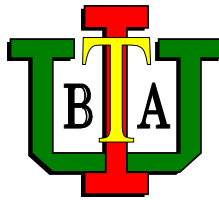


# **EfS Handbook**

**Education for Sustainability**



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# Present Earth and Need for Sustainability

**As** the human activities are progressing, competitions for exploitation are accelerating for economic growth but aggravating the imbalances of natural resources which in turn degrading the normal habitat of lives and the planet earth is at a great risk. Under these circumstances, control of such imbalances to conserve the nature faces urgent tasks: the improvement of the quality of the environment, which is necessary for man's very survival and as the source of all his material benefits; as far as possible, to completely reproduce organic and inorganic natural resources; to control natural processes for the steady and sustainable progress of social production and for comprehensive development and to safeguard peace on earth.

## Population, Natural Resources, Technology, Environmental Pollution, Climate Change and Adaptation

**Scientific** evidences reveal that earth is warming and climate is changing. The consequences of Climate Changes are:

1. Rising of seawater level and gradual inundation of low elevated regions
2. Natural disasters like floods, droughts, cyclones, hurricanes, intrusion of saline water into the territory and loss of huge agricultural land and habitats
3. Melting of glaciers of the mountains and ices of the polar regions and
4. Loss of biodiversity and adverse impact on natural and socio-economic systems.

According to AR4—Fourth Assessment Report-2007 of IPCC—Intergovernmental Panel on Climate Change, global temperature will increase by 1.8 to 4.0°C by 21<sup>st</sup> Century. It may even up to 6.4°C. The sea level rises predicted 18 cm (7 inch) to 89 cm (35 inch). Different regions may face different levels of warming and sea level rise.

Major contributors of the Greenhouse Gas emission are the developed countries and China, India, Brazil and some developing countries are increasingly emitting greenhouse gases. But poor countries like Bangladesh and Maldives are the innocent victims.

Statistics of emission of greenhouse gases for the period 1970 to 2004 is shown below:

Human activities increased	70%
Energy Sectors	145%
Transportation	120%
Industry	65%
Land and Forestry uses	40%

According to AR4 of Working Group II of IPCC:

If global warming rises by 1°C, will face water shortage another 1.2 billion in Asia, 0.2 billion in Africa

If global warming rises by 2°C, another 1.6 billion in Asia and Africa will face acute water shortage. More over rice production will decline by 12% in China.

If global warming increases further, the problems will intensify more.

Climate Change Adaptation: Bangladesh is the place where people are suffering frequently from natural calamities and are fighting against Climate Change disasters for long time. It is a right place for studying Climate Change effects. The people have already adopted tackling disasters like Sidr, floods, droughts and salinity. The country is facing serious water shortage, power and food crises.

It is predicted that one-third of the country will go under sea if seawater level increases by one meter only. Narayanganj may be the coastline or further inside. As a result, agriculture, habitats and biodiversity of major areas will be affected, therefore mass migration will be needed and cropping pattern will be changed due to intrusion of saline water.

It is essential to prepare ourselves to combat the future disasters from Climate Change and we need to develop human resources who can successfully work outside the country. Our population should be enormous resources to cultivate the world efficiently with new technologies, sustainable activities, awareness, capacity building by adopting clean development mechanism.

## Green Campus of IUBAT Declared by Prof. Eric Frank and Prof. M Alimullah Miyan on August 12, 2008



## Principles of Sustainability

**According** to LP Astanon and KN Blagosklonov the basic principles of Sustainability:

- The use of natural resources should take into account environmental conditions
- The use of some natural resources should not bring harm to others
- Renewable resources should be used in such way as to provide their reproduction
- Nonrenewable resources-mineral and metal ores-should be used sparingly and comprehensively so that deposits will last for many years.

According to Herman Daly

To be Sustainable, a Society

- Cannot use renewable resources faster than they are Regenerated
- Cannot Produce Wastes faster than they are Degraded, Dissipated and rendered Harmless
- Cannot use Nonrenewables over the long Haul at all

However, Dr. Mohammed A Rahman has proposed the following points on Sustainability

- Exploitation and Exploration are human behavior
- Natural Resources have a Limit and all are for the Goodness of Human Beings
- Exploitation must Not Exceed the limit of Regeneration
- Recycling process should not be Halted at any stage
- Change is universal; Undulation is the beauty of the earth that keeps the things on Moving
- Unhealthy competitions for Food and Wealth exploiting Natural Resources through Technology, Pollutes the Environment and makes the Life Unsustainable
- Both Change and Adaptation should run simultaneously and keep the earth's habitat favorable for Sustainable Living

## Symbol for Sustainability



**Palmyra Palm** is proposed as the Symbol for Sustainability

Palmyra palm is cosmopolitan, grows in versatile environmental conditions viz. Ethiopian desert to Cox's Bazaar Sea Beach of Bangladesh and high rainfall areas of Indochina; from Uzbekistan to South Africa. It adapts high plateau, hills and flats and low-lying lands, High humidity to droughty conditions. It can withstand wind speed of 300 miles/hour and it is the best windbreak against the storms. It gives fruits, toddy, fibers, claddings and timber; controls soil erosion, allows undergrowths and a good shelter for weaving birds. Palmyra palm has many medicinal values especially to rejuvenate the olds.

## Importance of Education for Sustainability

**It** is obviously important to educate the people of the earth to minimize the ecological contradictions involved all the countries of the world without exception. Thus Education for Sustainability (EfS) to aware the people: individuals, communities, industrialists, politicians, administrators, elites, explorers, scientists and researchers etc., enabling to recognize the harmful elements and their sources and to refrain from or to control such pollution and misbalancing activities or forces. This education is for motivation people towards loving the beauty of nature for coexistence.



Professor Dr. M. Alimullah Miyan delivering the opening speech (middle)  
Professor Dr. Eric Frank, the Guest of Honor (left) and Mr. Nicholas Genis  
Keynote Paper presenter (right)

# Program on Education for Sustainability (EfS)

**EfS** is the best program to deal with the environmental problems. It is most fundamental in our efforts to combat and control pollution, overpopulation and misuse/abuse of natural resources. Education for Sustainability includes following objectives:

- Creation of awareness of the problems
- Providing knowledge to deal with the problems
- Developing new attitudes towards environmental protection and sustainability
- Practical implementation of the activities
- Increasing participation and involvement of the community
- Responsibility for helping to solve environmental problems

## Seminar on the Role of Education for Sustainability in Pollution Control





# **Centre for Global Environmental Culture (CGEC) of IUBAT—International University of Business Agriculture and Technology and Program on Education for Sustainability**

**Centre** for Global Environmental Culture (CGEC) is modeled upon Regional Centers of Expertise (RCE) - networks of existing formal and non-formal educational organizations mobilized to deliver Education for Sustainability (EfS) to a regional community in consideration of specific local needs and concerns. The core elements of RCE- governance, management, research and development and transformative education, promote the goals of EfS itself. The integration of sustainable development concepts into educational curricula that is appropriate for local needs, improve access to quality education, support advocacy and awareness of sustainability and provide training, methodology and learning materials for trainers among the policy makers, program implementers, youth and public for proactive initiatives.

CGEC has been working to develop or restructure education in environment and sustainability issues tailored to local communities' requirements through the provision and delivery of training for trainers and a promotion of a greater awareness of the issue in general.

The mission of the Centre is to improve human capacity of private voluntary agencies, local and national government and international organizations through comprehensive professional development programs in sustainability and environmental management.

The objectives of the Centre, in particular, are:

- To apply knowledge of management science for effective management of environmental aspects
- To develop and integrate indigenous knowledge on environmental management and sustainability through research and consultation
- To conduct training and orientation programs for executives and policy makers
- To develop skills in environment
- To develop academic specialization on environment
- To disseminate information on environmental issues through information sharing and publication
- To develop appropriate linkages with national, regional and international environmental programs as well as bodies.





Distinguished participants from Bangladesh and abroad discussing in the Dialogue on Education for Sustainability at CIRDAP Auditorium at Dhaka on August 12, 2008

## Campaign against River Pollution



November 18, 2008



Sustainable Upland Field Agriculture Station, Naikhyongchari



Dr Mohammed A Rahman, Director, Education for Sustainability of IUBAT Participated a Workshop organized by UNESCO at Dhaka on January 11, 2009

# Awareness and Sustainability Practices

## Energy Crisis: Electricity

### Present Scenario of Electricity

Only 43% people of Bangladesh have the access to electricity and with frequent load shedding and disrupting the whole economy of the country. But we can not think even a day without electricity.

Present requirement of Electricity:	5,500 MW
Present electricity generation capacity:	4,120 MW
Present deficit:	1,280 MW
Electricity demand increment rate	8.1 %/year

**Electricity required by 2020** 10,450 MW

Present Production Sources	Production (%)
Hydroelectric power	5.7
Gas/Oil	84
Coal	7.3
Bio Gas	Very insignificant
Solar energy only for Rural Areas	60, 000 Units of 1.3-3.2 KW capacity
Bio-fuel thermal power	0
Nuclear energy	0
Wind mill	0
Ocean Current	0

From the above, it is obvious that thermal power generated from the gas and coal is the main source of electricity. The reserves of these fossil fuels are very limited and diminishing quickly. Moreover, burning of fossil fuel is also causing global warming and the climate is changing. For the above reasons, the country is now in a very critical situation. We need to think about our resources and technological advancement in future and use of alternative energy must be encouraged.

## **My responsibilities**

1. We must adopt all practices for energy savings
2. All electric lights should be replaced with energy saving ones
3. All computer appliances should be turned off immediately after uses and to ensure that no electricity is misused or lost
4. Use natural light and complete most of the works in the day time
5. Please switch off lights at the day time when sufficient natural light is available
6. Everybody should take care to ensure that all the switches of fans, lights and other electric equipments are turned off when the classes are over and when they are not required.
7. Avoid air conditioner
8. All electric short circuits or breakdowns should immediately be rectified /repaired.
9. All illegal connections and stealing of electricity must be identified and disconnected

# Energy Resource: Natural Gas

**Natural** Gas is the most important energy source of Bangladesh.

- Total Reserve of Natural Gas is 33.5 TCF (estimated)
- Yearly Consumption is 1800 MCF
- Yearly Requirement 2014 MCF
- Yearly Shortfall 214 MCF
- About 84% of the total electricity is generated from Natural Gas
- Other uses are:
  1. Manufacturing Urea Fertilizers
  2. Domestic Cooking
  3. Industrial Boilers/Furnaces
  4. Manufacturing Adhesives
  5. Liquefied Petroleum Gas

Although exploration is in progress still our present production is behind to meet the increasing demand. Many industries and domestic users are suffering due to shortages of gas supply and new connections have been stopped in some areas. It is estimated that, the reserve will be exhausted within 15 to 20 years.

Therefore, we are in a deep energy crisis. We need to be very cautious about wastage of natural gas and too aware against its abuse.

## My responsibilities

- We should not misuse electricity and must reduce electricity consumption by stopping unnecessary uses thus saving the Natural Gas
- During domestic uses, burners must not be kept ignited on when cooking is over
- The cook or domestic helps should be trained about regulation of the gas switch for optimal heat flame
- To reduce the risk of fire, the igniters/matches must fire first and then switch on the gas stove
- It is suggested to use auto-stove for economic use of gas
- We should stop immediately any leakage of gas and repair the breakdowns informing the appropriate authority
- All illegal connections and stealing of gas must be identified and disconnected
- We should practice ourselves and share the above information with our friends and families and neighbors.



# Water Crisis

**Water** is life, without water life can not exist. Although three-fourth of the earth surface is covered with water but its 96% is Ocean water. Only 4% is fresh water including Glaciers and Underground waters but a little of which again is usable and drinkable. This precious water is becoming unavailable due to pollution by manmade activities. A great crisis of available water is increasing and water is becoming more precious. A serious water crisis is prevailing in Bangladesh. Millions of people are suffering from serious diseases due want of safe water although the country receives more than 2000 ml rainfall a year. In dry seasons the surface water sources e.g. ponds, lakes and river dry up or get polluted. Withdrawal of underground water for agriculture and domestic uses pulling down the subsoil water table every year. Moreover deadly arsenic contaminated water has created severe health hazards all over Bangladesh.



Picture: No more water in the surface-well, with a depth of 10 meter, at Nikhongchari as the water layer has dried up. But once it was the only drinking water source of the dry season.

Therefore, we need to be very cautious about wastage of water and too aware against its pollution

## **My responsibilities**

1. Please do not misuse water because every drop of water is precious
2. Do not keep on running the taps continuously during washing, bathing and cleaning
3. Do not use excess soap and detergent during the bath and washing the clothes. It will help to reduce water pollution and will also save your money
4. Please think about re-use of your household water. In most cases one time used-water can be re-used for your kitchen garden and also for cleaning the commodes. To re-use, please collect used-water in a separate container/drum
5. Stop immediately any leakage of water and repair the breakdowns
6. Rural people have the traditional practices for reusing water for homestead plants. They used to wash crockery and utensils in the pond for feeding the fishes
7. Please do not throw garbage, faeces and urines etc., to the water ways/bodies
8. Do not allow any industrial wastes to the waterlines and other water sources
9. Do you know how much water one person is using per day in the cities? It is 150 to 200 liters and it costs BTN 1500 to 2000 a day for a man or woman
10. Other examples include the nearly 35 gallons of water behind every cup of coffee, the 700 gallons behind the typical dyed T-shirt, and the 630 gallons to produce a single hamburger
11. Reduce the withdrawal of underground water but use surface water and rainwater
12. For production of one kilogram rice (paddy) it requires at least 2,000 liters of fresh water. Can you imagine the cost of rice which is produced by utilizing subsoil water?
13. Remember that, the subsoil water table is alarmingly decreasing due to withdrawal of subsoil water. Ponds, surface wells, Bheels, Haors and rivers etc. are drying out. It's a great alarm for desertification of this region
14. In most of the cases underground water contains arsenic. Using this arsenic contaminated water thousands of people are suffering from serious dermal diseases
15. Due to withdrawal of underground water earth strata are becoming loose and fear of earthquake and land sliding is increasing alarmingly
16. Discourage use of excess chemical fertilizers and pesticides indiscriminately. They are poisoning the surface water and are killing millions of lives



# Management of City Refuses

**About** 5000 tons of domestic refuses are dumped everyday in Dhaka and its suburbs. At least 500 tons of organic fertilizers can be produced everyday from that garbage which may worth BDT 2,500,000 to 10,000,000. These organic fertilizers contain all the available nutrients even those are not possible to manufacture by chemicals.



Picture: Dumping of city wastes into the drain has caused serious problems

The garbage is of following kinds:

1. Green garbage
  - Vegetables and food refuses
  - Poultry and cattle farm refuses
  - Slaughter house refuses
2. Plastic, polythene, synthetic fibers, foams, rubber etc.
3. Metals
4. Glasses and ceramics
5. Wood chips/dust, leaf litters and paper products etc.
6. Feathers, fur and shells etc.

Usually the garbage is haphazardly dropped here and there, in the drains, open places or in garbage pits if available nearby. As the garbage collection facilities are very poor it often delayed to move them to the dumping places. As a result the fast degradable ones starts degradation which cause bad odor and pollutes the environment. However, in most of the cases, the garbage is being dumped in low-lying areas and used for land filling.

Green garbage is the biomass; of course it is the accumulated valuable soil nutrients which are coming from the crop producing areas. These precious nutrients should go back to their origin.

We do not need organic city dumping the soil nutrients from the hinterlands or from its exploitation zones. We must recycle them and ensure their reuse:

### **My responsibilities**

- Do not mix non-degradable synthetics like polythene, plastic, metals, furs and feathers etc. with the green garbage viz. vegetables and food refuses etc.
- Dispose the green garbage separately in garbage pit or collector for microbial decomposition to make compost or organic fertilizer
- During shopping avoid polythene and plastics.
- Discourage buying plastic and polythene wrapped or packed foods and other commodities
- Use jute or cotton bags, paper, bamboo baskets and natural fiber or woven shopping bags or containers
- Do not allow decomposition of paper and paper products but recycle them and reuse
- Store plastics, polythene, rubber, glasses, metals, feathers and furs separately for selling and recycling. Everything has some value and you can earn something
- Do not use detergents, pesticides and aerosols indiscriminately. Remember, microbes and other living creatures around us helping directly or indirectly. The things which we can not digest but microbes can do. The degraders and decomposers are the part of nutrient cycles and are also the part and parcels of living soils
- Aerosols are also harmful to delicate tissues, nerve cells of human being and other higher animals
- Use camphor, lantana and Menda (*Litsea monopetala*) bark smoke instead of aerosols
- Allow Quick Degradable refuses to decompose fast and return them to their place of origin, Slow Degradables to recycle for reuse and Non-Degradables must not be added anymore but recycle without changing their constituents
- Allow Renewables to regenerate faster than their consumptions/uses
- Do not use Non-renewable other than Recycling: we can alter the Physic but not the Constituents
- Remember, nothing is Unlimited but Change is universal, if we cross the Limit, a definite Crisis will be there.

# Polythene Saga

**Polythene** was considered more valuable invention than that the art 'Mona Lisa', in 1930s. It is the synthetic bi-product of crude oil. As a durable clean and handy product, its use spread all over the world like today's Mobile Phone. Polythene has replaced many natural fiber products of jute, cotton, bamboo, palms and grasses. Bangladeshi jute has lost its markets and it is no more considered as Golden fiber due to use of cheap polythene products.



Picture: Dumping of polythene along with other garbage in the city

But polythene is non-degradable; continuous addition has created the worst waste management problem. It has polluted the soil, water and has blocked the drainage systems, canal and rivers and creating water logging and temporary floods in the cities. To save our environment, we must reduce and restrict the use of polythene.

## My responsibilities

- Do not use polythene shopping bags and must not ask for
- Do not wrap food products with polythene, it increases the food poisoning effects
- Do not burn polythene, it pollute air with poisonous gas
- Do not throw or dispose polythene here and there, it increases the pests and mosquitoes
- Use natural fiber products like jute, cotton and bamboo instead of polythene
- In any case, polythene should be cleaned and recycled after the use

# Transports

**Quick** and easy transportation is considered as the symbol for development. With the advancement of technology fast running motorized vehicles, fueled by depletable fossil fuels viz. coal, oil and gases are used. The numbers of transports are increasing and the consumption of fossil fuels has also been increased. The burning of fossil fuels has increased the CO<sub>2</sub> level and causing greenhouse gas effect, the global warming. According to IPCC statistics (AR4 of 2007) the green house gas emission increased by 120% during the period 1970 to 2004 from combusted transport fuels only.

Smoke emitted from the transports reducing the sunlight intensity, polluting air with poisonous gases like carbon-monoxide, hydrogen sulfide, lead and dusts etc and air quality is deteriorating causing bronchial diseases like asthma, bronchitis and tuberculosis etc.

Transports are also adding sound pollution, especially, from engines and horns affecting nervous system and causing neural diseases, hearing and heart disease. Sound pollution is a silent killer. Heavy track traffic during peak office and working hours kills valuable time and the passengers and the drivers pass the time with agony and displeasure and loss of working hours.

Track traffic is really a great problem of this densely populated city, Dhaka. We should know the cost of such transport problem. With simple calculation one hour traffic jam for 200,000 nos. transports with 2 million passengers a day, the total loss stands at:

Man hour loss:            2,000,000 hours  
                                  = 250,000 Man-days  
                                  = BDT 5,000,000.00  
                                  = USD 735,000.00

Fuel cost:                 200,000 Liters X BDT 50.00  
                                  = BDT 1,000,000.00  
                                  = One day's food for 100,000 hungry people

To mitigate the multifaceted transport problems

## My responsibilities

- Walk to work, or use bicycle keep the body healthy and support reducing CO<sub>2</sub> and other pollutants from the transports
- Do not use personal/private cars, motorized light vehicles, auto rickshaws during peak and rush hours especially during office or schooling times.
- Prefer bus or train in the city roads and highways
- Do not cross the permitted speed limit during driving
- Never use hydraulic horns and avoid frequent horns

- Always maintain the speed lines and never cross solid lines where you are barred from crossing the lines
- Follow the traffic symbols and respect the traffic signals.
- Buses should follow the bus lane and never stop the bus other than the bus stop for getting down and taking passengers
- Do not compete driving on the city roads and highways.

## **Biodiversity**

**All** plants and animals are the members of living cycles. Plants are the ultimate source of food. They trap solar energy by their chloroplasts and prepare carbohydrates using CO<sub>2</sub> and water through the process photosynthesis, which we can not do but plants can. Do not say a plant as a weed but say biomass. They are helping living system through many cycles. All animals and plants and microbes are the part of living system and maintaining food chain. The relation may be symbiotic, antagonism, commensalisms, host and parasite, pest and predator, hunter and hunted and dominant or suppressed etc.

Look at the spider net carefully how they are nicely woven, see a butter fly how beautiful are their wings, look at an orchid nice it is, beehives and nests of the weaving birds how artfully are made. Did you ever think how the bats and cocks correctly maintain the time clock? Think of a forest, millions of trees, shrubs, herbs and creepers are growing luxuriantly, is there anybody watering them? Are they suffering from drought and water logging? But they are giving shelter and foods to hundreds of thousands of birds, animals, reptiles, insects and many more. All together are maintaining cycles living with the non livings and we of course need their presence. We must respect their right of existence.

### **My responsibilities**

- Plant a tree or sow some seeds every month of the year whether in your garden, a window box or down your street
- Nurse a plant, love a plant, feel and enjoy nursing
- Feed your pets and do not be cruel to wild animals but save them and their habitats
- Do not use chemical pesticides and herbicides to eradicate pests and weeds
- Adopt physical and biological methods for suppressing them
- Collect and propagate rare and endangered plants and animals
- Do not disturb the landscape but preserve habitats
- Grow right plant at right habitat i.e. shade-loving plants in the shade, sun-loving ones in the sun and partial shade loving in the partially shaded place
- Maintain safe distances from the structures, roads and bridges and transmission line etc. during plantation of trees

- Grow more multipurpose indigenous tree crops like jackfruits, mango, black berry, coconut, Palmyra palm, Bohera (*Terminalia belerica*), Amloki (*Phyllanthus embelica*) Horitoki (*T chebula*), Deowa (*Artocarpus lacucha*) , Kao (*Garcinia cowa*), drumstick (*Moringa oleifera*) and bamboos.
- Do not plant pollination hazardous plants e.g. Teak, Champak, Acacia (Akashmoni) and Barala etc. in the homesteads of rural and urban areas. They can cause serious skin and respiratory diseases like allergies, itching, asthma, bronchitis and lung cancer etc.

## **Food Security**

**Food** is the primary need of human being. Bangladesh is a poverty prone country. More than 37% people are underfed. Thousands of hungry people are gathering in the cities for work and food every year. But from where the food are coming, of course, from the rural farmlands. High inputs dependent technology driven production systems increased dependency of trade-based seeds, chemical fertilizers and pesticides, electricity and irrigation. People have lost their intense cultural practices and thus limiting the opportunity of growing foods for their own.

Although Bangladesh has a very low per capita land ownership, still the land is underutilized and less productive than the neighboring countries, due to lack of knowledge and appropriate technology. Crazy and trade-based short-term benefited crops and techniques have squeezed the efficiency and fertility of farmers and soils respectively. Huge lands remain uncultivated and loosing fertility and productivity due to paucity of appropriate knowledge-based practices and manpower. On the other hand many seasonal crops: cereals, tubers, fruits and vegetables do not get proper price by the farmers even they are not getting back their production cost. Many of the foods and vegetables get deteriorated during the harvesting season. Moreover, high inputs dependent cropping often suffer from many crises e.g. electricity for irrigation, fertilizers and pesticides, and floods and droughts. Not only this, after one or two crops the soil loss its fertility and texture.

To secure food for everybody we need to think deeply. We must be sympathetic to the hungry people.

### **My responsibilities**

- Eat local, seasonal and organic food and food products
- Avoid buying of imported fruits when seasonal fruits are available especially the summer fruits namely mango, guava, banana, jackfruit, black berry, sapodita and pine apple etc.
- Only jackfruit can secure one month's food of 160 million people of Bangladesh
- Avoid chemically ripen fruits
- Avoid harmful chemical-preserved food staffs

- Grow fruits, spices and vegetables instead of decorative plants or a grass lawn
- Avoid rich food, high fats, flesh protein and narcotics
- Nurse your plants and get extra pleasure from your homegrown foodstuffs.
- Always avoid many recipes but think for the underfed or hungry people and malnourished children and mothers
- Do not waste food but feed some one if you can
- Raise voice for the benefit of the marginal farmers, who are the backbone of the rural infrastructures and pillars of food security
- Discourage short-term benefited and high inputs dependent technology
- Be sympathetic to your poor neighbors, helping hands, passers by and disables
- Remember that food is a habit; try to maintain lower limit that you need, eat for survival but not survive for eating
- Bring more species and varieties of different adaptations under cropping culture
- Grow more coconut in the costal and low lying areas; coconut will only be safe drink for tomorrow.

## **Structural Buildings, Bridges and Transmission Lines**

Structural materials e.g. Timber and Bamboos, Earth, Stones, Metals, Bricks and Concretes, Plastics and Polyvinyl etc. are used for Construction. Utilization of these materials depends on the availability, durability, strength and aesthetic beauty. Necessary protective and safety measures against their deterioration or damages are ensured by design, engineered construction, fastening, cementing and surface coatings and with proper maintenance.

The possible hazards are wind, hailstorms, rainfall, floods, snows, earthquake, fire, biological degradation and self-load etc. with the depletion of renewable natural resources; non-renewable resources are being used abundantly which is a great alarm for sustainability.





Picture: Unplanned urbanization without easy access and drainage system



Picture: A banyan tree, anchoring roots on the wall without surface coatings

For a sustainable society, every family should have a well-secured and durable home for shelter. For easy communication, roads and highways, rails, bridges, wharfs and transmission lines should be ensured. To ensure sustainable structures, we need to aware for implementation of sustainable practices.

## **My responsibilities**

- To aware to implement the Code of Practices or National Standards of Constructions
- Renewable resources should get preference and their production should be synchronized
- Prefer safe preservative treated timber-framed structures; bamboo, palms nuts, canes, thatch and other fiber plants etc. are more comfortable, quick and easily regenerable, light, earth quake resistant and thus more sustainable.
- Safety measures: safe distances from the structures should be maintained during plantation of trees, erection of transmission lines and placement of utility services
- All houses should have access for emergency services like fire brigades and ambulances etc.
- Landscapes must not be disturbed i.e., natural undulation of the terrain viz. hills, catchments, lagoons, rivers and other water bodies must be protected
- All bridges across the floodplains must have required discharge facilities of excess water during heavy rainfall or upstream water
- All constructions must be protected by design, engineered construction, surface coatings and with maintenance
- All essential and routine cleaning and maintenance and necessary surface coatings should be applied to protect the structures

## **Seas and Oceans**

The Seas and Oceans are the ultimate resorts of water and waterborne organic and inorganic substances. The beauty of roaring and dancing waves of in the beaches cools and soothes our minds. The shadow of the blue sky reflects from the water surface attracts mind to have a deep bath

The Seas and Oceans are the ultimate resorts of water and waterborne organic and inorganic substances. The roaring and dancing waves, the shadow of the blue sky on clear water, rising and setting sun, the sparking of moon attract the minds of all. Therefore the beaches are the places of refreshment and tourism. Thousands of people from all corners of the world are visiting Cox's Bazaar, the longest sea beach of the world, everyday. Due to unplanned development of resort area after cutting the hills and establishment of shrimp hatcheries along the coast the beach is under a great threat from erosion. Moreover, disposal of wastes by the tourist and vendors has created pollution problem and is making the aquatic habitat



Picture: The Longest Sea Beach of the World, Cox's Bazaar



Picture: Save the Sea beach, Cox's Bazaar, the Wonder of the World  
Hill cutting and Shrimp Hatcheries eroding the beach



Picture: Wooden pilings and cement-concrete blocks to control sea beach erosion

## **My responsibilities**

- Keep the sea pollution free
- No spillage of oil or pollutants should be allowed into the sea
- Do not leave any plastic, polythene and other non-degradable substances in the beach
- Grow campaign against the industries causing harm to the sea and sea beach
- Grow campaign against development of chemical and/or poisonous affluent discharging industries along the coastline.
- Raise voice against hill cutting and any change of terrain along the beach
- Do not allow dumping of poisonous substances into the sea
- Make aware the agricultural estates, plantations and industries of the upstream not to use pesticides indiscriminately.
- Do not disturb the aquatic animals during the swarming and egg laying period especially in the estuaries and down streams

# Peace and Societies

**Human** beings are social. None can survive alone. They need association, help and supports of others. Unhealthy competition for food and wealth weakens the social bindings but pleasant cooperation keeps peace and love and develops sympathy to others. Without peace frustration and conflicts arise.

To restore peace and love in the societies:

## My responsibilities

- Make contact with the living earth everyday by lying down on the grass, or leaning against a tree and feeling your connection with nature
- Be sympathetic to others' sorrows; help and advise them to cope up the bad days
- Respect others' right and their opinions
- Help the relatives, neighbors, distresses and the needy passers by
- Respect elders; love younger and children and make them happy with sweet behavior.
- Exchange views and ideas with the friends and families
- Respect the laws of nature