial and insurance) is a very important issue in many developing countries. Development agencies and non-government organizations should play an important role in this market. They will help organize informal markets and create microfinance institutions that can operate at low transaction costs, reduce asymmetric information and moral hazard problems. In addition, these financial institutions will provide credit access to poor who lack or have limited collateral. However in recent years some have begun to question the extent to which microfinance can help improve livelihoods of the poor. According to Karnani (2009), the problem with microfinance is that it romanticizes the poor people as creative entrepreneurs. He adds; "Most microcredit clients are not entrepreneurs by choice; they would gladly take a job at reasonable wages if one were available". In insurance markets, the informal market can continue to play its role. However, the informal market fails when shocks hit many members of the household or community at the same time or in case of covariate risks.

A vibrant agriculture in India is central to the wellbeing of the largest and most rapidly growing section of the population living in rural villages. In the past two decades, the country has generated economic growth. Like other developing countries, India has also made signiûcant efforts to integrate its economy with the rest of the world by lowering tariffs and taking measures to open its economy for investment. Agriculture plays an important role in economic development, such as provision of food to the nation, increase in exports, transfer of manpower to non-agricultural sectors, contribution to capital formation, and securing markets for industrialization. Improvement in agricultural productivity is the answer to realization of each of these goals.

A successful strategy for alleviating poverty and hunger in developing countries must begin by recognizing that they are mainly rural phenomena and that agriculture is at the heart of the livelihoods of rural people. Poverty reduction strategies should primarily focus our attention on development of agricultural sector for the sake of the poor and industrialization for employment generation leading to reduction of poverty.

Conclusion

The analysis brings out the correlation among rural poverty, access to land, population growth and agricultural growth. Agriculture is an important sector in the economy of the NER, and has the potential for addressing unemployment, for the medium term at least, since it has higher employment elasticity than industry. Rising population, increasing demand for water resources, widespread land degradation and inadequate infrastructure appear to be major concerns of the agriculture sector in NER.

The North Eastern Region should give high priority to enhancing the productivity of the agricultural sector through the provision of required capital inputs. These inputs range from provision of easy credit to the small farmers, to create awareness on farm technology that should motivate farmers to adopt technology and substantially raise farm productivity and output, expansion of region-specific traditional and new high-value crops, well-developed infrastructure facilities like roads and transports, markets, rural electrification, the development of irrigation also should receive high priority in the development plans of the region giving impetus to the growth of agriculture and increasing the employment opportunities for the rural poor. The high rate of population growth needs to be curbed for increased agricultural productivity to have any signiûcant effect on poverty in rural areas.

References

Alam, K., *Integrated Rural Development Programme: A study on concept and process.* Uppal Publishing House, New Delhi.

Anand, S. (1983), *Inequality and Poverty in Malaysia, Measurement and Decomposition*, Oxford University Press, New York.

Bardhan, P.K.(1987). *Poverty and Trickle Down' inRural India; A Quantitative Analysis*, in: Jain, T.L.,(ed), Poverty in India, Ess Publications, New Delhi.

Bhattacharyya, N.N., *Rural Development in North East India: A Note (2004)*, Akansha Publishing House, New Delhi.

Bhattacharya, N, P. Chakraborty and M. Chottapadhaya (1989), *How Do the Poor Survival, as reproduced in Poverty in India–Data Base*

Bordoloi, B.N., *Poverty Alleviation and Rural Development: A Few Basic Issues*, Uppal Publishing House, New Delhi.

Chelliah, R.J. and R. Sudarshan (1998), *Income Poverty And Beyond: Human Development in India,* Social Science Press, New Delhi.

Datta Ray, B and Das, Gurudas.(2004): *Dimensions of Rural Development in N.E.India*, Akansha Publishing House, New Delhi.

Dandekar, V.M. and N. Rath (1971), *Poverty in India*, Economic and Political weekly, January 2

Dantwala, M.L. (1985), *Garibi Hatao: Strategy Options*, 'Economic and Political Weekly, March 16.

Friedman, R.D. (1965), *Poverty: Definition and Perspective*, American Enterprise Institute for Policy Research, Washington, D.C.

Government of India, Planning Commission, *Tenth Five Year Plan (2002-07)*, Vol.1, p.7.

Government of Meghalaya, *Statistical Abstract 2012*, Directorate of Economics and Statistics, Shillong.

Government of India, *Basic Statistics of NER 2015*, North Eastern Council Secretariat, Shillong.

Gupta, S. P. (1988), *Planning and Development in India: A Critique* Allied Publishers Pvt. Ltd., New Delhi.

Kakwani, N. (1986), *Income inequality and Poverty: Methods of estimation and PolicyApplication*, Oxford University Press, New York.

Poverty in India – *Data Base Issues,* G.K.Kadekodi and G.V.S.N. Murthy (eds), Vikas Publishing House, New Delhi.

Krishna, Meeta (2003) *Poverty Alleviation and Rural Poor*, Mittal Publications, New Delhi.

Mishra, S. K., Puri, V.K (2014), *Indian Economy,* Himalaya Publishing House, Mumbai, New Delhi.

Paul, S. (1989), *A Model of Constructing the Poverty Line*, Journal of Development Economics, Vol.30 (1).

Rein, Martin (1970), *Problems in the Definition and Measurement of Poverty*, in Townsend Peter (Ed.) The Concept of Poverty, Heinemann, London, p. 46.

Samanta, R.K.(ed) (1991); *Rural Development in North East India: Perspectives, Issues and xperiences*. Uppal Publishing House, New Delhi.

Sen, Amartya. (1984). *Poverty and Famines*, Oxford University Press, London, p.vii.

Sukhatme, P.V (1981), *On Measurement of Poverty*, Economic and Political Weekly, Vol. 16(32).

Takayama, N (1979), *Poverty, Income Inequality and their Measures*, Econometrica, Vol.47 (3)

Tendulkar, Suresh D. (1978), *Economic Inequalities and Poverty in India: An Interpretative Overview*, Himalaya Publishing House, Bombay.

Thon, D (1983-A), *A Note on a Troublesome Axiom for Poverty Indices*', Economic Journal, Vol.93.

Visaria, P. (1992), Data Base on Poverty in India: An Exploration , *Poverty in India-Data Base Issues*, Vikas Publishing House, Pvt. Ltd., New Delhi.

19

Corporate Social Responsibility: A Tool to Create Sustainable Tomorrow

A. Jayakumar
K.Geetha

Introduction

Globalization of Indian economy has led to a paradigm shift in the way corporate social responsibilities were performed in India. The way companies used to look at CSR activities has also changed from a philanthropic activity to more professional activity. Business enterprises are traditionally known as engines for driving the economic performance of an entity, its success being measured in terms of high returns on equity and its contribution to the development of the society and the nation's economic growth. The company gets everything from the society for its survival and it is the obligation of the enterprise to return positive attitudes towards the society. If the business organization fails to meet the expectations of the society, the society will punish the firm through their purchase behavior. Hence, the success of any business enterprise depends mainly on the ethical behavior of the enterprise towards the society.

Corporate Sustainability

The term corporate sustainability first came to widespread acceptance in the World Commission on Environment and Development report in 1987 where it was defined as "development that fulfils the needs of the present without limiting the potential for meeting the needs of the future generations." It refers to building a society in which an appropriate balance between economic, social and environmental goals is developed. In order to achieve this goal, all three

dimensions of sustainable development have to be satisfied, ie., economic, environmental and social dimensions (the well-known approach called triple bottom line). Integration of all three dimensions of sustainable development should be a condition for achieving long-term corporate sustainability.

It prompts the corporations to take a more objective look at their impacts on people and planet, rather than focusing on profit motive alone. An increasing number of companies are adopting this new way of addressing the intangible concepts of CSR through TBL which focuses on data collection, analysis and decision making using economic, environmental and social performance information.

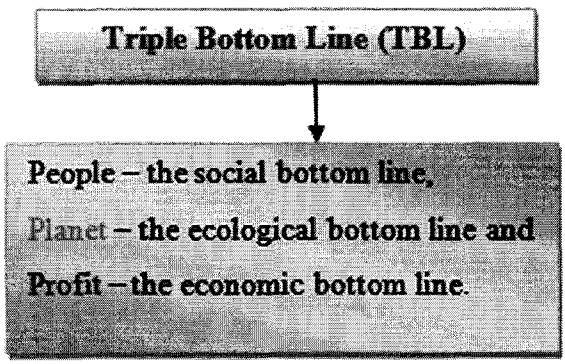


Figure 19.1 Dimensions of Sustainable Development

This broader coverage of Corporate Sustainability is also implied in the definition given by Pricewaterhouse Coopers which defines Corporate Sustainability as "meeting society's expectations that company adds social, economic and environment value from their operations, products and services". The report "The Business Council for Sustainable Development is released by the World Business Council for Sustainable Development during preparations for the 2002 World Summit on Sustainable Development in Johannesburg defines sustainable development as a form of progress that meets the needs of the present without compromising the ability of future generations to meet their needs.

Corporate sustainability is understood as the ability of a company, through its governance practices, and market present to positively influence ecosystems, society and economic development.

Global Driver of Sustainability

There are four sets of drivers relating to global sustainability.

- The first set of drivers relates to increasing industrialization and its associated material consumption, pollution and waste generation.

- The second set of drivers relates to the proliferation and interconnection of civil stakeholders.
- The third set of drivers relates to emerging technologies that may provide potent, disruptive solutions that could render the basis of many of today's energy and material-intensive industries obsolete.
- Finally the fourth set of drivers relates to the increases in population, poverty and inequity associated with globalization.

In short, global sustainability is a complex, multi-dimensional concept that cannot be addressed by any single corporate action. Creating sustainable value thus requires that firms addressed each of the four broad set of drivers. First, firms can create value by reducing the level of material consumption and pollution associated with rapid industrialization. Second, firms can create value by operating at greater levels of transparency and responsiveness, as driven by civil society. Third, firms can create value through the development of new, disruptive technologies that hold the potential to greatly shrink the size of the human footprint on the planet. Finally, firms can create value by meeting the needs of those at the bottom of the world income pyramid in a way that facilitates inclusive wealth creation and distribution.

Corporate Social Responsibility

Corporate social responsibility (CSR) has come to the forefront of corporate and economic concerns because of the increasingly globalized nature of business and the so-called New Economy, a knowledge-based, technology-driven environment that has, among other things, affected an increase in stakeholders' access to information. "The premise of the corporate social responsibility movement is that corporations, because they are the dominant institution of the planet, must squarely face and address the social and environmental problems that afflict humankind." As a mode of implementing human rights, labor, and environmental standards, CSR has long been discussed as a possible remedy to the inequalities created and exacerbated by globalization. It considers that a corporation is not just a self-centered profit-making entity, but that the company and its actions are also integral to the economy, society, and environment in which they occur. Directors and officers are becoming ever more aware that CSR may provide human rights, labor, and environmental protections to the communities in which they live and to the people they employ. The business case for such social responsibility among corporations is becoming clearer as globalization progresses. It includes:

- Managing risks
- Protecting and enhancing reputation and brand equity
- Building trust and 'license to operate'

- Improving resource efficiency and access to capital
- Responding to or pre-empting regulations
- Establishing good stakeholder relationships with current and future employees, customers, business partners, socially responsible investors, regulators, and host communities.
- Encouraging innovation and new ways of thinking
- Building future market opportunities.

As such, a social responsibility policy can provide value as a strategic part of a firm's daily activities. Under a strategy that integrates socially responsible practices, a company's analysis of profit, return on investment (ROI), or return on equity (ROE) as the bottom-line should be replaced by a "triple bottom-line".

The Relationship between CSR and Sustainable Development

A well-implemented and strongly enforced CSR policy is a key to sustainable development. CSR is a comprehensive notion that takes into account economic, social, and environmental concerns and, at the same time, protects the interests of all stakeholders by requiring greater transparency. Inherent in social responsibility of corporations is the understanding among corporate managers that their business decisions must be made with consideration of a "wider range of constituents than shareholders, and thus they ought to consider the implications of their actions on employees, consumers, suppliers..., the community, and the environment." Stakeholders may also include civil society organizations and other non-governmental organizations (NGOs). This stakeholder view of a corporation's social responsibility requires a constant dialogue between corporate decision-makers and the company's various stakeholders.

In the end, a well implemented and well-enforced CSR strategy that utilizes a constant dialogue with stakeholders should result in:

- Respect and care for the community of life,
- Improvement in the quality of human life,
- Change in personal attitudes and practices,
- Empowerment of communities to care for their own environments,
- Provision of a global framework for integrating development and conservation, and
- Creation of a global alliance.

All of these lead to long-term value creation for the corporation, its stakeholders, and the communities in which it operates. However, it is important to note that the implementation of a CSR policy will initially cause the corporation

to incur additional costs with no immediate return. That is, the corporation may have to choose more expensive inputs and production techniques to protect the environment or pay laborers more and provide improved working conditions, all of which consume resources and detract from the bottom line by increasing operating costs. CSR may also require the corporation to forego certain opportunities that are not aligned with the company's values and principles as found in its CSR policy. But, "having a set of clearly stated values, principles and policies, and mechanisms for measuring performance and ensuring internal and external accountability for these are crucial to the corporation's contribution to sustainable development in the globalized world.

Although CSR policies will vary among industries and among companies within those industries, three main areas that CSR policies will influence have been identified. First, CSR requires the implementation of socially responsible core business activities that minimize negative impacts and optimize positive impacts. This includes compliance with international standards concerning the environment, labor, and human rights. Companies can also be more proactive in controlling the risks and social costs associated with their activities. Second, companies should institute poverty-focused social investment and philanthropy programs such that their contributions to host communities and social causes become integral to the company's strategy. Third, CSR requires corporations to become engaged in public policy dialogues and institution-building with the goal of fostering an environment that is conducive to both profitable business and sustainable development.

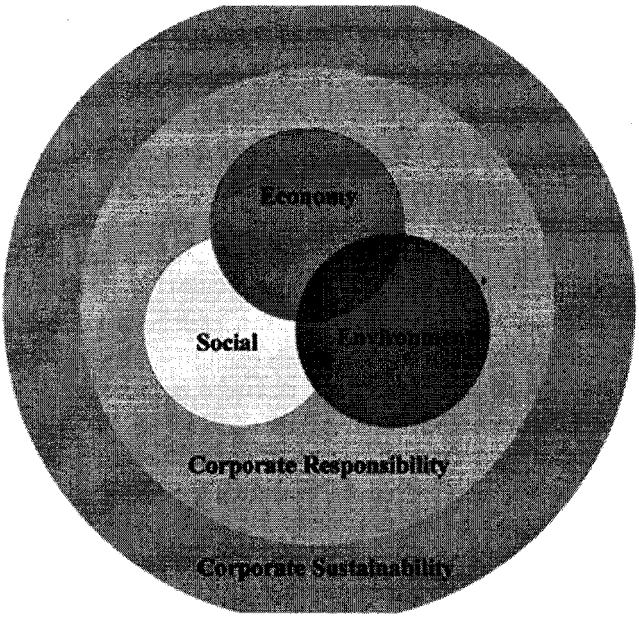
CSR and Corporate Sustainability are two sides of the same coin. CSR defines the social responsibilities of a corporation which, if implemented, will lead to the corporation being sustained. It implies that CSR is a tool to achieve sustainable development and forms part of it.

The model (fig 2), indicates that corporate responsibility can be understood as the balancing of the economic, social and environmental roles that companies play when conducting business. Hence, CSR refers to when firms balance the three elements of sustainable development.

CSR in India

A company taking on a wider responsibility towards the local community is not a new phenomenon in India. Indian firms have a history of corporate paternalism and philanthropy which has affected expectations on CSR in India. As India has moved towards a liberalized and market-oriented economy, the public's expectations on corporate support have increased. This trend is common for developing countries since their laws and implementation of these laws are generally not as strict as in developed countries when it comes to environmental issues or the protection of individuals. Also, the developing countries often lack

a strong state and have weaknesses in social systems as well as in laws that regulate business conduct. Subsequently with time and growth of capitalist structure in India government has realized CSR as an effective tool to be used in the growth and alleviation of poverty due to huge power of influence that business houses hold over the population.



Source: Van Marrewijk (2003; p.107)

Figure 19.2 General Models of CSR and Sustainability

The New Regulation on CSR in India

The Government of India has adopted an inclusive growth strategy to implement CSR through corporate sector. The Indian Parliament passed the legendary bill making CSR mandatory for corporate. The regulation makes it compulsory for companies of a certain size to necessarily spend 2% of their profits towards CSR activities. Specifically the regulation states the following: All companies with revenue greater than Rs. 1000 Cr ($200M) or profits of 5 Cr must spend 2% of the average of the last 3 years profits, towards CSR activity. With the passing of this bill India has brought CSR from the backroom to boardroom and we can expect a positive change in all respects of the country.

The business benefits commonly linked with CSR and corporate sustainability approaches are outlined below:

License to Operate: Possibly the crucial benefit for companies adopting CSR or corporate sustainability is preservation of their social license to operate through enhanced reputation and social capital.

Enhanced Reputation: It results from company focus on customer value, attention to employees and the environment, respect for the suppliers and good record on human rights. Investment in local communities normally attracts positive media attention and coverage in the local press where outstanding CSR or sustainability performance can lead to participation in high profile national and international events or awards. Overall, good corporate responsibility and sustainability performance increases a company's reputation strength and secures its social license to operate.

Enhanced Social Capital: It results from investment on multi-stakeholder processes, international collaborations and community programmes. Strengthened relationships with international organisations, NGOs, local authorities and other regional bodies become an important dimension of social capital at company, regional and international levels.

Improved Operational Efficiency

Improved risk control is attainable from transparency and broader awareness of financial, environmental and social risks. Enhanced risk management has a positive impact in operational efficiency and can result in significant direct cost savings depending on the size of the company and the sector in which it operates.

Increased Efficiency could also result from:

- Investment in technology to control environmental risks
- Eco-efficiency which means making more from less by reducing ecological impacts.
- continuous improvement in supply chain processes
- Improved human capital through talent attraction and retention and a motivated and participative work force.
- lower health costs from healthier employees

Improved Investment Opportunities

Improved investment opportunities from Socially Responsible Investment funds set up specifically for investing in CSR and sustainability practicing companies and from investors that take into account sustainability performance criteria.

New Market Opportunities

New market opportunities arise from social innovation and green products and services. Social innovation refers to social learning and problem solving in areas ranging from improvements in human health, education, human welfare, environmental protection and energy saving instruments.

Conclusion

It can be concluded that in today's competitive world, Organisation cannot be successful without taking into account the social responsibility. Achieving corporate sustainability is one of the objectives of business enterprise and CSR has been an important ingredient of any organization to achieve corporate sustainability. Over the past several years, India has been updating its corporate law and legal framework to increase transparency, accountability, and align with international business standards and now with the emergence of the new CSR Regulation. India is looking forward to become a benchmark in terms of the CSR practices, being one of the 1st nations in Asia to come up with such regulation. More and more companies are discovering that integrating CSR strategies in their company strategies are only going to make their operations more profitable and sustainable. More CSR rating companies, CSR Consultancy agencies have been coming up and this would bring new opportunities and development in near future. Hence, one can see the CSR as a major tool to create sustainable tomorrow.

References

Andre Sobczak, Gervaise Debucquet and Christelle Havard, "The impact of higher education on students' and young managers' perception of companies and CSR: an exploratory analysis", *Corporate Governance*, Vol.6, No.4, pp.463-474.

Anu Singh Lather and Sona Vikas (2010), "Sustainable business Strategy or Eyewash for unethical business practices: A study of the CSR initiatives of Coca Cola India", *Management & Change*, Vol.14, No.2, pp.1-28.

Capriotti, P., and Moreno A. (2009), "Communicating CSR, citizenship and sustainability on the web", *Journal of communication management*, Vol.13, No.2, pp.157-175.

Du, S., Bhattacharya, C.B., and Sen, S. (2007), "Reaping relationship rewards from corporate social responsibility: the role of competitive positioning", *International Journal of Research in Marketing*, Vol. 24, No.3, pp. 224–241.

Du, S., Bhattacharya, C.B., and Sen, S. (2010), "Maximizing Business Returns to Corporate Social Responsibility (CSR): The Role of CSR Communication", *International Journal of Management Reviews*, Vol.12, No.1, pp.8-19.

Fergus, A. H. T. and Rowney, J. I. A. (2005), "Sustainable Development: Lost Meaning and Opportunity?", *Journal of Business Ethics*, Vol.60, No.1, pp.17-27.

Jenkins, H. M. (2004), "Corporate Social Responsibility and the Mining Industry: Conflicts and Constructs", *Corporate Social Responsibility and Environmental Management*, Vol.11, No.1, pp. 23-34.

Jeremy Moon (2007), "The Contribution of Corporate Social Responsibility to Sustainable Development", *Sustainable Development*, No.15, pp.296-306.

Jones, M. T. (1999), "The Institutional Determinants of Social Responsibility", *Journal of Business Ethics*, Vol. 20, No.2, pp. 163-179.

Jothi M (2011), "Competitiveness, sustainability and CSR initiatives of commercial banks in India: An empirical study of BSE listed commercial banks", *The Alternative – Journal of Management Studies and Research*, Vol. X, No.1, Oct–March 2011, pp. 21-37.

Kailash Tuli, "Sustainable Business Strategy or Eyewash for unethical business practices: A study of the CSR initiatives of Coca Cola India", *Management & Change*, Vol.14, No.2, 2010.

KailashTuli, "Sustainable Business Strategy or Eyewash for unethical business practices: A study of the CSR initiatives of Coca Cola India", *Management & Change*, Vol.14, No.2, 2010.

Kamal Singh (2009), "Business Ethics and Corporate Social Responsibility – Time for action now", *Effective Executive*, Vol.XII, No.10, October 2009, pp.58-64.

Kamal Singh, "Business Ethics and Corporate Social Responsibility – Time for action now", *Effective Executive*, Vol.XII, No.10, October 2009, pgs.58-64.

Malvinder Singh (2007), "Corporate Social Responsibility- Contribution to sustainable development", *Productivity News*, Vol.45, No.3, May-June 2007, pp.52-54.

Payne, D. M. and Raiborn, C. A. (2001), "Sustainable Development: The Ethics Support the Economics", *Journal of Business Ethics*, Vol. 32, No.2, pp. 157-168.

Ruchi Khandelwal and Swarna Bakshi (2014), "The New CSR Regulations in India: The way forward", *Procedia Economic and Finance,* No.11, pp.60-67.

Salzmann, O. et al. (2005), "The Business Case for Corporate Sustainability: Literature Review and Research Options", *European Management Journal*, Vol.23, No.1, pp. 27-36.

Siebenhuner, B., and Arnold, M. (2007), "Organizational earning to manage sustainable development", *Business Strategy & the Environment*, Vol. 16, No.5, pp. 339-353.

Signitzer, B., and Prexl., A. (2008), "Corporate Sustainability Communications: Aspects of Theory and Professionalization", *Journal of Public Relations Research*, Vol.20, No.1, pp. 1-19.

20

A Conceptual Framework on Consumer Influence towards Corporate Social Responsibility: Building a Sustainable Society

Jogita Sorokhaibam Hussain
Jamal Hussain

Introduction

"CSR encompasses the ideas of corporate governance, sustainable wealth creation, corporate philanthropy and advocacy for the goals of the community" – *N.R. Narayana Murthy*, former Chairman, Infosys.

Corporate Social Responsibility is the most widely debated topic amongst Academia, Corporates, Government and Society at large. In recent times, it has received huge attention as society has become more intellectual and aware than ever before. Today, there is increased concern about the earth's depleting natural resources & related environmental issues. Mounting ethical concerns about the impact of modern consumption culture on society and the environment, the rising prominence of these environmental and social issues within mainstream media, the emergence of organized consumer activist groups and the increasing availability of ethical products, have all led to a growing awareness by consumers of the impact of their purchasing and consumption behaviour (Carrigan & Attalla, 2001; Crane & Matten, 2004). Ethically minded consumers feel a responsibility towards the environment and to the society, and seek to express their values through ethical consumption and purchasing (or boycotting) behaviour (De Pelsmacker *et al.*, 2005).

Traditionally, CSR was merely seen as a philanthropic activity or in some

way giving alms to the society. In the contemporary world of business identified by cut throat competition and powerful strategies, the nature & quality of CSR practices goes a long way in determining the survival and sustainability of the businesses. Today, consumers pay attention to the CSR records of the companies, encompassing mainly their community initiatives, while purchasing (Gildea, 1994). This shows that consumers are becoming more aware about society's development than ever before. Gugler & Shi (2009) also affirmed the fact that customers have been putting more weight on corporate image, social quality rather than tangible or technical matters. Corporate accountability and transparency in business practices is the need of the hour. Thus, the fast food giant *Starbucks* remarked in their annual report of CSR shows how socially responsible organization can go far ahead of its competitors and create stronger and better impressions amongst stakeholders:

"Consumers are demanding more than "product" from their favorite brands. Employees are choosing to work for companies with strong values. Shareholders are more inclined to invest in businesses with outstanding corporate reputations. Quite simply, being socially responsible is not only the right thing to do; it can distinguish a company from its industry peers."[1]

Unfortunately, there is less unanimity in defining CSR as many researchers, authors and practitioners have diverse opinions and viewpoints on what CSR should embrace and what would be its role. For some it may seem as, especially from shareholder's points of view, drainage of profit that actually belongs to them; or some think that this is the tactic by which the corporations veils their unethical or unsustainable practices; or some people think this is the real attempt to help and uplift the society (Lindgreen & Swaen, 2010).

CSR encompasses many terms in its bracket like business ethics, corporate citizenship, and corporate conscience or social responsibility. There has been a lot of debate on what should come under the purview of CSR. According to Epstein (2008), CSR concentrates on nine areas: ethics, governance, transparency, business relationships, financial return, community involvement, product value, employment practices and environmental protection. Carroll (1979, p.499) introduced a widely accepted and commonly cited definition of social responsibility by quoting that "to fully address the entire range of obligations business has to society, it must embody the economic, legal, ethical and discretionary categories of business performance". European commission narrated the main features of CSRas follows (European Commission, 2002):

"Despite the divergent approaches towards CSR, according to there is a large consensus on its main features:

CSR is behavior by business over and above legal requirement, voluntary adapted because businesses deem it to be in the long term interest.

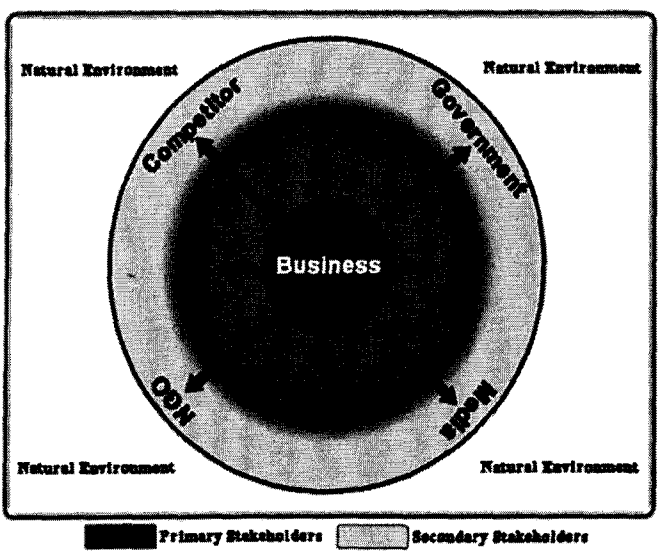
CSR is intrinsically linked to the concept of sustainable development: business need to integrate the economic, social and environment impact in their operation.

CSR is not an optional 'add-on' to business activities but about the way in which business are managed."

Stakeholders:

Now, the main question is in whose interest a corporation should serve and for whom it should be accountable? Various authors gave different views on who are the stakeholders, their importance and to whom the corporation must attend to for survival. Freeman (2010) described that a stakeholder can be any person, group, organization, institution, society and even natural environment. In other words, Stakeholder may be an individual, a group or entity, who is capable enough to exert force that determines business performance or the fate of business firms. There must be a mutual and interdependent relationship between the businesses and the stakeholders which will result in business sustainability as well as societal development.

While Freeman (2010) gave the broader view of stakeholder theory, Mitchel *et al.* (1997) introduced a much narrower view explaining which groups of stakeholders should deserve maximum management attention. According to them, stakeholders like Consumers, Employees, Investor and Suppliers are necessary for corporate survival. These can be regarded as primary stakeholders because they



Source: Author(s)

Fig. 20.1 Stakeholders of a Business Firm

hugely influence the firm and also get affected by the firm's activities. If any of the primary stakeholder groups withdraws its support the firm's operation is adversely affected (Clarkson, 1995). In this study, the primary focus is given to one of the primary stakeholder i.e., customer.

Consumer as a Stakeholder

It follows from the above observation that many authors or researcher perceived customer as a primary stakeholder and believe that company's long term survival is truly dependent on consumer. Clarkson (1995) opined that customers are essential for survival of companies and represent a central feature of every CSR report. It would not be wrong if we say consumers are responsible for the ultimate survival of any business. They not only affect the business performance but also affect other stakeholders of the firm like employees, investors, supplier etc. Business firms can attract the stakeholders by being socially responsible, offering the best, innovative and eco- friendly products or services. Therefore, it would be imperative to say that consumers have enough power to become key drivers for CSR to the extent that they could even compel business firms to become more social and environmentally responsible. This is the need of the hour as natural resources are depleting at a much faster pace and there is a desperate need to save the earth for tomorrow's generations. This thought is discussed at greater length in the conceptual framework.

CSR, Corporate image & Consumer Perception

Perception is the mental image framed in the mind through observations and experiences. Previous researches confirm that consumers perceivebusiness firms differently based on their CSR inclination.Corporate must ensure that consumer, who actually decides the fortune of the business, must be aware and frame a positive image in their mind about CSR initiatives. Wigley (2008) and Oberseder *et al.*, (2013) observed that awareness about CSR initiativesinfluence consumer's attitude positively and they have stronger intention to purchase the company's offerings. Moreover Becker-Olsen *et al.* (2006) and Ellen *et al.* (2006)asserts that motives behind the CSR initiatives plays great role in shaping consumer's perception towards businesses. So consumers having high awareness level about the CSR initiatives perceived positive image about those corporationsthatare socially responsible and it influence their product evaluation and purchase decision. According to Sen and Bhattracharya (2001) key moderators of consumer response to CSR are individual consumer and company specific factors. They observed that the consumer reaction to CSR is contingent as consumer react negatively to negative CSR information and positively to positive CSR information. Lee *et al.*(2012) observed that consumer perceived CSR initiatives favorably and positively when it matches with the consumer's lifestyle and values

which consequently increases C-C (consumer – company) identification and improves brand loyalty.The consumer's positive and favourable CSR belief leads to strong C-C identification (Bhattacharya &Sen, 2003), and strengthen the consumer brand relationship.

CSR & Consumer Purchase Behaviour

Corporate CSR friendliness builds positive corporate image in the society, enhances brand value and improves product evaluation, while the reverse may ruin the corporate reputation and consequently lead to hostile stakeholder relationship. For example Brown & Dacin (1997) observed that negative CSR associations ultimately can have a detrimental effect on overall product evaluations, whereas positive CSR associations can enhance the product evaluations.

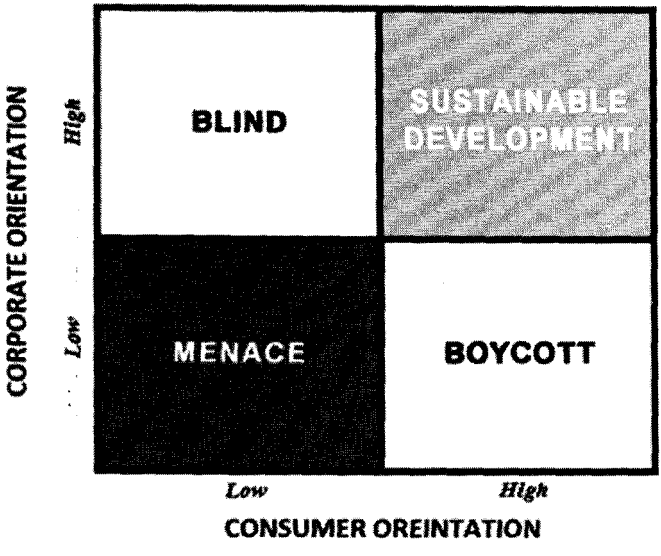
Vogel (2005) reported that up to 90% of consumer's purchase and consumption behaviour is influenced by corporate responsibility practices of the firm. Hence it proves that Lee *et al.* (2010) observation that there is a linear relationship between consumer awareness of company's CSR initiatives and their purchase intentions. Ross *et al.* (1992) and Sprinkle & Maines (2010) also found that many consumers claim to be more willing to buy products from companies involved in social causes; and also have direct and positive influence on consumer loyalty to a firm (Garcia *et al.*,2005; Lee *et al.*, 2012). Therefore, it affirms that CSR has a positive effect on consumer evaluations of the company and its products which leads to increased willingness of purchasing behaviour (Sen & Bhattacharya, 2001; Brown & Dacin, 1997). Consumer buys product / services from the company when they *Know, Like and Trust* the company. The trust factor can only be built by being socially responsible in the eyes of the consumers. Khojastehpour & John (2014) highlighted in their study that environmental CSR has a positive effect on corporate reputation and corporate profitability.

The Cognitive Dissonance

Even though the attitude of consumers favors CSR but many researchers like Auger & Devinney (2007); Carrigan & Attalla (2001); Carrington *et al.* (2014); De Pelsmacker *et al.* (2005) revealsthat consumer does not walk on their talk and exhibit intention – behavior gap. This shows how Cognitive Dissonance exists in the attitude and buying pattern of consumers which may be due to various reasons like awareness, accessibility, high cost, limited options, trust, time, habit etc.This part of the study is still in infancy stage. Mention may be made ofCarrington *et al.* (2014, p.2759) study which reveals four interrelated factors affecting the ethical intension – behaviour gap: (1) prioritization of ethical concerns (2) formation of plan/habits (3) willingness to commit and sacrifice (4) modes of shopping behaviour. They propose that closing the gap will have positive outcome on the future sustainability of economies, societies and environments.

The Conceptual Framework

CSR Orientation Grid is a conceptual framework which is developed on the basis of two dimensions, viz. *Corporate Orientation* and *Consumer Orientation*with orientation towards social responsibility ranging from *low* to *high.* Societal development and making the world a safer and better place to live in depends on the mutual responsibilities of both consumers and business firms.The conceptual framework as depicted in *Figure 20.2* - has four quadrants, viz. *Menace, Boycott, Blind, and Sustainable Development.*



Source: Author(s)

Fig. 20.2 CSR Orientation Grid

The Two Dimensions

Corporate Orientation

It reveals the extent of corporate's policies and practices, their social responsiveness and their intentions towards societal development. High CSR orientation exhibit better responsibility towards society through corporate philanthropy, proactive initiative to social causes, sustainable practices like eco-friendly processes, products etc. as compared to Low CSR orientation

Consumer Orientation

Consumer's Orientation describes the consumer perception and purchase behaviour. The high oriented consumers think themselves as responsible citizensof

the society and perceive firms which are socially and environmentally responsible as positive and frame favourable purchase intention for the products offered by them.They stand against socially irresponsible business firms and can even go to the extent for boycott against those firms in extreme cases.On the contrary, low oriented consumers takea laidback attitude and show low participation in community development activities. They generally exhibit low or no awareness about CSR initiatives. They easily purchase available products and do not make deliberate attempt to go for eco-friendly products / services.

The Quadrants

Menace

Both corporate and consumer have low orientation towards CSR meaning that neither corporate nor consumer are responsible towards society development, so this quadrant is called as 'MENACE' to the society. Corporate give less importance to CSR initiatives as well as consumers are less sensitive towards sustainable development.Both of them believe that societal development issues are taken care of by external agencies like government, NGOs or developmental agencies.This quadrant reflect the biggest threat to the society's sustainability.

Boycott

This quadrant characterized by corporate's low orientation towards CSR butconsumersare in position of high orientation. Consumers do not bear and tolerate corporate's irresponsible policies and practices. So 'BOYCOTT' term is used and it is appropriate as consumer neglect corporate's unsustainable practices and market offerings and call for boycott to punish them. The term 'boycott' arrived from Charles C. Boycott of Ireland who was ostracized in 1880 for refusing to reduce rents. In the subcontinent of India, the term came into greater prominence when the great boycott against British by *Mahatma Gandhi* for salt and cloth (Bondurant, 1965). In a survey in 1999 of 25,000 consumers in 23 countries found that 40% had at least thought about punishing a specific company over the past years they viewed as not behaving responsibly[2]. There are numerous instances in the world history where consumers punished the corporates and altered their policies and practices towards more socially and environmentally responsible. The power of consumers in a similar fashion has also been highlighted in Michael E. Porter's five forces strategic model emphasize on the significance of buyer's bargaining power and its ability to alter the equation of business competition (Porter, 2008). Consumers are vital for any business corporation as they not only affect economic prospects of the business but to a large extent decide corporate's reputation, its brand image, stakeholder relationship etc. This underlines the power of consumers as they can prove to be very influential in aligning business firms towards CSR.

In our context, Consumer boycott is a prominent punishment mechanism for unsustainable and unsocial practices by business firms. Friedman (1985) defined boycott as "an attempt by one or more parties to achieve certain objectives by urging individual consumers to refrain from selected purchases in the marketplace." Boycotts may be only the most manifest example of a broader phenomenon of consumer behaviour influenced by perceived CSR lapse (Smith, 1990). It represents the idea that consumers can influence business practices by refraining from purchase (John & Klein, 2003). The Economist (1990, p. 69)reported in its article that "consumer boycotts have become popular for one simple reason — they work."Friedman (1999) called 'economic consumer boycotts' those are against unfair marketing practices, and in particular to unfair price increases. According to Grappi (2013) consumer react negatively towards corporate irresponsibility, stronger the perceived corporate ethical transgression, the greater the felt of contempt, anger and disgust, that leads to negative word of mouth and even protest behaviour. Customers stop buying products or go for legal suits, shareholders sell their stocks, employees do not perform, and environmental advocates sue (Wood, 1991). Alternatively, irresponsible behavior by firms agitates stakeholders. They often react by boycotting the company (Hayes & Pereira, 1990), reducing consumption of the company's products (Sen & Bhattacharya, 2001), initiating legal action against the company (Greeno & Robinson, 1992). Corporate those dealing with a socially irresponsible corporate brand were more likely to punished and less likely to reward by the consumers (Sweetin *et al.*, 2013).

Boycott or protest cost a lot to the corporation and research found that product boycott announcements are associated with significant negative stock market reactions (Davidson *et al.*, 1995). As evidence, in 1995, European boycott of *Royal Dutch/Shell*, over its plan to dump the Brent Spar oil platform at sea resulted in widespread negative publicity and up to 50% decline in sales in some markets (Paine & Moldoveanu, 1999). The news pesticide controversy of*Pepsi* and *Coca-Cola* beverages in India reduced the sales of both companies by 60% (Financial Express, 2006). Another example is the ongoing multi-country boycott of *Nike* over alleged sweatshop conditions at Asian suppliers, still struggling to recover their lost brand image in footwear industry.

Blind

In this quadrant, corporates have high orientation towards CSR and their practices are environmentally sustainable as they offer eco-friendly products, engage in philanthropic activities etc., but consumer are either not aware of them or suspect the intentions of CSR. Such situation is called as 'BLIND' whereconsumer undermines firm's initiatives.

Authors believe that corporations can only be able to develop and uplift

societywhen they have enough economicresources to execute and sustain CSR activities. However, it is also to be noted that corporates have to sustain themselves to engage in better and bigger CSR roles. CSR must be seen as an investment i.e., corporate should get gainsin return in terms of increased sales of their sustainable products or processes through increasedconsumer purchases. It is a virtuous cycle as firms having more economic resourceswill be able to contribute more towards the society. The ideal CSR policy should enhance (also help in building) company's profitability and thus their sustainability which will ultimately help in ploughing more money into CSR activities for sustainable development.

Sustainable Development

In this conceptual model, the best quadrant is the 'SUSTAINABLE DEVELOPMENT', which is an ideal combination of consumer and corporate high orientation towards CSR. Here, the perfect synergy exists between consumer and corporate. This is the win-win situation. It can reap huge benefits not just for the society but also the corporates.The concept of Sustainability is built on the foundation that what cannot continue forever will not continue forever. Corporates are obviously major users and often abusers, of our limited stocks of the various forms of natural capital upon which our economic, social, and cultural well-being are based (Stoner & Wankel, 2010). There has been an increasing concern about the rapid exhausting of the earth's natural resources which has been the debate around many sustainability conferences. Corporate should always oblige towards society becauseCarroll (1991) commented having granted the right by society to operate within a community; corporations have an implied social responsibility toward the community. Mintzberg (1983, p. 12) wrote "there is no such thing as a purely economic strategic decision for a big business" andso there is no neat distinction between economic goal [of business] and social goals.

Although, this remain a controversial discussion on the outcome of the CSR initiatives. Many researchers find no link between CSR and business performance, while others showed it positive for the business.Review on literature reveals that there is CSR benefits is not limited to enhancing financial performance but there are non-financial benefits. For example, Lichtenstein *et al.* (2004) briefed that being socially responsible firm, it brings various benefits like increased purchases and donations from consumer for charitable causes. It enhances shareholder value and more specifically, that some CSR activities create goodwill among consumer in excess of their price tag (Martin, 2002 p. 70). According to Mishra & Suar (2010, p. 587) "an increase in the aggregate CSR boosts firm performance. CSR related benefits may arise due to two reasons. First, the CSR-induced revenue can increase from enhanced sales and prices/margins. Second, the CSR-induced cost decrease can result from tax concessions, reductions of duties by the government

to promote CSR activities, efficiency gains from environment-friendly technologies, and reduced cost of capital". Gupta & Sharma (2009) elaborated how social initiatives can be seemedas business opportunity; and managing social benefits and economic benefits simultaneously (Porter & Kramer, 2002).There are number of instances where we can observewhere corporates devoting enough resources for social causes and which turns to be beneficial for the corporate too. For examples, Indian Insurance giant, *Life Insurance Corporation of India*in collaboration with microcredit federations in the rural Andhra Pradesh, expanding their customer base which lead to increase in their gross margin by 27% (Brugmann & Prahalad, 2007). Indian Market Research Bureau reveals that *Hindustan Lever Limited*, Consumption of their products in rural households has increased by 15-20% after an initiative called '*Project Shakti*'in 2001 for creating livelihood of rural women in India (Sood & Arora, 2006). Consequently,HLL in their Business Sustainability Report 2013 – 14 added that *Project Shakti* have 65,000 Shakti Entrepreneurs.[3]Likewise there are many other examples like*ICICI*making business by launching insurance for small land holding farmers to insure them against whether changes. Retail giant *Wal-Mart* implemented cost control mechanism like re-routing trucks, recycling packaging, use of solar energy while remaining environment friendly.*Tata's*new social initiative opened driving school to train drivers.**It is a**two-fold strategy that involves employment opportunities for the youth and dealing with the subject of safety on road.*Tata's*industrial relation CSR administrative head, G.S Uppal, commented that "To maintain the growth momentum of the industry we decided to take up this skilling initiative under CSR (corporate social responsibility). It will not only help the society but also the business in general."[4]The impact of firm's proactive environmental practices on market share, profitability, and return on investment is better in environmentally conscious companies compared to not so conscious companies (Ahmed *et al.,* 1998).

Apart from the above gains, Porter and Kramer (2002) suggested CSR provides competitive advantage to the business firm and according to Waddock & Graves (1997) it can achieved through tax savings, decreased regulatory burden, and improvements in the quality of local labor. Moreover, Kanter (1999) believed it brings product differentiation among the peers. Du *et al.*(2010) believe that social responsibility behaviour not only shape a positive and favourable attitude and belief about the company but also, build corporate/brand image and strengthen stakeholder – company relationships. They also claim that advocacy behaviors like good word – of – mouth marketing, employee organizational commitment and citizenship behavior will be increased. Husted (2003) asserted when firms focus their social actions on communities in and around their area of operation, they reap the benefits of a socially responsible image among their employees and the local community. So, CSR is not a cost centre but an effective

management tool with multi-dimensional benefits (Gupta & Sharma2009, p. 396). European Commission on CSR reported as "The main function of an enterprise is to create value through producing goods and services that society demands, thereby generating profit for its owners and shareholders as well as welfare for society..."(European Commission, 2002).

Discussion & Conclusion

The main endeavor behind this study is to identify the role of Consumer in Sustainable Society Development. The authors makes an effort to highlight how consumer can be a key driving force for CSR and subsequently pressurize business firms to go for more CSR activities that leads to societal growth and development. Through the conceptual framework on CSR, it has been demonstrated that corporate and consumer high orientation could proceeds towards 'Sustainable development' of the society as well as ensuring corporate sustainability.The society will reap the maximum benefit, also ensuring corporate wellness, when there is an ideal combination of both corporates and consumers orientation towards CSR are high. This leads to SUSTAINABLE DEVELOPMENT for corporate and society as well. However, the extensive literature review also has revealed that this is not always the case.The worst scenario is depicted when both corporate and consumer display low orientation which may endanger the future of sustainable development of society and has been termed as MENACE in the framework. There is also the not so favorable case where corporates are highly oriented but consumers are not, which has been termed as BLIND, as consumers do not welcome corporate's efforts which may be due to difference in attitude and action of consumers - a case of Cognitive Dissonance arises which may be due to lack of trust on corporate motives, awareness, accessibility, high cost, limited options, trust, time, habit etc. The case may be contrary when consumers are enlightened and corporates are not ready to pump in more CSR and in the process ends up delivering less eco-friendly products and services or the business process not fulfilling ecological safety standards. Then it becomes paramount to utilize thepower of consumers to have a check on the system and employ the method of BOYCOTT to compel the corporates to follow sustainable guidelines or simply run out of business.There has been a lot of instances in the corporate history which has revealed this important facet of consumer power.

This study would like to conclude by observing that consumers have immense power to save the world and make it a better place to live in.Enlightened Consumers and Corporates together can create a win-win situation which can go a long way towards sustainable society. Together we have to pledge the importance of a sustainable planet and thus leaving a better and greener earth for tomorrow's generations. This study is conceptual in nature and could be taken as

foundation work that would trigger further evidence based research on this emerging area that link consumer, corporates and sustainable society.

References

Ahmed, N. Z., Montagno, R. V. and Firenze, R. J.(1998) Organizational Performance and Environmental Consciousness: An Empirical Study. *Management Decision,* 36(2),pp. 57-62.

Auger, P. and Devinney, T. M. (2007) Do What Consumers Say Matter? The Misalignment of Preferences with Unconstrained Ethical Intentions. *Journal of Business Ethics*, 76, pp. 361 – 383.

Becker-Olsen, K., Cudmore, B.A., and Hill, R.P. (2006). The Impact of Perceived Corporate Social Responsibility on Consumer Behaviour. *Journal of Business Research,* 59 (1), pp. 46 – 53.

Bhattacharya, C.B & Sen, S. (2003) Consumer – Company Identification: A Framework for Understanding Consumer's Relationships with Companies. *Journal of Marketing*, 67(2), pp. 76 – 88.

Bondurant, J.V. (1965) *The Conquest of Violence: The Gandhian Philosophy of Conflict.* Berkeley: University of California Press.

Brown, T.J and Dacin, P.A. (1997) The Company and the Product: Corporate Associates and Consumer Product Responses. *Journal of Marketing*, 61(1), pp. 68 – 84.

Brugmann, J. and C. K. Prahalad (2007) Co-Creating Business's New Social Compact. *Harvard Business Review,* 85(2), pp. 80-90.

Carrigan, M. and Attalla, A. (2001) The Myth of Ethical Consumer – Do ethics matter in Purchase Behaviour? *Journal of Consumer Marketing*, 18(7), pp. 560 – 577.

Carrington, M.A., Neville, B.A. & Gregory, J.W. (2014) Lost in Translation: Exploring the ethical consumer intention – behaviour gap, *Journal of Business Research*, 67, pp. 2759 – 2767.

Carroll, A B. (1991) The Pyramid of Corporate Social Responsibility: Toward the Moral Management of Organizational Stakeholders. *Business Horizons*, 34 (4), pp. 39-48.

Carroll, A.B. (1979) A Three Dimensional Model of Corporate Social Performance. *Academy of Management Review*, 4(4),pp. 497 – 505.

Clarkson, M.E. (1995) A Stakeholder Framework for Analyzing and Evaluating for Corporate Social Performance. *Academy of Management Review*, 20(1), pp. 92 – 117.

Crane, A. and Matten, D. (2004) *Business Ethics: A European Perspective* Oxford: Oxford University Press.

Davidson W.N., III, El-Jelly, A. and Worrell, D.L. (1995) Influencing Managers to change Unpopular Corporate Behaviour Through Boycotts and Divestitures: A stock Market Test. *Business and Society*, 34/2, pp. 171 – 196.

De Pelsmacker, P., Driesen, L. and Rayp, G. (2005) Do Consumers Care About Ethics? Willingness to Pay for Fair-Trade Coffee. *Journal of Consumer Affairs,* 39(2), pp. 363-385.

Du, S., Bhattacharya, C.B. and Sen, S. (2010)Maximizing Business Returns to Corporate

Social Responsibility (CSR): The Role of CSR Communication. *International Journal of Management Reviews*, 12(1), pp. 8 – 19.

Ellen, P.S., Webb, D.J., and Mohr, L.A. (2006) Building Corporate Associations: Consumer Attributions for Corporate Social Responsible Programs. *Journal of the Academy of Marketing Science*, 34(2), pp. 147 – 157.

Environics (1999), The Millennium Poll on Corporate Social Responsibility: Executive Briefing. Available at: www.mori.com/polls/1999/millpoll.(Assessed on: 18.07.2014)

Epstein, M.J. (2008) *Making Sustainability Work: Best Practices in Managing and Measuring Corporate Social, Environmental and Economic Impacts.* San Francisco: Berrett-Koehler Publishers.

European Commission (2002) *Communication from the Commission concerning Corporate Social Responsibility: A business contribution to Sustainable Development*, Availableat:http://eurlex.europa.eu/legalcontent/EN/TXT/?qid=1405928049589&uri=CELEX:52002DC0347. Accessed on:21/07/2014.

Financial Express: (2006) *New Norms to Gauge Toxins in Colas Soon.* December 18.

Available from: http://www.financialexpress.com/news/new-norms-to-gauge-toxins-in-colas-soon/187010. Assessed on: 29/06/2014.

Freeman, R.E. (2010) *Strategic Management: A stakeholder approach.*New York: Cambridge University Press.

Friedman, M. (1985) Consumer boycotts in the United States, 1970- 1980: Contemporary Events in Historical Perspective. *Journal of Consumer Affairs,* 12, pp. 96-117.

Friedman, M. (1999) *Consumer Boycotts.* London: Routledge.

Garcia, M., Crespo, A.H. and Rodriguez, I. (2005) Influence of Corporate Social Responsibility on Loyalty and Evaluation of Services. *Journal of Business Ethics*, 61(4),pp. 369 – 385.

Gildea, R.L. (1994) Consumer Survey Confirms Corporate Social Action Affects Buying Decisions.*Public Relations Quarterly*, 39(4), pp. 20-21.

Gugler, P. and Shi, J.Y.J. (2009) Corporate Social Responsibility for Developing Country Multinational Corporations: Lost War in Pertaining Global Competitiveness? *Journal of Business Ethics*, 87(1), pp. 3-24.

Gupta, S. and Sharma, N.(2009) CSR-A Business Opportunity.*Indian Journal of Industrial Relations,* 44 (3), pp. 396-401.

Grappi, S., Romani, S. & Bagozzi, R.P. (2013) Consumer Response to Corporate Irresponsible Behaviour: Moral Emotions and Virtues. *Journal of Business Research*, 66, pp.1814–1821.

Greeno, J. L. and S. N. Robinson (1992) Rethinking Corporate Environmental Management. *Columbia Journal of World Business*, 27 (3-4), pp. 222 – 232.

Hayes, A. S. and Pereira, J. (1990) Facing a Boycott, Many Companies Bend. *Wall Street Journal*, Eastern Edition, p. B1.

Hindustan Unilever Limited, Business Sustainability Report 2013 – 14.Available at: http://www.hul.co.in/Images/BRR-2013-14_tcm114-364167.pdf (Assessed on: 28.07.2014)

Husted, B. W.(2003) Governance Choices for Corporate Social Responsibility: To Contribute, Collaborate or Internalize? *Long Range Planning* 36(5), pp. 481-498.

John, A. and Klein, J. (2003) The Boycott Puzzle: Consumer Motivations for Purchase Sacrifice. *Management Science*, 49(9), pp. 1196 – 1209.

Kanter, R.M. (1999) From Spare Change to Real Change. *Harvard Business Review,* 77(3): pp. 122–132.

Khojastehpour, M. and John. R. (2014) The Effect of Environmental CSR Issues on Corporate/Brand Reputation and Corporate Profitability. *European Business Review*, 26(4), pp. 330 – 339.

Lee E.M., Park S.Y., Rapert, M.I. and Newman, C.L. (2012) Does Perceived Consumer Fit Matter in Corporate Social Responsibility Issues? 65, pp.1558 – 1564.

Lee, Ki-Hoon., and Shin, D.(2010) Consumer's Responses to CSR Activities: The Llinkage Between Increased Awareness and Purchase Intention. *Public Relations Review,* 36, pp. 193–195.

Lichtenstein, D R., Drumwright, M.E. & Braig, B.M. (2004) The Effect of Corporate Social Responsibility on Consumer Donations to Corporate supported Non-profits. *Journal of Marketing*, 38(4) pp. 16 – 32.

Lindgreen, A. and Swaen, V. (2010) Corporate Social Responsibility. *International Journal of Management Review,* 12(1), pp. 1 – 7.

Martin, Roger L. (2002) The Virtue Matrix: Calculating the Return on Corporate Responsibility. *Harvard Business Review,* 80(3), pp. 68-75.

Mishra, S. and Suar, D (2010) Does Corporate Social Responsibility Influence Firm Performance of Indian Companies? *Journal of Business Ethics*, 95, pp. 571-601.

Mitchel, R.K., Agle, B.R., and Wood, D.J. (1997) Toward a Theory of Stakeholder Identification and Salience: Defining the Principle of Who and What Really Counts. *Academy of Management Review*, 22(4), pp.853 – 886.

Oberseder, M., Schlegelmilch, B.B., & Murphy, P.E. (2013) CSR Practices and Consumer Perceptions. *Journal of Business Research*, 66,pp. 1839 – 1851.

Mintzberg, H. (1983) The Case for Corporate Social Responsibility. *The Journal of Business Strategy*, 4(2), pp. 3 - 15.

Paine, L.S. and Moldoveanu, M. (1999) Royal Dutch/Shell in Nigeria. *Harvard Business School*, Case Study 9, pp. 399-126

Porter, M.E. (2008) The Five Competitive Forces that Shape Strategy. *Harvard Business Review*, 1, pp. 79 – 93.

Porter, M.E. and Kramer, M.R. (2002) The Competitive Advantage of Corporate Philanthropy. *Harvard Business review*, 80(12), pp. 57 – 68.

Ross, J., Patterson, L., & Stutts, M. A. (1992) Consumer Perceptions of Organizations that Use of Cause Related Marketing. *Journal of the Academy of Marketing Science*, 20(1), pp. 93-97.

Sen, S. and Bhattacharya, C.B. (2001) Does Doing Good Always Lead to Doing Better? Consumer Reaction to Corporate Social Responsibility. *Journal of Marketing Research*, 38, pp. 225 – 243.

Smith, N. C. (1990) *Morality and Market: Consumer pressure for corporate Accountability*. London: Routledge.

Sood, A. and Arora B. (2006) The Political Economy of Corporate Responsibility in India, Technology, Business and Society. *United Nations Research Institute for Social Development (UNRISD)*, (18).

Sprinkle, G.B. and Maines, L.A. (2010) The Benefits and Costs of Corporate Social Responsibility. *Business Horizons*, 53(5), pp. 445-453.

Stoner, J.A.F. and Wankel, C. (eds.) 2010 *Global Sustainability as a Business Imperative.* New York: Palgrave Macmillan

Sweetin, V.H., Knowles, L.I., Summey, J.H. & McQueen K.S. (2013) Willingness to Punish the Corporate Brand for Corporate Social Irresponsibility. *Journal of Business Research*, 66, pp. 1822 – 1830.

Tata Motors to train truck drivers in sales push. Available at:http://www.dnaindia.com/money/report-tata-motors-to-train-truck-drivers-in-sales-push-1572042 (Assessed on: 20.07.2014)

The Economist (1990) *Business: Boycotting corporate America*. 26 May (vol.315), p. 69.

Waddock, S. A. and S. B. Graves (1997) The Corporate Social Performance - Financial Performance Link. *Strategic Management Journal* 18(4), pp. 303-320.

Wigley, S. (2008) Gauging Consumer's Responses to CSR Activities: Does Increased Awareness Make Cents? *Public Relations Review* 34, pp. 306–308.

Wood, D.J. (1991) Corporate Social Performance Revisited. *Academy of Management Review* 16(4), pp. 691- 718

Vogel, D. (2005) *The Market for Virtue: The Potential and Limits of Corporate Social Responsibility*. Washington, D.C.: Brookings Institution Press.

http://www.starbucks.com/assets/6ee14301a2364729abe59867fb913520.pdf (Assessed on: 04.07.2014)

21

A Graphic Presentation of Communication, Land Use and Environment in Meghalaya

Jennifer Thangkhiew
Buhtimai Lyngdoh
Iahunlin Khyriem
Bulsilian Lyngdoh Mawphlang

Communication

In general, communication is a means of connecting people or places. Transport and telecommunications are the most widely used means of communication. They constitute the infrastructure for the growth of primary, secondary and tertiary activities of men. All these determine the stage of progress and culture of the people living under various environmental conditions. With the progress in culture and civilization, new means of transport and tele communications have been developed.

Transport

Transport is one of the prime requisites for the advancement of human technology. It is an indication of the economic, social and commercial progress which has lead to the globalization of the entire world. It has enabled the exchange of ideas and inventions between different countries, and has considerably contributed to the progress and development of the world. Transport is one of the fundamental and indispensable parts of human culture. The "economic and commercial importance of the greatest magnitude is, now-a-days, attached to the development of transport".[1]

It is, therefore, clear that effective transport is indispensable for the economic progress of the world. Manufacturing, merchandising, banking, extracting and the like businesses all depend upon transport activities. The indispensability of transport is a major factor in the development in all the countries of the world. Transport plays its dominant role not only in the economic and political spheres but also in the social sphere where it has considerably influenced the life of people. As transport helps in getting raw materials and finished products in large quantities and varieties, it has raised the standard of living of the different peoples of the world.

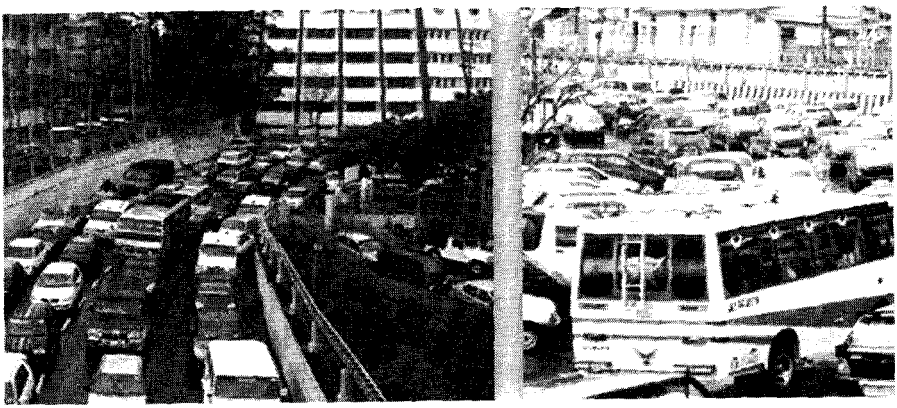
Meghalaya situated in North East India has a geographically hilly terrain which makes transportation limited. Though there is air connectivity from Umroi airport. But it has limitation because air transport is quite costly and transport of heavy goods does not fall within the purview of air transport for the same reason. Recently there is a railway connectivity uptoMendipathar in Garo hills. So roads are the chief means of transport activity in the state despite the high cost involved and airways is quite insignificant. Owing to the topography of the region, there are still some remote areas which remain inaccessible till date. As a result, the overall economic growth and development of the state has been slow.

In view of these impeding factors, road transport is the only means of transportation for carrying goods and passengers in the State as well as to and from the State. Another importantly significant aspect is that road transport has become the life-line of the State as far as its economy is concerned. Further, roads are also the only connecting link between Meghalaya and the rest of the country either socially or culturally. As such they are the arteries and veins which channelised the overall circulation in the economic health, social coordination and cultural understanding in the State and in the country.

In Meghalaya, though roads had been constructed initially during the middle and later half of the nineteenth century, yet the advent of motor vehicle was but in the early period of the twentieth century. According to available records, the first motor vehicle which came to Shillong and travelled the Guwahati- Shillong road was in 1904. The post independence period saw an increase in the number of vehicular traffic. The last decade shows a remarkable improvement in the process of vehicular traffic in the state. There has been a multiple fold in the increase of motor vehicles presently, which means that there is an increase in the level of air and noise pollution, as more cars means more carbon emissions, which affects the environment.

In Meghalaya, the land tenure system remains feudal even after independence. The land is owned mostly as private property of clans, families or individuals, and partly as community property of the people.[2] The roads are situated either in between private residential areas, government owned properties

or buildings owned privately. While the number of vehicles has increased drastically yet the roads remain the same and as a result, there is no scope to widen the roads. This congestion within the city, many a time, has resulted in the traffic coming to a standstill. While roads are the only means of motor transport yet it has become increasingly difficult to travel just within the city itself due to huge number of vehicles and narrow roads which is indirectly related to land ownership.

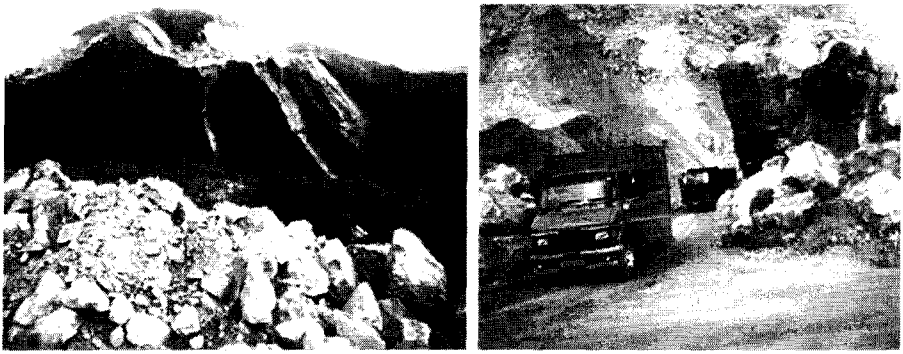


Pic 1- Heavy Traffic

Effect on Environment due to Road Construction

To ease congestion, the construction of the four-lane highway was started since 2010. For instance, large areas of land which include hills, trees and cultivated lands were cleared to make way for the road construction. The clearing of trees and hills for the expansion of the road which is meant to ease traffic congestion, on the other hand is clearly effecting the environment.

Pic 2- Construction Site at GS Road. (NH- 40)



Pic 3- Landslide in NH-40

The cutting down of hills and loss of vegetative cover makes the land more susceptible to soil erosion thereby increasing the chances of landslides leading to road blockades.

Telecommunication

Telecommunication is a two-way process of exchange of information over significant distances by electronic means. Telecommunication services are those that are provided by a communication company that offers voice and data services over a large area. The most common form of telecommunication service is telephone service, which is done on either a wired or wireless standard. Other services may include Internet, television, and networking for businesses and homes. These services may not be available in all areas or from all companies.

In Meghalaya land-line telephone services was started during the year 1984-85,[3] but when we look at the tele-density in the entire NE region is poor as compared to the rest of India, according to the survey conducted by the Ministry of DONER (Development of North eastern region)[4]

Table 21.1: Tele-density

Category	Assam	North East	All India
Rural	27.47%	33.51%	36.81%
Urban	142.96%	145.80%	166.54%
Total	44.91%	60.72%	76.03%

However with the advent of wireless services such as mobile phones, internet facilities and data services, there has been a sharp increase in the number of mobile phone users. These facilities have made communication more accessible and cost effective. During the past two decades there has been a great increase

in the use and demand for cellular telephone service. One product of this growth has been a sharp acceleration of demand for new areas to be served and consequently an increase in the number of cellular telephone transmission facilities and antennas erected.

Cell phone technology has revolutionized the telecommunication sector in India. Owing to its several advantages, cell phone technology has grown exponentially in the last decade. The number of cell phones and cell towers are increasing without giving due respect to its disadvantages. All over the world, people have been debating about associated health risk due to radiation from cell phones and cell towers.

Mobile phones and towers emit electromagnetic radiation[5] which has adverse health effects on humans, animals, plants and environment. Radiation can be classified into thermal and non-thermal effects. Thermal effects refer to heating effect which you observe if you hold the phone for long near your ear. Non-thermal effects on the human body cells, genes and the DNA and are more harmful than thermal effects. These non-thermal effects can lead to many types of disorders in humans such as headaches, sleep disorders, memory problems and constant body pain and others.[6]

Pic no. 4 Mobile Towers

The effects of radiation can be seen on animals like birds and bees. When birds are exposed to weak electromagnetic fields, they become disoriented and begin to fly in all directions, which explain migratory birds undermining navigational abilities. A large number of birds like pigeons, sparrows, swans are getting lost due to interference from the new "unseen enemy", i.e. mobile phone masts.[7]

According to a research conducted by Professor Girish Kumar, Electrical Engineering Department IIT, Bombay, it states that, "Recently, a sharp decline has also been noticed in commercial bee population in Kerala posing a serious threat to honey bees, hitting apiculture (the cultivation of bees on a commercial scale for the production of honey). The State has the highest density of mobile towers. Similar cases have been observed in Bihar, Punjab, Nepal and other parts of India and have been attributed to increasing electro pollution in the environment. When honey bee colonies were exposed with radiation, the honeycomb weight and area were reduced and returning time of honey bees increased compared to similar non-exposed colonies... The current dying/vanishing of honey bees can have serious consequences for human health. Scientists warn that the steady decline in bees and other pollinators could trigger crises bigger and more immediate than global warming."[8]

Apart from bees, birds and animals, electromagnetic radiation emanating from cell towers can also affect vegetables, crops and plants in its vicinity. The trees bearing fruits located around the vicinity of mobile towers do not produce healthy fruits which are fit for consumption because of high susceptibility to insects and worms.

Pic 5. Unripe Rotten Local Fruits

Telecommunications and Land use Policy

Absence of Land use policy gives unqualified rights to the land owners to do whatever they wish with their land.[9] Hence, we see mobile towers being erected in residential areas although it has been researched that the radiation emitted from mobile towers are health hazards. But since land is privately owned, there is no means to prevent the land or house owners in leasing out their land or rooftops to erect a mobile tower.

Also owing to the topography of the region being hilly, more mobile towers are required when compared to plain areas. Hence, we see many mobile towers of different companies within very short range from each other erected on the top of houses of people. This makes the residential locality look more like mobile tower colonies.

Sustainable Development

The concept of sustainable development was established at the UNO conference on human environment at Stockholm in 1972.[10] The World Commission on Environment and Development (1987) points out that, "the idea of sustainable development reaches far beyond environmental protection, as it means a process of change in which exploitation of resources, direction of investment, orientation of technological development and institutional changes are made consistent with the future as well as the present needs.

Sustainable development is about striking the right balance between economic development, social equity and environmental protection. For the road transport industry, meeting this objective translates into the challenge of satisfying market demands at the lowest economic, social and environmental cost possible.

Sustainable Transport

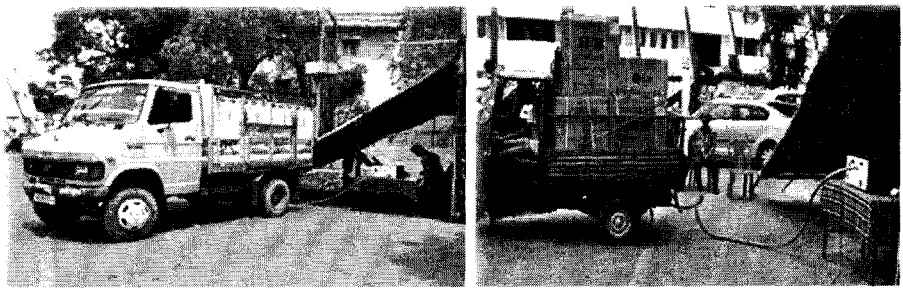
This refers to the broad subject of transport that is or approaches to being sustainable. It includes vehicles, energy, infrastructure, roads, railways, airways, waterways, canals, pipelines, and terminals. Short-term activity often promotes incremental improvement in fuel efficiency and vehicle emissions controlswhile long-term goals include migrating transportation from fossil-based energy to other alternatives such as renewable energyand use of other renewable resources. The entire life cycle of transport systems is subject to sustainability measurementand optimization.

Sustainable transport systems make a positive contribution to the environmental, social and economic sustainabilityof the communities they serve. Transport systems exist to provide social and economic connections, and people quickly take up the opportunities offered by increased mobility.The advantages of increased mobility need to be weighed against the environmental, social and economic costs that transport systems pose.[11]

Measures for Sustainable Transport

From walking to work to carpooling, there are lots of ways you can reduce your impact. Since most pollution from cars and trucks is due to the burning of fuel, you can reduce pollution from these sources by burning less fuel, burning fuel cleaner and burning cleaner fuel.

- Buy the most fuel efficient vehicle that meets your average daily needs for less pollution.
- Use transit and car- or van-pool to reduce travel costs and congestion.
- Bike or walk to avoid fuel use entirely.
- Other alternative transportation fuels such as natural gas a bio-diesel are most practical for fleets of vehicles.
- Pollution checking by transport department.



Pic 6. Emission Checking by the Pollution Board

Sustainable Telecommunication

- Limit your use, talk for short durations and switch sides during long conversations. SMS/IM, chat whenever possible.
- Use the land-line, whenever possible.
- Use speakerphone or wired hands free, but keep the phone at least 1 feet away.
- When not in use, keep the mobile phone away from your body as they still continue to emit some radiation while trying to communicate with the base station by sending at least one pulse per minute. Do not keep it in your pocket, under your pillow etc.
- Use cell phones with lower Specific Absorption Rate (SAR) values. If someone lives close to a mobile tower:
- One can request the operators to reduce the power transmission
- Change the angle of the antenna so that no house falls in the main beam of the antenna, or
- Go for Shielding Solution
- All over the world, people are going for fiber optic solution, low power transmitting antennas and in-building solutions and repeaters.

Alternatively, areas where the radiation levels are high, people can go for radiation shielding solutions like – Window Shielding Film, Shielding Curtains, Radiation Shield units etc.[12]

Conclusion

In conclusion we can say that the road to success for any economy to develop depends on its ability to integrate and maintain the balance between humans and the environment. At the same time the Government should take adequate measures to see that the concept of green economics is promoted and maintained in the state of Meghalaya.

Pic 7 Green Shillong

References

Prof. Girish Kumar: *A report on cell tower radiation*, Electrical Engineering Department IIT Bombay. Accessed on 18/7/2014

S.K.Srivastava: *Economics of Transport*, S. Chand and Company(Pvt)Ltd,New Delhi,1987.

Soumen Sen: *Between Tradition and Change*, B R Publishing Corporation, Delhi, 1988.

http://mdoner.gov.in/content/tele-density-other-telecom-issues Accessed on 16/7/14

http://www.thehealthsite.com/diseases-conditions/can-electromagnetic-radiation-from-mobile-towers-harmyou/?gclid=CJv3ooOEi78CFVIsjgodlHEAWA Accessed on 15/7/2014

http://www.pca.state.mn.us/index.php/air/air-quality-and-pollutants/air-pollutants/mobile-sources/motor-vehicle-pollution.html. Accessed on the 18/7/201

http://www.thehealthsite.com/diseases-conditions/can-electromagnetic-radiation-from-mobile-towers-harm-you/?gclid=CJv3ooOEi78CFVIsjgodlHEAWA Accessed on 18/7/14

Index

Accelerated, 52, 62, 65, 69-70, 221

Accessibility, 196, 199, 202, 209, 212-213, 242, 248

Accreditation, 128

Acquisition, 68-69, 155

Aesthetically, 156

Afforestation, 95-111, 148, 158, 183

Amenities, 117, 123, 141, 220

Aquatic, 29, 49, 140

Aspiration, 50, 76, 186

Atmosphere, 1, 3-4, 6-8, 10, 13, 29, 170, 174, 180

Attitude, 39, 151, 156, 173-174, 241-242, 244, 247-248

Attributed, 31, 196, 210, 258

Attributes, 153

Biodiversity, 1, 4, 7, 11, 26, 28, 46, 97, 128, 131, 138, 146, 159, 180-181

Catastrophic, 1, 8

Clusters, 101

Collaboration, 49, 119, 183, 225, 247

Compensatory, 96-97, 102-105, 108, 110-111

Concessional, 64, 66, 70, 182

Condenses, 19

congestion, 143, 255, 260

Consciousness, 31, 122, 249

Consumers, 2, 59, 63, 67, 70, 72, 84, 128, 232, 238-245, 248-249

Cumulative, 154, 210

Customize, 176

Degradation, 4, 19, 26, 28, 30-31, 41, 45, 112-113, 127, 131, 140-141, 218, 227

Depreciation, 52, 62, 65, 69-70

Ecological, 2, 7, 28, 41, 79, 91, 93, 97, 134, 146, 152, 180, 219, 235, 248

Ecology, 3, 25, 28-29, 40, 42, 45, 79, 91, 93, 145

Eligible, 30, 64, 67-68, 71, 88-89

Emerging, 7, 20, 167, 182, 231, 249

Emissions, 2-4, 6, 8, 10, 13, 20, 169, 180, 254, 259

Encompass, 174

Encouraging, 54-55, 60, 111, 154, 180-182, 184, 213, 221, 232

Endeavours, 25

Endorse, 181, 184

Enthusiasm, 174

Entrepreneurial, 124

Equipped, 176

Evaporates, 19

Exogamous clans, 116

Exploration, 41-42, 85, 228

Extinction, 1, 81

Extraction, 5, 13-14, 25-26, 31, 39, 41-43, 84

Flourish, 26, 84

Hydrology, 29

Immature, 162, 167

Immense, 50, 75, 80, 143, 169-170, 181, 248

Impairment, 149

Impermeability, 49

Impression, 125

Indigenous, 26, 39, 54, 76, 113, 128-130, 155-156, 183

Indiscriminate, 29

Infiltration, 42

Innovation, 54, 176, 178, 189, 232, 236

Insecurity, 43, 202, 205, 212
Irrigation, 225, 227
Logistics, 212
Lucrative, 69
Malnutrition, 203, 206-207, 211, 214-215, 220
Metaphor, 42
Mitigation, 26, 31, 54, 97
Neutralizing, 8
Open-cast, 26
Optimization, 7, 259
Organic, 80, 114, 119-125, 154, 167-168, 213
Orientation, 74, 113, 243-246, 248, 259
Perception, 74-75, 207, 211, 236, 241, 243
Pioneers, 189
Potential, 20-21, 29, 40, 50, 52, 55-58, 66-67, 72, 75-76, 113, 124, 129, 148, 151, 154, 156, 168, 218, 227, 229, 231, 252
Poverty, 21, 43, 117, 154, 195, 200, 205, 208, 211, 213, 215, 217-218, 220-228, 231, 233-234
Preferential, 59, 62, 64
Preservation, 122, 131, 147, 179-181, 192, 235
Prevalent, 40
Regeneration, 18-19, 86, 90, 96, 98, 100-101, 106, 162, 170
Renewable, 50-56, 61, 63-64, 66-67, 69, 71-77, 149, 154, 184, 259
Seeps, 161
Sensitizing, 131-132
Slackness, 31
Stagnant, 54, 210
Stakeholders, 39, 43-45, 106, 109, 114, 122, 131-132, 150, 152, 169, 231-232, 239-241, 245, 249
Starkest, 220
Subsidy, 61, 64-65, 70, 207, 212-213
Susceptibility, 258
Suspicion, 41
Sustainable, 2-3, 5-7, 11, 21-22, 31, 46, 75, 92-93, 111-114, 119, 122-123, 125, 128-129, 143, 145, 147-149, 151-153, 156-160, 168, 179, 181-183, 185, 219, 229-233, 236-238, 240, 243-246, 248-250, 259-260
Tariffs, 59-62, 69, 226
Terrain, 84, 146, 254
Topography, 26, 39, 84, 254, 259
Trajectory, 76-77, 208
Transformation, 76, 220
Tremendous, 14, 134, 189
Unregulated, 38-40, 43, 46
Unscrupulous, 45
Urbanization, 52, 133-136, 138, 141-144, 217
Vocational, 165
Volatility, 54

• **Dr. Evakorlang Kharkongor** is an Associate Professor of Economics in Shillong College, Shillong. She is involved in a number of activities for enhancing academic and professional excellence. She has writtentext books, published a number of papers in national and international publications, co-authored and edited a number of ISBN publications and ISSN Journal. She is a member of a number of academic and professional bodies. She is also a Life Member of Indian Economic Association and currently is the Vice President of the Meghalaya Economic Association.

• **Dr. Ashutosh Dey** is an Associate Professor in the Department of Economics, Ri Bhoi College, Nongpoh, Meghalaya. He has contributed too many national and international seminars and conferences. He completed a minor research project on Poverty and Rural Development in North Eastern Region. Dr. Dey is a life member of Indian Economic Association and Meghalaya Economic Association as well.

• **Dr. Philo Math Passah** is former Professor of Economics of the North Eastern Hills University. He has co-authored and edited numerous books and is the author of more than 80 published researched papers both in Economics and History. Professor Passah is associated with numerous organizations. He was an Executive Member of the Indian Economic Association, President of the North Eastern Economic Association, Co-founder and first president of the Meghalaya Economic Association. He received the Rashtriya Gaurav Award with Certificate of Excellence by India International Friendship Society and was inducted as Leading Professional 2013 and included in the 37thEdition of the Dictionary of International Biography by the International Biographical Centre, Cambridge, England.

• **Dr Natalie West Kharkongoris** an Associate Professor of Economics and Chairperson, Incubation Center, Indian Institute of Management Shillong. She has twenty-three years of research experience, 12 years of consultancy experience and has presented and published a number of publications. Dr. Natalie received the Broad Outlook Learner Teacher Award from the former Prime Minister of India, Dr. Manmohan Singh on 24th November, 2004, the Rashtriya Gaurav Award with Certificate of Excellence on the 16th July, 2011 in New Delhi. She also received the Innovative New Member Award from the Lions Club 322D in 2011. She is a national and international speaker. Currently, Dr. Natalie is the President of Meghalaya Economic Association, Member of Indian Economic Association, American Economic Association and an active Member of Green Economics Institute, UK.

The Book

The bookis the outcome of a Two-day International Seminar on ***Green Economics: The Road to a Balanced and Healthy Economy.*** It containsthe edited compilation of research papers byacademicians, research scholars, government officials, business leaders, sustainability practitioners and also by noted personalities from Colombia University, and the Green Economics Institute, United Kingdom. The papers reflect the diverse issues of the ecological consequences of the development mechanisms adopted, share experiences and suggests measures for harmonizing resource utilization and maintaining the ecological balance.

MEA
Meghalaya Economic Association, Shillong, Meghalaya
and

ISBN: 978 93 90434 07 7