ABSTRACT

A

NATIONAL SEMINAR

ON

BURNING ENVIRONMENTAL ISSUES:

RISK TO BIODIVERSITY AND HUMAN HEALTH

WITH SPECIAL REFERENCE TO NORTH EAST.

A

NATIONAL SEMINAR

On

Burning Environmental Issues:

Risk to Biodiversity and Human Health

With Special Reference to

North East India

ABSTRACTS

Organized by

Saint Mary's College
Shillong - 793003

In Collaboration with

State Council of Science and Technology and Environment

PROGRAMME

Date: 15th May, 2013 - Wednesday

INAUGURAL SESSION
TIME: 10:00-11:00AM

1. Arrival of Chief Guest
2. Lighting of the Lamp
3. Presentation of Bouquets
4. Welcome Song: Degree Students
5. Welcome Address : Principal
6. Keynote Address: Prof. B.K. Tiwari, Department of Environmental Studies, NEHU
7. Speech by Guest of Honour: Shri. P.B.O. Warjri, IAS, Addl. Chief Secretary, Govt. of Meghalaya
8. Speech by Chief Guest: Dr. M. Ampareen Lyngdoh, Minister of Urban Affairs, Govt. of Meghalaya
9. Vote of Thanks: Coordinator
10. National Anthem

REFRESHMENT

Academic Session I

Day 1: 15th May, 2013

Venue: Auditorium ::: Time: 11:30 AM – 1:30 PM

Concepts, issues and regulations of the Environment and Biodiversity

Chair person:

Prof. B. K. Tiwari, Department of Environmental Studies, NEHU, Shillong

Resource Person:

Shri T. T. C. Marak, IFS, PCCF, Govt. of Meghalaya

Paper Presenters:

- Environmental Ethics and Education:
  Dr. (Mrs.) Brinda Bazely Kharbirymbai,
  Associate Professor ,
  Department of Education, NEHU, Shillong

- Understanding Environmental Crisis from an Ethical Perspective
  Saphimosha Blah,
  Assistant Professor,
  Department of Philosophy,
  Saint Mary's College, Shillong

- Shrinking River Island Majuli- A threat on biodiversity
  Mayuri Das, Research Scholar,
  Department of Geography,
  NEHU, Shillong

Academic Session I

- Conservation of Environment for Healthy Living– Role of Educational Institution in North-East

  Prof. A. Henia,
  Deparment of Education, NEHU

- NERCORMP's initiatives in conserving biodiversity through community participation in North East India

  Mihin Dollo and L. Baite-IFS
  NERCORMP, Regional Office,
  Shillong

- Forest Management Issues in Khasi Hills

  Dr. Rekha M. Shangpliang,
  Assistant Professor,
  Department of Sociology,
  NEHU, Shillong

Lunch Break: 1:30 – 2:30 PM

Academic Session II

Day 1: 15th May,2013

Venue: Auditorium ::: Time: 2:30 – 5:00 PM

Environmental Degradation: Theogenic, Anthropogenic and Technogenic in North East India

Chairperson:

Smt. Patricia Mukhim, Editor, The Shillong Times

Resource Person:

Shri M. J. West, PHE, Rural Circle, Shillong

Paper Presenters:

- Lesson learnt from 2012- flood of Assam
  Mr. Pankaj Roy, Research Scholar,
  Department of Geography, NEHU,
  Shillong

- Bird Hunting in Arunachal Pradesh: A case study of Siang Region of Arunachal Pradesh, North East India.
  Mr. Ripin Taba, Dr. Daniel Mize,
  Department of Zoology,
  Rajiv Gandhi University,
  Arunachal Pradesh

- Landslide and Flashflood Hazard Analysis in Shillong Master Plan Area

V. J. J. Wallang, Department of Geology,
St Anthony's College, Shillong
B. K. Tiwari*,
Department of Environmental Studies,
North-Eastern Hill University, Shillong.

- Cadmium Stress on In-vitro pollen germination of *Helecteres isora* L.

Ramanjan Ghanta & Subrata Mondal
Department of Botany,
Visva-Bharati, Santineketan

- Distribution and enrichment of heavy metals among sediments in a natural reservoir : a case study with the Deepor Beel in Guwahati

Sanghita Dutta
Research Scholar,
Department of Environmental Science
Tezpur University

- Spatial distribution and Source Apportionment of Polycyclic aromatic Hydrocarbons (PAHs) in drinking water and soil of surrounding areas of Borholla oilfields of Jorhat, Assam

  Jinu Deka
  Research Scholar,
  Department of Environmental Studies,
  Tezpur University

- Problems of E- waste: A Catalyst to Environmental Degradation

  Dr. Ved Pal Singh Deswaal,
  Senior Assistant Professor,
  Faculty of Law, M.D. University
  Rohtak, Haryana

- Environmental Degradation of West Kameng District

  Cheten Jomba,
  Department of Geography,
  Rajiv Gandhi University,
  Arunachal Pradesh

Light Refreshment

Academic Session III

Day 1: 15th May, 2013

Venue: Room II ::: Time: 2:30 – 5:00 PM

Environmental impact of human activities on rivers

Chairperson:

Dr. Q. Kharbuli, Associate Professor, Academic Staff College, NEHU, Shillong

Resource Person: Shri Toki Blah ,IAS (Retd.), President ICARE, Shillong

Paper Presenters:

- River Wah Umkhrah in Shillong – Encroachment and its consequences

  Dr. I. Syiem, Associate Professor,
  Department of Education,
  NEHU, Shillong

- Encroachment upon Bank of river Wah Umkhrah By Human Population and its effects on environment and biodiversity

  Dr. Sanjiban Goswami, Associate Professor,
  Department of Botany,
  St. Edmund's College, Shillong

Academic Session III

- Comparative microscopical and microanalytical studies on some haematological parameter in dwarf snake head *Channa gachua* from two different location of the polluted River Umkhrah in North East India

  Ms. E. Mary Pala, Research Scholar,
  Department of Zoology,
  Gauhati University, Guwahati
  Dr. Sudip Dey,
  Electron Microscopy Division,
  SAIF, NEHU
  Dr. Aparajita Borkotoki,
  Department of Zoology,
  Gauhati University, Guwahati

- Umiam Reservoir, Shillong's ' Wasted' Pride

  Bashida Masar, Associate Professor,
  Department of Zoology,
  St. Anthony's College, Shillong

- Impact of domestic Discharge on the Water Quality of River Umkhrah (Poster Presentation)

  Jasmine T. Sawian, F. G. Lyndem,
  Wansah Pyrbot,Larihun Jeengaph &
  R. C. Laloo;
  Dept. of Botany, NEHU, Shillong

Light Refreshment

Academic Session IV

DAY 2: 16th May, 2013

Venue: Auditorium ::: Time: 9:30 – 11:45 AM

Population Growth, Environmental Degradation and Human Health

Chairperson: Dr. V.T. Darlong, Country Coordinator, UN-IFAD, New Delhi

Resource Persons:

1. Prof. K. P. Sarma, Department of Environmental Studies ,Tezpur University, Assam
2. Shri Naba Bhattacharjee, Member , MPERF, Shillong

Paper Presenters:

- Anthropogenic activities and their impact on environment of Papum Pare District of Arunachal Pradesh

  Mr. Koj Riniya, Research Scholar,
  Department of Geography,
  Rajiv Gandhi University,
  Arunachal Pradesh

- Impacts of Land use/ Land cover on land degradation in Deopani basin of lower Dibang Valley District, Arunachal Pradesh

  Mr. Jeremiah Modi, Dr. Tage Rupa,
  Department of Geography,
  Rajiv Gandhi University,
  Arunachal Pradesh

Academic Session IV

- Population Growth, Environmental Degradation and Human Health: A Perspective from the State of Arunachal Pradesh

  Tame Ramya,
  Ph.D. Scholar,
  Department of Anthropology,
  Rajiv Gandhi University,
  Arunachal Pradesh

- Degradation of Raid Sawkur Nongkseh Sacred Grove

  Carvy L. Nongpluh,
  Assistant Professor,
  Department of Geography,
  Saint Mary's College, Shillong

- Amphibian Decline: Risk to Human Health

  Dr. Saipari Sailo, Dr. Dibyandu Paul,
  Department of Environmental Studies,
  NEHU, Shillong
  Dioneas A. War,
  Department of Zoology,
  St. Edmunds College, Shillong

Tea Break: 11:45 AM – 12:00 PM

Academic Session V

Day 2 : 16th May,2013

Venue: Room II ::: Time: 9:30 – 11:45 AM

Unscientific and Unregulated Mining and processing of Natural resources

Chairperson: Dr. Z. Changsang, Scientist, Central Pollution Control Board, Shillong

Resource Person:

Rev. H. H. Mohrmen, Unitarian Union , Jowai

Paper Presenters:

- New Mineral Policy – A Changing Perspective and Vision Insight into Dynamics of Unscientific and Unregulated Mining in Meghalaya.

  Iasuklang Kharumniud,
  Assistant Professor,
  Department of Political Science,
  Saint Mary's College, Shillong
  Krishna Chauhan, Assistant Professor,
  Department of Economics,
  Buddha Bhanu Saraswati College,
  Shillong
  Shankar Sharma, Associate Professor,
  Department of Commerce,
  Shillong College, Shillong

Academic Session V

- A comparative study on the socio-economic impact of limestone mining by corporate sector and individual miners in Shella.

  Dr. Subrata Puryakashtha,
  Department of Geography,
  NEHU, Shillong

- Effect of Coal stock drainage on the soil fertility and plant productivity (Paddy) in Jaintia Hills Districts, Meghalaya, Shillong

  F. G. Lyndem, Wansah Pyrbot, Jasmine T. Sawian, Dr. R. C. Laloo;
  Dept. of Botany, NEHU, Shillong

Tea Break: 11:45 AM – 12 NOON

Academic Session VI

Day 2: 16th May, 2013

Venue: Auditorium ::: Time: 12 NOON-2:00PM

Deforestation, Green House Effect and Forest Conservation

Chairperson:

Shri. Naba Bhattacharjee, Member, MPERF,Shillong

Resource Persons:

Dr. Surender Singh, Department of Geography, Shivaji College, University of Delhi

Paper Presenters:

- Forest fire – Its impact on the biodiversity of Ribhoi District of Meghalaya

  K. Nongrum, Dr. D. D. Nengnong, A. P.Warjri, W. Ryndem, P. R. Lamare,
  Department of Geography,
  Synod College, Shillong

- Forest fire, grazing and regeneration problems: A case study of Dibang Valley District of Arunachal Pradesh, India

  Mr. Athuko Tayu,
  Rajiv Gandhi University,
  Arunachal Pradesh

Academic Session VI

- Climate Change and Sustainable development: Are we living sustainably?

  Mr. Baniateilang Majaw,
  Research Scholar,
  Department of Political Science,
  NEHU, Shillong

- Forest Conservation through sericulture: An example of conservation by peoples participation

  Dr. Amal Bhattacharya,
  Scientist –C,
  Regional Office,
  Central Silk Board, Guwahati

Lunch Break 2:00 – 3:00 PM

Academic Session VII

Day 2 : 16th May, 2013

Venue: Room II :::: Time: 12 NOON– 2:00PM

Waste Management , Bioremediation and other feasible effective strategies to control environmental degradation

Chairperson:

Shri. Toki Blah, IAS (Retd.), President ICARE, Shillong

Resource person:

1. Prof. S. R. Joshi, Department of Biotechnology and Bioinformatics, NEHU, Shillong
2. Shri Wanshan Kharkrang, Environmental Engineer, Meghalaya Pollution Control Board , Shillong

Paper Presenters:

- Solid Waste – An environmental concern and role of environmental education

  Dr. (Mrs) Rihunlang Rymbai,
  Assistant Professor,
  Department of Education, NEHU

- Waste Management in Shillong City

  Dr.. I. Syiem,
  Associate Professor,
  Department of Education,
  NEHU, Shillong

Academic Session VII

- Commercial revival of Natural Dyes In North East India: A strategy to protect environment

  S. N. Mishra, Dr. A. Basu
  Regional Silk Technological
  Research Station,
  Khanapara, Guwahati

- Inter connectivity between Media and Environment

  Dr. (Sr.) Mary Harriet, Principal,
  Saint Mary's College, Shillong

- Environmental awareness among the students of Shillong

  Dr. Yodida Bhutia,
  Department of Education, NEHU

- Biodiversity of Eri Silk Worm and Its Host Plants of North East India: Prospect for utilization of their by-products

  B. K. Singh, N. Tiken Sing, Bitopan Das, A. Bhattacharya, Nizora Bhuyan, P. Jayaprakash
  Central Silk Board,
  Banphool Nagar Path, Guwahati

Lunch Break: 2:00-3:00 PM

PROGRAMME

Date: 16th May, 2013 - Thursday

VALEDICTORY

TIME:3:00-4:00 PM

1. Presentation of bouquet
2. Valedictory Address: Principal
3. Reading of the proceedings
4. Speech by Chief Guest: Shri. R.G. Lyngdoh, CEO, Livelihood Improvement Company (LIFCOM), Meghalaya
5. Distribution of certificates : Chief Guest
6. Vote of Thanks: Convener

ACADEMIC SESSION I

ENVIRONMENTAL ETHICS AND EDUCATION

Dr. (Mrs.) Brinda Bazely Kharbirymbai,
Associate Professor , Department of Education, NEHU, Shillong

Abstract:

Environment is the most important part of our lives. It is the environment which provides us not only fresh air to breathe but beyond that environment even provide many other resources to our day to life. Ethics are basically morals and values, Environmental ethics are moral relationships between us and the world around us, What kind of knowledge and understanding best illuminates our relationship with nature or the environment and the environmental consequences of our actions, including ideological content?

This paper will try to highlight the role of environmental education in bringing about necessity in harmony with social and economic goals. Education is critical for promoting sustainable development and improving the capacity of people to address environment, mitigation and development issues. Environmental ethics in us can be imbibed through awareness in environmental education.

KEYWORDS- Environment, Ethics, Education

UNDERSTANDING ENVIRONMENTAL CRISIS FROM AN ETHICAL PERSPECTIVE

Saphimosha W. Blah
Assistant Professor, Department of Philosophy,
St. Mary's College, Shillong

Abstract:

Environmental Ethics as an academic discipline emerged in the early 1970s in response to the sudden awareness, that the industrial civilization had given rise to an environmental crisis in the 1960s. The industrial civilization has not been achieved without a great environmental price. Many of the great rivers of the world had become open sewers. The atmosphere over many large cities was choked with noxious gases. Open spaces and wild life habitats have given way to high ways, skyscrapers and shopping malls. Environmental Ethics concerns itself with ethical issues arising from the relationship between humans and the natural environment. Of particular interests are ethical considerations in relation to human efforts to conserve the natural environment.

Indigenous and traditional environmental ethics, however, have already existed though covertly, in different parts of the world for a very long time. In many indigenous cultures nature was looked upon as something divine and therefore the object of reverence and respect; nature, in some traditional culture, was considered the creation of God and hence should be handled with care; while in some other nature was visualized as a oneness of all life.

The Khasi tribe, which is an indigenous group of people found in the northeastern part of India, also has their own views on nature and man's role, and the close relationship which could be perceived from this saying – "*U Khasi u im bad ka Mariang, bad ka mariang ka im bad u*" – a Khasi lives with nature and nature lives in him.

SHRINKING RIVER ISLAND MAJULI– A THREAT ON BIODIVERSITY

Mayuri Das,
Research Scholar, Department of Geography,
NEHU, Shillong, Meghalaya.

Abstract:

Majuli, the world's largest inhabited river island has been shrinking in size over the years due primarily to the phenomenon of river bank erosion leaving only 421.65 sq.km of the island by the year 2001 rendering hundreds homeless especially during floods. Needless to mention, this accelerated rate of shrinking in the size of the island cannot be without its impact on the society, economy, demography and culture. Majuli is inhabited by different groups of people belonging to Mishing, Deori, Koch, Kalita, Ahom, Kachari (Sonowal Kachari), Nath (Yogi), Brahmin, Gosain etc. The different tribes of indigenous people have been living in Majuli. Majuli, one of the inhabited fresh water river island in the world happens to be a major seat of rapid social, demographic, cultural and economic change due to flood induced river bank erosion which is taking place at an alarmingly increasing pace year after year. Erosion is likely to submerge the river island in next 15 – 20 years. At stake is the glorious heritage of Assamese culture (already 29 satras vanished out of 65 satras). Population is increasing inspite of exodus due to displacement and per capita cultivable land holding is diminishing consequent threat on culture, socio – economy and ecology. It is a problem region and is a region perceived as highly "vulnerable".

CONSERVATION OF ENVIRONMENT FOR HEALTHY LIVING– ROLE OF EDUCATIONAL INSTITUTIONS IN NORTH EAST

Prof. A .Henia
Department of Education,
NEHU, Shillong

Abstract:

Everything which surrounds us may collectively be termed as environment. Environment has emerged as an economic commodity of strategic importance in the present day world. While technological development in fields such as medicine, engineering, science and technology, industry and transportation has greatly improved the quality of life, this same technology also endangers it in many ways by way of environmental pollution. Similarly we also witness the rapid depletion of the rich natural resources and extinction of varied flora and fauna species. North east region is no exception. It needs urgent measures to conserve and protect the environment from pollution and further deterioration. It is known for having rich natural resources, hence it is important to conserve the natural environment for sustainable development and ecological balance. A healthy environment is essential to our personal health. In today's complex world, it is necessary to define health in very broad terms. Health cannot be defined as merely the absence of disease or as purely personal conditions. Our health as individuals depends on the health of our environment. A healthy environment includes a wide variety of favourable factors. It does not merely make life possible, but makes life worth living. Therefore conserving the environment is felt extremely important as pollution and degradation it impacts the health of all. One such role could be

undertaken by the educational institutions towards learners' awareness and participation of conserving the same.

NERCORMP'S INITIATIVES IN CONSERVING BIODIVERSITYTHROUGH COMMUNITY PARTICIPATION IN NORTH-EAST INDIA

Mihin Dollo ,Coordinator (Natural Resources) &
L. Baite-IFS, Managing Director,
NERCORMP, Regional Office, Shillong

Abstract:

North east India is globally acknowledged for its rich eco-cultural practices well entrenched with varied traditional knowledge related to biodiversity conservation and sustainable natural resource management. The northeastern region, being one of the two internationally recognized "Biodiversity Hotspots" of the country needs more attention to lessen the degradation of natural ecosystem due to anthropogenic activities by involving local communities. In recent past, intrusion of culturally insensitive technologies and market based economics coupled with population pressure has led to unsustainable extraction of natural resources. However, the key concern around the globe today is to meet the demands of growing human population while sustaining ecological needs. Involving indigenous communities in managing natural resources and providing them alternative livelihoods can play a pivotal role to meet the ecological requirements and human necessities in the ethnically rich region. With this outlook, NERCORMP has initiated to take up activities in three northeastern states (Assam, Manipur and Meghalaya) of India with the broad objective- "To improve the livelihoods of vulnerable groups in a sustainable manner through improved management of their resource in a way that contributes to

preservation and restoration of the environment." In the first phase, NERCORMP covered 860 villages having a total of 39,161 households, and have established 1012 Natural Resource Management Groups (NaRM-Gs) and 3168 SHGs covering a total population of about 2.35 lakhs. In its second phase, the project is covering 465 villages having 21,212 households, and has established 497NaRM-Gs and 1391 SHGs so far. The community and women in particular are empowered through NaRM-Gs and SHGs by providing revolving funds and grants for various income generation activities (IGAs). In order to minimize the dependency of the communities on forest based natural resources, diverse alternative livelihood options such as agricultural and horticultural activities, dairy, piggery, goatery fishery, poultry, duckery, etc., has been supported along with various capacity building programme. Also, by promoting animal husbandry, hunting has been reduced over a period of time, as livestock rearing could supplement demand for meat and besides fulfilling the cash need of the communities. Moreover, around 1836 km^2 has been brought under Community Conserved Areas (CCAs) across the project villages for *in-situ* and *ex-situ* conservation of economically and ecologically potential species through aided natural and artificial regeneration which has improve the natural forest stands.

Key words*:* Biodiversity Hotspot, NaRM-Gs, SHGs, revolving fund, IGAs, alternative livelihood and CCAs.

FOREST MANAGEMENT ISSUES IN KHASI HILLS

Dr. Rekha M. Shangpliang,
Assistant Professor, Department of Sociology,
NEHU, Shillong

Abstract:

The Khasis are a people who live in close communion with forests. It is their well loved home, an abode of worship and a store-house of daily necessities of their life, like food, water, fodder and fire-wood. The Khasis assign a deep sense of awe and reverence to the different elements of forest in their natural abode, which conjure up to them as matters of life and death. This symbiotic relation between the Khasis and the nature has been appropriately defined by a Khasi author O.H.Mawrie in the following words – " *U Khasi u im bad ka mariang, bad ka mariang ka im bad u*", which means – A Khasi lives with nature and nature lives with him.(O.Mawrie, ……..) The hill slopes and deep gorges remain, through the year round, covered with trees, cane and bamboo groves, wild banana, medicinal plants and herbs and innumerable varieties of edible and non-edible forest produce.

This increasing realization of the multiple benefits of forests to mankind has created global concern for their protection and preservation and it has motivated humankind to formulate appropriate policies and plans at various levels from global to local. The forest department of British India which was created in 1864 started its general policy of forest administration by enforcing State dominion over forest resources, with a view to achieve systematic economic gains. The British looked at

forests as a main source of revenue and brought large areas of natural forests under Government control through enactment of forest laws. After the British left, the government of India followed the same set of forest rules and regulations in the name of economic development and fulfillment of National Forest Policy which resulted in further infringement of traditional rights of the people over forest produce. The Supreme Court on December 12, 1996 imposing blanket ban on forest operation threw millions of poor people out of employment affecting their basic source of livelihood.

ACADEMIC SESSION II

LESSON LEARNT FROM 2012 –FLOOD OF ASSAM

Mr. Pankaj Roy,
Research Scholar, Department of Geography,
NEHU, Shillong

Abstract:

Flood is a recurring phenomenon in Assam causing loss of life and property. The disruption of 2012 by flood is no more similar to any earlier flood in the valley. Despite the early warning provided by National Remote Sensing Centre the loss of life was more. Did the state administration warn the people at the right time? Were the people aware about the early warning? If yes, then why so many casualties? These are some questions which necessarily need to be answered. This paper will try to seek answers to these questions and make a general analysis of the devastation caused by the biggest flood that ever occurred in the most flood prone state of the nation.

Keyword: flood magnitude, flood warning, flood devastation, awareness and Assam.

BIRD HUNTING IN ARUNACHAL PRADESH: A CASE STUDY OF SIANG REGION OF ARUNACHAL PRADESH , NORTH-EAST INDIA

Mr. Ripin Taba & Dr. Daniel Mize,

Department of Zoology, Rajiv Gandhi University, Arunachal Pradesh

Abstract:

Arunachal Pradesh is the north-eastern most state of India which is located within the Eastern Himalayan biodiversity hotspot, most of which is unexplored land in terms of wild life. This state is situated in the Trans-Himalayan region between 26 °28'N and 29°23N Latitude and 91°31'E and 97°30'E Longitude and having tropical to alpine vegetation. Siang Region occupies the central part of Arunachal Pradesh which comprises of three districts; East Siang, West Siang and Upper Siang. This region has one National Park and two Wildlife Sanctuaries. The Mouling National Park having a total area of 483 km^2 is spread in the three districts of Siang region. D. Ering Memorial Wildlife Sanctuary and Kane Wildlife Sanctuary are situated in East Siang and West Siang District respectively. Arunachal Pradesh is very rich in fauna due to suitable vegetation. In India, Arunachal Pradesh is second highest in terms of avian diversity with around 837 species of birds. Out of this, 40 species are threatened birds. Out of these 36 threatened species, 25 are vulnerable species, 4 are endangered species and 7 are critically endangered species. Till now the bird population is very high in Arunachal Pradesh but it is under tremendous pressure

due to the hunting practice of people of the state. The basic factor for hunting of birds is the food habit of the people; besides this, hunting practice is inter-related with the traditional system and customs of people of the state. Adi tribes of Siang-Region celebrate their *Arran* festival by carrying out hunting of wildlife which has also caused a loss in the numbers of bird individuals. The hunting of birds is performed by trapping them and with the help of shotguns and catapults. The people of this region also use different traditional techniques for hunting of birds. The main reasons for this rampant hunting of birds are ignorance and unawareness of the importance of bird diversity among the people of the state.

It is , therefore, important to highlight and document some of the practices of hunting which lead to the loss of life of many bird individuals in Siang Region of Arunachal Pradesh and trying to create awareness among the people of the region about the importance of bird diversity which will be very helpful in the near future for the conservation of bird species in the state.

Key words: Siang Region, Arunachal Pradesh, India, Hunting, Trapping.

LANDSLIDE AND FLASHFLOOD HAZARD ANALYSIS IN SHILLONG MASTER PLAN AREA

V. J. J. Wallang, Department of Geology, St Anthony's College,Shillong.
B. K. Tiwari*, Department of Environmental Studies, North-Eastern Hill University, Shillong.

Abstract:

The twin hazards of landslide and flash flood are recurrent geoenvironmental hazards that cause loss of life and damage of properties. Certain sectors of Shillong city and adjacent areas experience these hazards year after year. However no systematic study on the causes and consequences of these hazards are available. As many as 60 minor and major landslides have been documented through on site inventorisation during 2003 and 2004 within Shillong Master Plan Area (SMPA), some of which are recurrent type while most of them are found in new localities. Their distribution is predominantly along NH-40 but several of these occur in thickly inhabited areas of the urban sprawl. Recurring flash floods have been recorded mainly in a narrow zone along Wah Umkhrah River that drains a sediment filled topographic low. An integrated study of the casual factors using Remote Sensing data analysis, GIS and field investigation in respect of geological, geomorphological and meteorological parameters suggests that multiple factors are responsible for landslide and flashflood in Shillong city master plan area. Landslide recurrence was observed in areas with slope $<35^{o}$ and mostly within a buffer of 0-1 m from the nearest road. These are also the areas characterized by

Precambrian phyllitic rocks with high feasibility, high lineament density (0.8-3.2km/km^2) and drainage density (1-4.1km/km^2). It is interesting to note that landslide and flashflood occurred when monsoonal rain was at its peak, more specifically, during the days with highest precipitation. The study suggests that high positive pore pressure water developed in the fissile rocks and thin soil cover overlying bedrocks due to seepage of water from continuous precipitation is the triggering factor for slope failure. The study shows that SMPA in general and the northern part of the study area in particular are highly susceptible to mass movement due to geological and geomorphologic factors. The immediate cause of flashfloods are, however constriction of the floodplain of Wah Umkhrah river by settlement, uncontrolled input of debris from the surrounding cliffs following high intensity rain and high relief of the terrain.

Key Words: Integrated study, geological and geomorphologic parameters

CADMIUM STRESS ON *IN VITRO* POLLEN GERMINATION OF *Helecteres isora* L.

Ramanjan Ghanta and *Subrata Mondal
Department of Botany, Visva-Bharati, Santiniketan-731235 (India)

Abstract:

The present paper reveals the effect of Cadmium stress on *in vitro* pollen germination of Atmora *(Helecteres isora* Linn.). The medium containing 100 ppm H_3BO_3 supplemented with 5% sucrose showed maximum 94% germination along with 804 µm pollen tube development. Cadmium had a highly toxic effect on pollen germination and tube growth, which were greatly inhibited as metal concentrations increased. Pollen showed an increasing tendency to bursting, strong morphological abnormalities, characterized by uneven or aberrant growth, thick callose deposition, tube bursting, more than one tube formation from single pollen grain etc. at higher concentrations (120-840 µM). Cadmium concentration at 840 µM almost stopped pollen germination as well as tube growth, which adversely affect the pollen viability.

DISTRIBUTION AND ENRICHMENT OF HEAVY METALS AMONG SEDIMENTS IN ANATURAL RESERVOIR: A CASE STUDY WITH THE DEEPOR BEEL IN GUWAHATI

Sanghita Dutta ,
Research Scholar,
Department of Environmental Sciences,
Tezpur University, Assam

Abstract:

The concentrations of cadmium, cobalt, chromium, iron, lead, zinc, copper and arsenic in bed sediments of Deepor Beel have been studied in eight different locations. Grab samples of bed sediments were collected following the standard methods. The sediment samples of the wetland were processed and analyzed for heavy metals using ICP-OES. Based on the geoaccumulation indices, the sediments are considered to be unpolluted with respect to Cd and moderately polluted with Zn, Pb and As. The enrichment factor of both Pb and Zn were significantly high indicating very high pollution of these two metals from anthropogenic sources. The calculation of ecological risk assessment showed that among all the heavy metals Pb has the highest ecological risk followed by As. X-ray diffraction analysis of the samples showed the presence of minerals augite, chlorite, feldspar, quartz, spinel and staurolite.

Keywords: Deepor Beel, heavy metals, ecological risk assessment, geoaccumulation index, enrichment factor

SPATIAL DISTRIBUTION AND SOURCE APPORTIONMENT OF POLYCYCLIC AROMATIC HYDROCARBONS (PAHS) IN DRINKING WATER AND SOIL OF SURROUNDING AREAS OF BORHOLLA OILFIEDS OF JORHAT, ASSAM

Jinu Deka,
Research Scholar, Department of Environmental Studies,
Tezpur University,Assam

Abstract:

PAHs are ubiquitous organic contaminants in environments that consist of fused aromatic rings which are mostly originated from anthropogenic processes. Concentrations, spatial distribution and sources of 16 US EPA priority polycyclic aromatic hydrocarbons (PAHs) were investigated in surface soil and groundwater of the surrounding areas of Borholla Oil fields, Assam. The concentrations of individual PAHs in the Borholla oilfield & its surrounding areas varied from 0.003 mg/Kg to 52.28 mg/Kg in soil and 0.003 mg/L to 42.22 mg/ L in water. Both spatial and temporal variation in the concentration of PAHs was observed. A high abundance of PAHs with 2, 3 & 4 rings had been found. Contribution of the 6 EPA carcinogenic PAHs was very less to the total PAHs concentration. The source apportionment study of PAH inputs to soil and ground water were qualitatively and quantitatively determined by diagnostic ratios and multivariate statistical analysis which revealed that the sources of these PAHs are mainly pyrogenic.

Key-words: Polycyclic Aromatic Hydrocarbons, oil-fields, source apportionment, pyrogenic.

PROBLEMS OF E-WASTE: A CATALYST TO ENVIRONMENTAL DEGRADATION

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Abstract:

Science and technology has been playing a vital role in producing goods and services to improve the quality of life, but resultantely there is a certain element of hazard or risk. Because of the advancement of science and technology we have been generating new electronic products and dicarding old ones, leading to create a hub of e-waste. Waste is any material that is not needed by the owner, producer or processor. India has long been a destination for the dumping of e-waste from developed countries but also has a rapidly growing domestic electronics industry, making national legislation that tackled both e-waste imports and domestically produced electronics the key aim of the campaign. After highlighting the problem, Greenpeace worked behind the scenes for several years to get companies, industry associations and government experts to draft legislation that a binding law to make producers financially liable for the management of e-wastes, and in particular their own e-waste.

Strategies to Control Environmental Degradation

After several years of campaigning by environmental groups, India's Ministry of Environment and Forests (MoEF) introduced E-waste (Management and Handling) Rules 2010, which came into effect in May

2012. These measures include ***Extended Producers' Responsibility*** (EPR) for recycling, reducing levels of hazardous substances in electronics and setting up collection centres. The new rules cover discarded IT and telecoms equipment and consumer electrical goods. However, medical devices, light bulbs, fluorescent tubes and batteries are excluded. The legislation also restrict the use of toxic substances like cadmium, mercury, lead, hexavalent chromium, polybrominated biphenyls and polybrominated biphenyl ethers in the manufacture of electronics. Environmental groups are calling for the government to go further and ban polyvinyl chloride (PVC) and brominated flame retardants (BFR) in electronics. This new Indian e-waste law is a big step in the right direction – its not going to solve e waste problems right away (effective implementation and future strengthening of the regulation is needed) .

"This is not just a victory for the environment but business, as it creates a level-playing field. The rule ensures a transition from the current out-of-sight out-of-mind approach to proper recycling of e-wastes and in the process accelerating the commercial introduction of green electronic products in the market." We need to follow following principles to protect our environment. They are as follows

- Precautionary Principle.
- Polluter Pays Principle.

The e-waste crisis can only be solved by three key measures

- Manufacturers are directed for the products which may be reused and recycled.
- Companies must take responsibility for the costs of their products at the end of life, adopting what is called Individual Producer Responsibility.
- Strong global regulation and enforcement of laws to prevent illegal, and sometimes legal, exports of e-waste for dumping in the territory of India.

We know that laws have been created to be followed by the citizens. Therefore we must keep our e-wastes items in the baskets provided and follow the rules and regulations to maintain our mother Earth neat and clean and pollution free. It is our fundamental duty also to maintain our environment pollution free as the same is our fundamental rights which has been declared by the Hon'ble Supreme Court in the case of Subhash Kumar vs. State of Bihar (1991) and T.N. Godavardan vs. Union of India in (1996).

ENVIRONMENTAL DEGRADATION OF WEST KAMENG DISTRICT

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Abstract:

Introduction

West Kameng district is a mountainous tract in Arunachal Pradesh which covers an area of 7422 sq. km located in the western most part of Arunachal Pradesh. The district can be termed as mini Arunachal Pradesh in terms of diverse ethnic groups inhabiting in a small region. The headquarter Bomdila is located in 8000feet above the sea level. It extends approximately between 91°30′ East longitude and 26°54′ to 28°1′ North latitude. The topography is mostly mountainous of Himalayan origin. The study area experiences arid Tundra or a cool climate in the North. According to 2011 census, the total population is 87,013 with 49,568 male and 37,445 female and it gives it a ranking of 618th in India (out of a total 640).

The present discourse is in relation to the environmental degradation of West Kameng District, Arunachal Pradesh. Environmental degradation is one of the major problems. In the present day, environmental degradation is being considered as a serious threat to all the living organisms on the planet earth. In this perspective the above theme has been selected to focus on such aspects of environment. If such aspects are not checked at the right time then it will become disastrous to the health of all living organisms. The total forest cover in West Kameng District is 5154km².

Earlier West Kameng district was more forested area but now a days it has becomes changed i.e. forests are cleared due to rapid growth of population in the region. The headquarter Bomdila is such an example. The area is deforested day by day due to construction of roads, dams, making of houses and firewood purposes etc. Shifting cultivation (jhum) is practised by many people in the rural areas which leads to the change of climate. Due to rapid population growth the settlement system became compact, resulting in lack of good drainage system, waste disposal management and parking facilities etc. During the rainy season (flood) people face lots of difficulties due to lack of proper drainage system. Landslide is also a common phenomena in the region during the months of June, July and August.

The term 'Environment' has been derived from the French word 'Environner' meaning to encircle. Similarly, environment is the sum total of surrounding external conditions within which an organism, a community or an object exists.

Environmental degradation refers to the overall lowering of environmental qualities because of various anthropogenic and natural causes. Environmental degradation describes about the erosion of the natural environment through the depletion of resources, the destruction of ecosystems and the extinction of plant and animal species. Population growth, deforestation, shifting cultivation, pollution, dam and road construction, acid rain etc are the major causes of environmental degradation. Their effects and desirable suggestions will be also included.

ACADEMIC SESSION III

RIVER WAH UMKHRAH IN SHILLONG-ENCROACHMENT AND ITS CONSEQUENCES

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Abstract:

Encroachments include activities such as mowing, plantings, trash dumping and construction of varied structures. The river Wah Umkhrah in Shillong is marred by extensive pollution and encroachments along its banks. Many illegal constructions such as houses , workshops , car garages have come up on the Umkhrah banks causing the river to be on the verge of extinction..

A few decades ago the spot was an open expanse of land, a beautiful spot- where residents of Shillong would enjoy to watch the crystal clear waters of Wah Umkhrah. People of the locality and adjoining areas used to organize picnics and functions there. In absence of any conservation measures, the river has been encroached and turned into a garbage dump. The river has been turned into a junkyard with tons of polythene, cardboard, steel and other scavenged items dumped on it. Pungent smell has engulfed many localities along the Umkhrah as sewage of the illegal hutment directly flows into the river affecting its flora and fauna.

The present paper will focus on the encroachment by human beings along the banks of the Wah Umkhrah and highlight its consequences.

ENCROACHMENT UPON BANK OF RIVER WAHUMKHRAH, SHILLONG BY HUMAN POPULATION AND ITS EFFECTS ON ENVIRONMENT AND BIODIVERSITY

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St. Edmund's College, Shillong

Abstract:

The river Wahumkhrah of Shillong has become polluted due to various human activities in recent years. Encroachment along the river bank, flow of garbage and sewage, domestic wastes, cleaning of automobiles directly into the river etc are some of the causes of river water pollution. Discarded plastic materials and poly bags are the main factors for causing flood hazards and landslides in different parts of its course.

In 2012, a task force comprising over 20 local NGOs of the state, the KHADC and the Mylliem Syiemship was formed for safeguarding and protecting the important rivers of the state which have become polluted due to various human activities. The KHADC has launched "the clean Wahumkhrah mission" on 26th of April,2013 by organizing a cleaning drive along the river at Umkaliar on the outskirt of the city. Recently KHADC is formulating a bill as per provision of Para 6 of the Sixth schedule to restrict human activities which hamper and pollute the rivers.

The present study is a modest attempt to analyze the problem, causes and possible solutions of periodic floods and large scale land -

slides in different localities which are nearby river Wahumkhrah. The present paper is based on the primary data collected from different locations of Wahumkhrah river starting from Happy Valley to Mawlai bridge. Besides primary sample survey, in preparing this paper personal interactions and interview method have also been incorporated to know the view of the general public regarding the causes of flood and landslides in those areas. Correlation between different biotic groups and physico-chemical characteristics of the water showed that dissolved oxygen (DO), biological oxygen demand (BOD), chlorides, conductivity etc. generally affect the biotic population of the river water. Seasonal variations of biotic and physico-chemical parameters suggest that encroachment and waste management needs special attention for revamping the health of the river water.

The Fourth UN World Conference on Women (held in Beijing in1995) recognizes the importance of women in natural resource management and particularly emphasized the active involvement of women in developing strategies for management and sustainability of water resources. The need of the hour is to create awareness among the people of the indispensible need of clean water for living a hygienic life and scientific management for sustainable development. This calls for people's active participation and cooperation in coordination with the scientific community and the government.

COMPARATIVE MICROSCOPICAL AND MICROANALYTICAL STUDIES ON SOME HAEMATOLOGICAL PARAMETERS OF DWARF SNAKEHEAD, *Channa gachua*, FROM TWO DIFFERENT LOCATIONS OF THE POLLUTED RIVER UMKHRAH IN NORTHEAST INDIA

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Abstract:

Environmental pollution is now a major national and international issue. Earlier, it was thought that hill stream ecosystem is comparatively less prone to severe pollution, since it is away from hectic human activities, but this is not the case today. The location of the present study area (Umkhrah River) is Meghalaya (abode of clouds). The Umkhrah River covers the Shillong City, which is the headquarters of the East Khasi Hills district and the state capital of Meghalaya, India. Umkhrah River lies at an altitude of about 1600 meters above mean sea level. Even though the total stretch of the River Umkhrah is only about five kilometres, yet its significance for Shillong is immense since its command areas are strategic locations of Shillong. The present investigation was carried out to investigate the toxic effects of different pollutants on the haematological parameters of *Channa gachua* in two locations (Wah kaliar- polluted site I and Jingthang Briew- polluted site II)along the River Umkhrah as compared to the control site, Rural Resource and Training Centre (RRTC). The sources of pollution at

Wah Kaliar are mainly from stone and sand quarrying, sewage discharges and detergents from washing of clothes and cars along with petrol, grease, brake oil and mobile oil from the washed cars while those at Jingthang Briew include municipal discharges, fertilizers, effluents from slaughter houses and the wastes generated from the many automobile workshops and service stations besides wastes from hospitals and restaurants in its vicinity.

The haematological parameters like total erythrocyte count was found to be higher at both the polluted sites, polluted site I ($3.26 \times 10^6/mm^3$), polluted site II ($3.15 \times 10^6/mm^3$) as compared to control site ($2.76 \times 10^6/mm^3$). Accordingly, the haemoglobin content of fish from the polluted sites (I and II) was found to be higher as compared to the control site, i.e 16.3 gm%, 15.9 gm% and 13.4gm% respectively. Also, the total leukocyte per cubic mm of blood was recorded to be higher in fish from polluted site I (1,33,850) and polluted site II (2,02,650) as compared to control site (1,28,250). Optical and scanning electron microscopy of the RBC in the fishes at the two sites also revealed a number of abnormalities. In terms of light microscopy (micronucleus assay) the percentage of micronucleus was found to be higher in the fishes from polluted site II (4.25%) as compared to fishes from polluted site I (3.4%). Scanning electron microscopic study revealed higher percentage of crenated erythrocytes, echinocytes, lobopodial projections and membrane internalisation in the RBC of fishes from polluted site I as compared to polluted site II. Energy dispersive X-ray spectroscopy exhibited the absence of lead in the erythrocytes of fish from the control site but presence of slightly higher percentage of lead in erythrocytes of the fish collected from polluted site I as compared to fish from polluted site II. The overall results suggests that the pollutants mentioned earlier,

at site I produced more adverse effects on the haematological parameters of *Channa gachua*.

It may be mentioned that, the river Umkhrah until less than forty years ago was a place where people washed their clothes, swam and fished as it was clean and endowed with a rich variety of local fishes, unlike the present scenario. The present study thus indicates a direct correlation between differentially polluted water site and the severity of the haematological disorders observed.

UMIAM RESERVOIR, SHILLONG'S "WASTED" PRIDE

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Abstract:

The present communication reports the past, present and future of the Reservoir Umiam, in North-East India, Meghalaya. The Umiam reservoir also known as Barapani or Damsite was formed as a result of the construction of the dam across the river Umiam for generating hydroelectric power. The reservoir was once a clean water body harbouring approximately 19 fish species including the famous indigenous mahseer. It was the only source of livelihood for 200 to 250 fishermen. However, in recent years, the fish population has been showing a declining trend and the number of fishermen has come down to about 60 people daily and yet, none of them can depend solely on the lake for their livelihood.

Rapid urbanization and lack of civic sense among some people in Shillong city and the neighbouring villages have transformed Umiam Reservoir into the cesspool of Shillong. The three rivers, Umiam, Umshyrpi and Umkhrah that feed the reservoir are being fed by the streams and drains of the city, collecting and bringing all the waste materials directly into them. An estimated total of 20 to 25 tonnes of solid waste finds their way into the drains and then into the rivers every day, and an approximate 2,025 million litres of sewage enter river Umkhrah and river Umshyrpi every year. Municipal dumping ground of

Shillong city at Mawiong (Mawlai) is not far away from the river Umiam, just before it enters the mouth of the reservoir.

Recent research by Central Pollution Control Board (CPCB) confirms the contamination of the rivers Umkrah and Umshyrpi with sewage. Latest research on common carp inhabiting the reservoir Umiam found out high concentration of lead and silicon in the blood of the fish as well as prominent structural abnormalities in the tissues studied. The same study also reported high level of lead in the water body, suggesting contamination of the reservoir with this heavy metal.

Proposals were made, money was sanctioned to revive the reservoir and yet, there was no implementation till date. The life of the dam was estimated to be around 200 years at the time of commissioning in 1965. The astounding fact is, Umiam reservoir will perish soon if the existing situation continues unabated.

Keywords: Umiam; Reservoir, Pollution, Waste, Fish, Shillong.

IMPACT OF DOMESTIC DISCHARGE ON THE WATER QUALITY OF RIVER UMKHRAH IN SHILLONG, MEGHALAYA

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Abstract:

Aquatic ecosystems have become adversely contaminated leading to loss of biodiversity and depletion of other natural resources. Water resources, in particular, are under serious threat both in terms of their quality and quantity. All such environmental perturbations exert tremendous pressure on human health and socio-economic fabric of the society. Khasi Hills of Meghalaya has a large number of rivers and streams that drain the undulating landscape of the area. These water bodies serve as important sources for drinking water, irrigation and support a rich array of floral and faunal diversity of the locale. During the last few decades, there has been phenomenal increase in disturbance and developmental activities have caused massive damage to landscapes and biological communities. Unfortunately, rampant discharge of pollutants directly into the river has adversely affected the quality of water of most aquatic ecosystems especially in Shillong, the state capital of Meghalaya. The adverse effect of domestic discharge is water

contamination. The river Umkhrah in Shillong, Meghalaya is the major victim of rampant pollutant discharge and encroachment. The physico-chemical parameters and level of metals observed in this study have shown that the majority of the water utilized from the various natural sources examined is polluted. This was observed mainly to be due to the indiscriminate dumping of wastes into the environment, discharge of domestic sewage, leaching of heavy metals, organic enrichment and silting. Water quality of river Umkhrah has degraded to the extent that the river and its tributaries are losing their life sustaining role and becoming devoid of aquatic life. As anthropogenic sources of waste inputs increase, the quality of the river also declines and its impacts can be detected further downstream. This is a major threat to human population, especially those within the area and indicates the serious condition of the water bodies of the area that hardly can support any aquatic organisms. In view of this fact, the present study was aimed to determine the water quality of river Umkhrah in Shillong, Meghalaya to see how the discharge of urban and domestic wastes affects the water quality.

Keywords – water bodies, domestic discharge, contamination, water quality

ACADEMIC SESSION IV
ANTHROPOGENIC ACTIVITIES AND THEIR IMPACT ON THE ENVIRONMENT OF PAPUM PARE DISTRICT OF ARUNACHAL PRADESH

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Abstract:

Worldwide, increasing population is the major problem interfering with development and environment. Increasing population growth is one of the hottest issues of the world, directly affecting the economy of country or region and many other areas. Today needs are constantly changing; the capitalist world has made people replace their needs and wants with an ever increasing range of goods and services. The UNDP reports have looked into the human development , they have emphasized on human wellbeing based on human capabilities, human choices, and centrality of people. Different scholars have a different perspective of human needs. The present study involves the study of anthropogenic interferences in bringing rapid population growth and urbanization in Papum Pare district of Arunachal Pradesh. The district extends between 26^{o} 55' north and 28^{o} 40' north latitude and between 92^{o} 40' east and 94^{o} 21' east longitude. The total population of Papum Pare district is 1,76,385 (2011census), of which 90447 are male and 85938 are female. There was change of 44.57 % in the population compared to population as per 2001. Papum Pare is the most populous district of the state. This increase in population has led to an increase in residential areas. Geographical area of district is 2875 km^2 and average

annual rainfall 3200 (mm), total forest cover of Papum Pare district is 75 %. At present rapid population growth ,space problems and over exploitation of natural resources, has led to a loss of biodiversity and environmental degradation has become a serious problem in the district. The traditional cultivation practice , ongoing unscientific and unsystematic development especially tourism, quarrying ,power projects and construction have caused varies forms of environmental degradation. Deforestation, over grazing, soil erosion, land degradation and water pollution are the other serious problems resulting from anthropogenic activity in the area affecting the unique biodiversity.

IMPACTS OF LANDUSE/LANDCOVER ON LAND DEGRADATION IN DEOPANI BASINS OF LOWER DIBANG VALLEY DISTRICT, ARUNACHAL PRADESH

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Abstract:

Land degradation is one of the most slowly affecting factors of environmental degradation. It is the loss of utility or potential utility through the reduction of or damage to physical, social, cultural or economic features and low reduction of ecosystem diversity. Land degradation is therefore a menace to living-being and environment. The problems and associated loss of soil productivity and soil organic matter and declining of soil quality is one of the major attraction points to be carried out. So, effort has been put out to traces out how vehemently the landuse/landcover are effecting upon the degradation of soils in the study area. The present study area is a part of Lower Dibang Valley district located between $28^0$04'19" N to $28^0$14'40" N latitude to $95^0$42' E to $96^0$58'36"' E longitude and is covering 246.11sq.km. It is inhabited by local indigenous Idus and the Adis practicing Jhum and permanent type of cultivation. The study intends to focus on the landuse and landcover impacts on land degradation in three river basin of Iphi, Eze and Emme River in Lower Dibang Valley district. The physical setting, climatic condition, anthropogenic factors are responsible for creation of land degradation in the region. The area is drained by three major rivers like Iphi, Emme and Eze which are degrading soils in large quantity especially in the rainy season. The objectives behind the study is to

bring out up-to-date soil degradation status map as through the soil degradation map the extent of various degradation-related problems would be known and to understand the impact of landuse/landcover on land degradation so as to initiate remedial measures. To do so, the work has been carried out with the help of computer assisted interpretation of digitized topographic maps of 1:50000; beside this source , data has also been collected from various branches of Government of Arunachal Pradesh Government physically.

POPULATION GROWTH, ENVIRONMENTAL DEGRADATION AND HUMAN HEALTH: A PERSPECTIVE FROM THE STATE OF ARUNACHAL PRADESH, INDIA

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Abstract:

As the human population doubles every few decades, its impact on the environment increases at a faster rate. Humans cannot escape the decree of population growth; when population increases, the resources required for its sustenance also increases, therefore humans have made a remarkable impact on the environment primarily through the use of natural resources and production of wastes. This paper examines the impact of population growth on the environment and the attendant result on human health in one of the frontier states of north-east India, i.e. Arunachal Pradesh. Rapid growth of human population has been identified as an underlying cause of environmental problems in the state. The paper recommends measures to limit rapidly growing population as well as strategies to reduce the negative impact of human activities on the environment.

Keywords: Population; Growth; Environment; Degradation; Health.

DEGRADATION OF RAID SAW-KUR NONGKSEH SACRED GROVE

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Abstract:

Sacred forests or groves have been identified as indigenous way of conserving the biodiversity. It had been practiced in many parts of the world through various means and methods.

In Meghalaya the sacred groves have been an inseparable part of the indigenous people way of life. In the Khasi Hills, special significance have been attached to such groves as their existence holds a very important place for the establishment, successful existence and survival of a "Hima" (state).

The sacred groves have been well- preserved since time immemorial. However, due to certain reasons which may be environmental or anthropogenic changes take place affecting the status of the sacred groves. The sacred groves are facing degradation, the scale of which vary.

The present paper aims to understand the degradation of sacred grove through a case study of the Raid Saw- Kur Nongkseh Grove.

AMPHIBIAN DECLINE : RISK TO HUMAN HEALTH

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Abstract:

Declines in amphibian populations, including population crashes and mass localized extinctions, have been noted since the 1980s from locations all over the world. These declines are perceived as one of the most critical threats to global biodiversity, and several causes are believed to be involved, including disease, habitat destruction and modification, exploitation, pollution, pesticide use, introduced species, and increased ultraviolet-B radiation (UV-B). While human activities are causing a loss of much of the world's biodiversity, amphibians appear to be suffering much greater effects than other classes of organism. Because amphibians generally have a two-staged life cycle consisting of both aquatic (larvae) and terrestrial (adult) phases, they are sensitive to both terrestrial and aquatic environmental effects. Amphibians are integral components of many ecosystems, often constituting the highest fraction of vertebrate biomass. Their conspicuous role is noted to be of particular importance in tropical forests, where in acting as both predator and prey species, they play a

they play a key role in trophic dynamics. Their high collective biomass, alongside their high digestion and production efficiencies, are some indicators of their potential importance in such "functions" as the maintenance ecosystem energetic and carbon flow, the maintenance of arthropod abundance, and the provision of a critical prey base for higher order predators, such as arachnids, snakes, and birds.

Many scientists believe that amphibians serve as "canaries in a coal mine," and that declines in amphibian populations and species indicate that other groups of animals and plants will soon be at risk. Amphibians play a pivotal role in ecosystem as secondary consumers in many food chains. Tadpoles have significant impact in nutritional cycling. They are herbivorous to omnivorous and are the prey items for both invertebrates and vertebrates. Adult amphibians are the best biological pest controllers. Invertebrates and vertebrates also predate them. Because of their importance in ecosystem, decline or extinction of their population has significant impact on other organisms along with them. Besides, frogs produce a wide array of skin secretions, many of which have significant potential to improve human health through their use as pharmaceuticals. Approximately 10% of Nobel Prizes in Physiology and Medicine have resulted from investigations that used frogs. When a frog species disappears, so does any promise it holds for improving human health.

Out of the 6000 recognized species of amphibians in the world, India has over 286 species of amphibians and about 105 species are found in the North East. North East India is an important part of Eastern Himalayas as well as Indo-Myanmar Biodiversity Hotspots and supports some of the very unique and rich biota on earth.

Key words: Amphibian, Biodiversity, North East India.

ACADEMIC SESSION V

NEW MINERAL POLICY -A CHANGING PERSPECTIVE AND VISION: AN INSIGHT INTO DYNAMICS OF UNSCIENTIFIC AND UNREGULATED MINING IN MEGHALAYA

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Krishna Chauhan,
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Abstract:

North -Eastern region of India being hilly is predominantly rural and about 80 percent people live in village and little over 75 percent workers are engaged in agriculture and allied activities. Agriculture in the region is stagnating at subsistence level and the region has remained largely untouched by any noticeable development in the last six decades. Therefore, the development of the region has been linked with the development and regulated use of natural resources and mining is one of the major components; its sustainability will depend on scientific mining and sensible exploitation. Mining in Meghalaya has contributed to the growth and employment generation since the last century and has been undergoing structural changes, though at a price unacceptable to the biodiversity and environmental sustainability. With the New Mineral

Policy being approved by the cabinet and based on the fundamentals of scientific and regulated mining, it is expected to bring new opportunities in mining sector though challenges and hurdles are waiting

The present study tries to throw some light on the unscientific and unregulated mining in Meghalaya and possible paradigm shift under the New Mineral Policy and develop a scientific mining regime based on sustainable environmental management, greater economic equality and community participation in accordance with commonly accepted notions and vision.

Key words: Mineral; Unscientific Mining; Meghalaya; North-Eastern Region

A COMPARATIVE STUDY ON THE SOCIO-ECONOMIC IMPACT OF LIMESTONE MINING BY CORPORATE SECTOR AND INDIVIDUAL MINERS IN SHELLA, MEGHALAYA

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Abstract:

Meghalaya, one of the states of north east India is rich in mineral resources. Limestone is found here whose estimated reserve is about 4147 million tones. There are huge deposits of limestone in the southern part of Meghalaya bordering the Bangladesh plains. As the deposition of limestone are horizontal to sub- horizontal on a regional scale and are often exposed its exploitation becomes easy. Shella and its adjoining areas located in the Shella Bholaganj block of East Khasi hills has large deposits of limestone. Here the private sectors comprising of the Corporate house of Lafarge Umium Mining Pvt. Ltd and individual mine owners are engaged in extracting limestone from the quarries. The limestone is mainly exported to Bangladesh in order to support the Chatak cement plant located in Sonamganj district. This paper basically compares on the nature of mining between the corporate sector and the individual miners and the socio- economic impact of limestone mining on the local population and the economy of state in general. The paper is empirical in nature (here primary data has been generated by field investigation) supported by secondary data.

Key word- Limestone mining corporate sector, individual miners, socio-economic impact

EFFECT OF COAL STOCK DRAINAGE ON THE SOIL FERTILITY AND PLANT PRODUCTIVITY (PADDY) IN JAINTIA HILLS DISTRICT, MEGHALAYA.

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Abstract:

Mining affects the environment in different ways depending on the physical context in which the mining occurs. Coal mining can have adverse environmental impacts. These may interfere with groundwater, land subsidence, flows of rivers, geological hazards, mine waste disposal, aesthetics and potential damage to the infrastructure and ecological havoc leading to contamination of soils and water that pose major environmental and human health problems. The coal extraction and processing industry may generate acid mine drainage (AMD) which has the properties of a low pH and high metals concentrations.

In the following study the effect of coal stock drainage on the soil fertility and plant productivity of paddy was studied in Jaintia hills district, Meghalaya. In the present study it was found that the soil parameters such as organic carbon was highest in the coal stocking sites, nitrogen concentration was higher in the control site and available P was lower in the coal stocking sites. The elemental concentration of metal Fe, Cu, Cr and Ni was found to be higher in the coal stock

site Wapung and Khliehriet than in Ialong the control site.

A definite pattern of growth was observed in paddy plants growing at the control site with greater height than the plants in the coal stocking sites. The chlorophyll content of paddy was highest after 50 days of observation in all the three sites during the two years of study. Among the three sites, paddy grown in Khliehriat had the lowest chlorophyll content. The highest grain yield was obtained from Ialong (control) than in the affected coal stocking sites.

ACADEMIC SESSION VI
FOREST FIRE
ITS IMPACT ON THE BIODIVERSITY OF RIBHOI DISTRICT MEGHALAYA

K.Nongrum, D.D.Nengnong, A.P.Warjri, W. Ryndem and P.R. Lamare
Department of Geography, Synod College Shillong.

Abstract:

The foundation of all human activities and overall development has been based on the exploitation of the geo-environmental resources(biotic and abiotic).Initially the earth was abundantly blessed with these, but the quest for higher economic development, the growing nature of the standard of living and the onset consumerism has resulted in the rapid depletion of all these resources. The pressure from population growth, urbanization, the pursue of different of agricultural practices both traditional and modern, mining, quarrying, deforestation , industrial activities, faulty developmental programmes including the degradation of environmental ethic of humans themselves just to name a few, have pushed countless number of life forms in many regions of the world to complete extinction or close to it. Such environmental degradation and loss of biodiversity is also seen and experienced on a daily basis in our own surroundings at Ribhoi district of Meghalaya. Here one could see the disappearance of the entire ecosystems before our very eyes due to the above mentioned anthropogenic activities and mismanagement.

Biodiversity refers to the variety and variability of plants, animals, and micro -organisms present on the surface of the

earth. Biodiversity is the basic determinant of the structure and function of all eco-systems and provides the foundation for the well being and security of all living organism including humans. As a whole, it is the ultimate resource that can sustain the very existence and livelihood of mankind indefinitely if properly maintain. Therefore the most important responsibility of mankind at this juncture is to ensure that the presence and wholesomeness of the entire environmental components should be kept intact not only for the daily sustenance of the present but also to enable the future generations to continuously enjoys a world rich in biodiversity, filled with plants, animals and other resources needed for normal and meaningful living.

With a favorable physical condition, Ribhoi district of Meghalaya, without a doubt has a comparatively richer bio-diversity than all the other districts of the state. The huge reserve of renewable environmental resources (flora and fauna) along with other abiotic resources has played a vital role in sustaining the economy of the district for countless generations. However it is sad to note that with the passage of time and onslaught of all forms of callous human activities driven by greed and total absence of environmental ethic, the whole ecosystem at present is in a pathetic state and on the verge to collapse.

Thus like in many parts of the country and all across the globe, this fast environmental deterioration has brought about a long and unending list of complex environmental issues of which many of them have proven to be so detrimental and has already taken their toll even at Ribhoi district. The factors that has brought about all these issues especially the depletion and loss of biodiversity has resulted from

the growing population pressure, shifting cultivation, conversion of forestland into plantation agricultural fields, deforestation, urbanization, mining and industrialization, pollution, soil erosion etc. The same has also brought about all sorts of inconveniences and health problems including water scarcity and food shortage amongst the inhabitants especially the vulnerable ones of the district.

Yet still another unwarranted anthropogenic stress on the environment of Ribhoi district that has further aggravated the situation is in the form of forest fire which is very frequent especially during the dry pre-monsoon period (February-May). According to observation, perhaps it would be very true to consider it as the ultimate and most destructive form of deforestation that a landscape and everything in it could endure. This particular season is also a vulnerable period in a year as it coincides with the sprouting of vegetation and the reproducing period of all forms of fauna. Therefore it is sad to see this period of Mother Nature's regeneration instantly charred into ashes with a simple spark of wild fire that turn into an inferno within seconds and spreading far and wide consuming and decimating everything on its way. It is estimated that 50 % of Ribhoi district's forested and scrub land faces such problems almost on a yearly basis.

Forest fires do happen naturally, however what concern us all is that the frequency of its occurrence is usually man made and with the magnitude of destruction cause by it, truly this is a hot and burning environmental issue that needs to be address urgently as it poses the greatest risk to the fragile biodiversity already weaken by the other factors mentioned earlier. At the same time it pollute the atmosphere with smoke, dust and excess carbon dioxide exposing the society at large to different forms of health hazards.

Hence this paper is an earnest effort to analyze the reasons why such forest fire occurs frequently with due consideration especially from human perspective. It will also highlight the actual impact on the myriad of life forms in the Ribhoi district environment as a whole including the inhabitants. The study will also contribute meaningful and relevant remedial suggestions with a positive hope that the same could be use by all concerns in a collective quest to effectively mitigate and control the above mentioned environmental menace that has eluded serious scrutiny for much too long.

Key words: Biodiversity, Forest fire, Environmental issues, Environmental ethics……

FOREST FIRE, GRAZING AND REGENERATION PROBLEMS: A CASE STUDY OF DIBANG VALLEY DISTRICT OF ARUNACHAL PRADESH (INDIA)

Athuko Tayu,
Rajiv Gandhi University,
Arunachal Pradesh

Abstract:

Forests are fragile ecosystems particularly in the present world. Deforestation is common where ever human settlement takes place and other forest resources are utilized. Forest is the heart of our mother earth and we the sons and daughters of this beautiful mother. Now a days we as human beings are the greatest enemy of our own motherland. The greed and necessity of our day to day modern life tend to suck the blood of our mother earth heartlessly The study area is taken from Dibang Valley district of Arunachal Pradesh with the total area of 9029 sq km and located between the 28º 46´ to 28º´ 49 N Latitude and 95º 52´ to 95º 54´E Longitude respectively. Topographically the area is characterized by very high mountains, plateaus and rugged topography. The area has only few river valley dominated by settlement and other activities . The area is situated at an altitude of 500m to above 3500 meters from the mean sea level. This paper would discuss about the ever changing face of the entire Dibang valley District due to forest fire for grazing. The Idu-Mishmi tribe of this district rear the animal called Mithun (*Bos frontalis*). For raising of Mithuns, large community land has to be burnt down for the proper growth of grasses every year.

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For this purpose, the large areas are intentionally set fire which leads to destroys the vegetation cover of the adjoining areas. In fact, this tribal group practices shifting cultivation simultaneously with domestication of many animals including Mithun as part of their economic activity. A case study on forest regeneration of every inch of the different parts of the world is very important to make sustainable environment and forests management. The objective of research proposal is to study the alternative methods of rearing Mithun and how to regenerate the existing barren forest land. The study involves various methodologies like group discussion, household survey, interviews, questionnaires, photography, field visit, and collection of previous records from Government accounts etc. Combining all these methodologies will provide concrete information and possible outcomes which will enable the research purpose to be meaningful.

Keywords:
Fragile, Deforestation, Regenerate, Consumer, Heartlessly, Rugged Topography, Mithun (*Bos frontalis*),
Grazing, Intentionally, Domestication, Shifting CultivatorEconomic Activity.

CLIMATE CHANGE AND SUSTAINABLE DEVELOPMENT: ARE WE LIVING SUSTAINABLY?

Mr Baniateilang Majaw,
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North-Eastern Hill University,
Shillong

Abstract:

Climate change is one of the major challenges of our time and adds considerable stress to our society and to the environment. Cherrapunjee in Meghalaya, India, is one of the wettest places on Earth, but there is very little forest left on this place. Presently, the remaining forest patches are the only source of potable water for the entire area during the dry season. Cherrapunjee is a tourist destination of Meghalaya. It is also a place where limestone quarrying and coal mining have been exploiting the ecosystem for decades with forest clearance being a serious concern as forests may not sustain forever. Small patches of forests known as sacred groves were traditionally protected by the local people, but with the consequent decline of the indigenous Khasi culture, the sanctity of these groves seems to be partially eroding. Most notably, the kilns adjacent to the forest are causing severe damage to the trees of the sacred groves as well as resulting in ecologically dead streams. The paper will attempt to highlight the environmental dangers of Sacred Groves in Cherrapunjee.

FOREST CONSERVATION THROUGH SERICULTURE – AN EXAMPLE OF CONSERVATION BY PEOPLE'S PARTICIPATION

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[@] Brahma, D.
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Abstract:

The polyphagous nature of wild silkworms makes it most potential for forest conservation. They feed on a variety of plants ranging from shrubs to trees growing under varied eco-climates belonging to the family: Combertaceae, Myrtaceae and Lytheracea for Tropical Tasar; Fragaceae and Salaceae for Oak Tasar; Lauraceae, Magnoliceae, Rhamnaceae, Rutaceae, Verbinaceae and Celastraceae for Muga; Euphorbiaceae, Simarubaceae, Rutaceae, Cariaceae and Apocynaceae for Eri. This is the most eco-friendly culture that supports maintenance of forest biodiversity, soil conservation and sustenance of tribal population living on forest resources. In fact sericulture as an avocation could support the parallel growth of forest and human and diffuse the man animal conflict. The paper discusses the potentiality of sericulture in forest conservation.

ACADEMIC SESSION VII

SOLID WASTE- AN ENVIRONMENTAL CONCERN AND ROLE OF ENVIRONMENTAL EDUCATIO

Mrs. Rihunlang Rymbai

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North Eastern Hill University ,Shillong

Abstract:

Introduction

The environment has sustained life on earth with its resources throughout the ages. Man, being a superior being tries to study and bring order to the environment. In course of time, man's greed has taken over and started misusing and abusing the environment's resources at a faster rate. Exercising the earth's resources is increasing, leading to exploitation of resources and leaving the environment in a chaotic situation. Not until some decades back does the effect of exploitation and pollution was realized and steps for replenishing the environment were carried out. Restoration of the environment is taking place, but at a shallow rate. One reason is undue preservation and conservation of the environment and the other reason is because of the increasing life style. There is an unmatched balance between need and want and more of waste is generated. The problem of solid waste disposal and its management is taking its toll. The dumping ground of this heap of garbage is the environment itself. The question is, how will the environment take in all the waste produced by human activities everyday and at the fast rate that it is producing? What are the

solutions that science, ethics, habits and education can bring?

Need of the Study

Waste is one of the top listed environmental problems which cause a lot of concern. Therefore, there is a felt need to focus on solid waste. The study is trying in a small way to turn people's attention to solid waste. It tries to flash out on the sources of solid waste and its disposal. It attempts to find out how the Governmental and Non-Governmental agencies are managing solid waste. The paper also focuses on suggestions to improve solid waste management and the importance and significance of environmental education in general.

The study will help in bringing an insight into how to manage solid waste effectively for a better environment.

Keywords- Solid Waste, Solid Waste Disposal, Solid Waste Management, Environmental Education.

THE INTERCONNECTIVITY BETWEEN MEDIA AND ENVIRONMENT

Dr.(Sr.) Mary Harriet
Principal,
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The book of genesis in the Bible says that God created everything and He found that everything was good, but what has happened to this beautiful serene and gentle mother earth now? Who has disfigured it? How can we redeem the beautiful cosmos in its originality?

At this paradoxical juncture, the role of media so to say becomes very important and worthwhile. In this modern knowledge based society media plays the role of facilitator of development disseminator of information and being an agent of change, regarding the issue of environment awareness. Media plays a vital role in spreading the factual truth of the dreadful condition of the environment . Along with the hub of debates and discussions, it tries to suggest alternatives to people and policy makers by creating awareness, it motivates a genuine interest to probe into the cause of ecological degradation. Thus, environment awareness is one of the important issues, which media presents consciously and effectively to challenge people, of the present environmental threat and the health hazards on the living beings.

Media as the agents of information and its interconnectivity with other parameters in creating awareness of the environmental burning issues are discussed with the help of the statistical tools.

The outcome of this paper will highlight how media can become a magic multiplier when there is sharing of knowledge, creating awareness, emphasizing the potentials of natural resources. It will also emphasize how the society can overcome the hurdles of environments by integrating traditional and modern communication systems

Key words: Serene and gentle earth, environmental hurdles, health, commitment, awareness, media the magic multiplier, statistical tools

COMMERCIAL REVIVAL OF NATURAL DYES IN NORTHEAST INDIA: A STRATEGY TO PROTECT ENVERONMENT

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Abstract:

Colour has been played a dominant role in the life of human beings since time immemorial. Colour substances acquire their true colours as a result of their property to absorbing a definite portion of the visible light and reflecting other. Dyes and Pigments are two types of colouring matters. Those colouring matters which is either absorbed by textile fibers or have capability to combine with textile fibers are known as dyes.

The name natural dye covers all the dyes derived from natural resources: plants, animals and minerals. The knowledge of manufacturing natural dyes from *Indigo* is known in India since more than 10,000 years ago. Natural dyes are being extracted from *Bixa - Kusum*, in Java since more than 5,000 years ago. About 3,500 years ago *Purple* dyes extracted from shell-fish were in use in Tyre. Synthetic dye was first discovered in the year 1856 by William Henry Perkin (1838-1907) at Royal College of Chemistry, London. Gradually synthetic dyes were successful in replacing natural dyes from textile industry. However

the carcinogenic effect and environmental degradation due to use of synthetic dyes has degraded the environment and its adverse effect on human health is also well known.

In recent years, there is a trend towards revival of human interest in the use of natural dyes due to reasons like: (i) Renewable resources, (ii) Natural origin, (iii) Mild chemical reaction, (iv) Human friendly, (v) Easy hazard free disposal and (vi) Natural and creative finishing. North-East India is natural abode for a large number of flora and fauna producing natural dyes. There are about 30 plants and 3 animal sources of natural dyes region.

Some of them are: Kusum-Annatto (*Bixa orellama),* Turmeric (*Curcuma tinctoria),* Indigo(*Indigofera tinctoria,)* Pomegranate(*Punica granatum),* Onion *(Alium cepa),* Lotus-Kamal (*Nymphaea lotus),* Harsingar (*Nyctanthes arbortristis),* Lack Insect (*Laccifer lacca)* with the dye recovery ranging on an average from 0.2 -6.0 % , depending on sources.

Studies have revealed that Assam and other North-Eastern states of India is producing about 1000 tones equivalent of dry dyes materials each year however only about 2 % are being used in National pool for natural dyes production. Assam has become one of the leading state supplying 100% exclusive dyed fabrics on natural dyes. It is estimated that during the year 2008-09 fabrics worth around Rs 5.00 crores were produced in Assam exclusively dyed in Natural dyes and natural mordents. Most of theses fabrics have been sold to traders and exporters in cities like Chennai, Bangalore, Hyderabad, Ahmadabad and Mumbai. There is potentiality to increase this output to Rs 100 crores by the year 2020. Effort is needed towards commercial concentration of Natural dyes resources of the region.

BIODIVERSITY OF ERI SILKWORM AND ITS HOST PLANTS OF NORTH EAST INDIA: PROSPECTS FOR UTILIZATION OF THEIR BYPRODUCTS

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Abstract:

North East India lying between 22-30^{0}N latitude and 89-97^0 E longitude; and sprawling over 2,62,379 sq.km is known for its unique reservoir of bio-resources including sericigenous insects and their host plants. The region is the abode of various sericigenous fauna and flora including the eri silkworm and the forest/ waste land based food plants, belonging to the family Euphorbiaceae, Araliaceae, Rutaceae and Simaroubaceae etc. The cultivated eri silk worm *Samia ricini* Donovan and its wild counterpart *Samia canningi* (Hutton) with several eco-races and strains are also available in the region. Presently, seven eco-races viz., Borduar, Titabar, Khanapara, Mendi, Sille, Dhanubhanga, Nongpoh and six strains of eri silkworm viz, G.B.Plain, G.B.Spotted, G.B.Zebra, Yellow Plain, Yellow Spotted and Yellow Zebra have been isolated and maintained for commercial exploitation. Castor (*Ricinus communis* Linn.) and Kesseru

(*Heteropanax fragrans* Seem.) are the primary food plants and other important food plants include Payam (*Evodia flaxinifolia* Hook.,),Tapioca (*Manihot utilissima* Phol.),Barpat (*Ailanthus grandis* Roxb.) and Barkesseru (*Ailanthus excelsa* Roxb.). The rich bio-resources of silkworm and host plants, their products and by products are the sources of livelihood for several communities of the region thereby playing a pivotal rural in rural economy. Since 1.30 lakh families of the region are engaged in Ericulture by utilizing the foliage of these forest/ waste land-based food plants, there is urgent need for protection of existing bio-resources from further erosion through revitalization of eco-system/ habitat. The alarming rate of erosion of biodiversity in the region is a matter of grave concern and need of the hour is to draw strategies for conservation and sustainable use of valuable bio-resources of the region.

The paper deals on the biodiversity of eri silkworm and its host plants with prospects for utilization of the ericultural products and by products as sustainable source of livelihood in the region.

Key words: Eri silkworm, Food plants, Sustainable livelihood, By products utilization

ENVIRONMENTAL AWARENESS AMONG THE STUDENTS OF SHILLONG

Dr Yodida Bhutia,
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Abstract:

Environment has meant different things to different people at different times. Some describe it as the sum total of physical and biotic conditions influencing the response of an organism. The Environment Protection Act 1986 of India states that "Environment includes water, air and land and human beings, other living creatures, plants, micro-organisms etc" (Sapru, R.K.). Environment has been considered as the sum total of all the factors that affects an organism. More specifically, the sum of those portions of the hydrosphere, lithosphere and atmosphere into which life penetrates is the biosphere. A better understanding of our environment is indispensable because it will enable us to predict better the inter-related effects of some of the major challenges facing the world today, among which, are demographic changes; economic development; availability of food, energy and raw materials; development and utilization of new technology, rate of inflation and availability of investment capital. All these issues have significant impacts on the Environment, which in turn affects developments in those areas. Better understanding of the Environment can only come through environmental education, and that is why, environmental education is so important and essential at present.

The paper will focus on the level of environmental awareness among the students of Shillong and compare the environmental awareness of male and female students.

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