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From Editor's Desk.....

Greetings!!!

Pop Envis is progressing in leaps and bounds. During the past 6 months, Envis centre of IIPS has made many achievements. Besides regular portfolio of activities like web updating and news compilation, Envis organized three workshops, i.e. Environmental sustainability and modelling; GIS and its application and Gender Development and Environment. Eminent experts from Mumbai delivered their thought provoking lectures and interacted with the participants in a responsive manner. Around 40-60 scholars, researchers and professionals from different parts of Mumbai took active participation in each of these workshops. Besides expressing contentment in their knowledge enhancement, they also made many positive propositions for betterment of Pop-Envis activities. Envis also celebrated the World Environment day in a meaningful way. Our team visited nearby schools and engaged the students in variety of creative activities. We appreciate the student's enthusiasm and eagerness to learn more on environmental issues.

The current issue contains three articles, conference and news links, report on one of the workshops mentioned above, environment day celebration and the summary progress of Pop- Envis.

Your continued support is appreciated.

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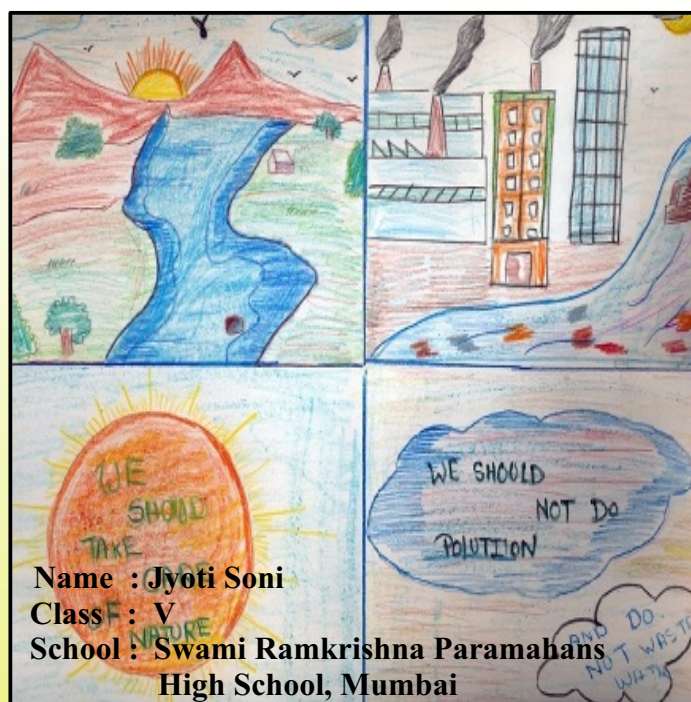
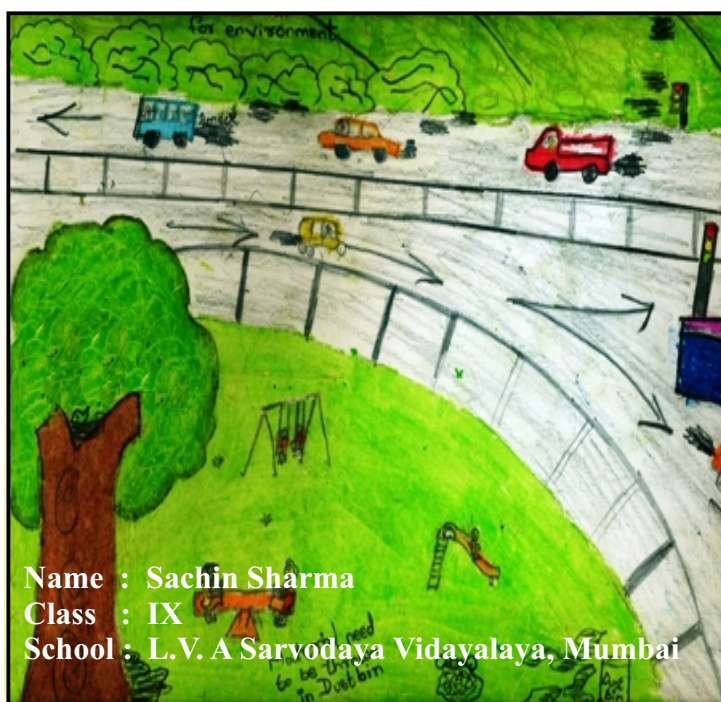
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Increasing Population and Challenges to Sustainable Development

Deeksha Dave *

Introduction

World Population is rising each decade. Fulfilling the necessities of this large number extracts resources from the nature which are finite and do not grow at the same pace as the population does. Reckless exploitation causes depletion of these resources and creates imbalance in society. With the rising number of people on the planet and with their changed life style, it is only not wise but essential to adopt sustainable development model. Sustainable development seeks to achieve economic prosperity, ecological integrity and social equality. Improved and quality living is correlated with economic development which in turn depends on ecological well being of the planet. The population explosion is putting a strain on the resources of the earth and creating a big divide between the rich and the poor thereby challenging the objectives of sustainable development. The current paper highlights the issue of population growth and throws light on the existing challenges in the way towards sustainable development.

Malthus in 1870 in his work entitled '*An Essay on the Principle of Population*' alarmed mankind by proposing that an increase in human population beyond sustainable limits would result in a catastrophic plunge in population due to famine and/or disease. He explained that whereas human population grew geometrically, the food grown would be added arithmetically.

Earlier rise in population has been attributed to increase in life expectancy of the people owing to better medical facilities. By 1960, the world population reached three billion. Just 15 years later, in 1975, the population soared to four billion, topped five billion in 1987 reached six billion in 1999 and seven billion in 2011, completely doubling in less than 40 years.

Dynamics of population such as population growth,

population density, etc. affect the nature of development. Economic well being is an indicator of development and in today's world it encourages adoption of unsustainable means to satisfy the needs of people which has negative consequences in terms of their sustainability.

Sustainable development is defined as the development which meets the needs of the present without compromising the ability of the future generations to meet their own needs. This definition came at the time when the world population was somewhere around 5 billion and developed countries wanted to reduce the impact of environmental damage that they caused.

Today, not only the population numbers are changing but also population structure and population distribution are showing diverse trends. Developed nations are already characterised by ageing population and the developing countries are also showing the same picture due to decrease in longer life and change in age structure. Owing to urbanization and migration, the distribution of population has also become non-uniform. In this view, meeting the objectives of sustainable development is a tough task.

Uneven and continuous population growth has resulted in economic instability, ecological degradation and social injustice in the society. The target date of Millennium Development Goals is drawing near and its time to reflect on the goals which were set and targets achieved. There is also a need to reframe the goals in the changing scenario. The natural resources do not increase in this manner nor does our expertise gets transformed in such a way that it is easy to feed and support such huge numbers. Therefore, the current paper is an attempt to explore the population growth trends and challenges towards sustainable development.

Crowded Earth and Sustainable Development

How many people can inhabit the earth is a vague idea. It is difficult to figure out the number of individuals who can live on this planet because it depends not just on the number but also on the way the people live on the earth. The growing population does not worry us due to the rising numbers but also because of unhealthy living style and consumption patterns that have changed much over decades. It is essential to explore how does the quality of life on Earth would have been better if there were decrease in existing population or what would happen if population continues to increase further. How many people can the Earth support sustainably? Mahatma Gandhi has rightly quoted “The earth has enough to satisfy the needs of everyone but not the greed of everyone.” It is visible that with the growing population, the pressure on natural resources has increased. According to the reports, the earth will face severe water shortages and land shortages in the times to come.

The UN expects world population to rise to between eight and 11 billion by 2050. Our consumption patterns in the next 10 years will largely determine the scale of this increase, and the future quality of human life on the planet and the prospects for survival of our fellow species.

Challenges ahead

Moving towards the 21st century, human beings are facing economical, environmental and social challenges. The way to sustainable development is not smooth. Following are the challenges towards sustainable development in an era of increasing population growth.

Reaping the Demographic Dividend

The footprints laid down by the current generation will lay the foundation of future growth for the younger generation. For a country like India which is passing through demographic transition, this becomes more important.

Steps must be ensured for reaping the demographic dividend. Young people should get benefit from their improved health and productivity that will come from equitable, productive and non discriminatory societies. The theme of the World Population Day 2014 is ‘Investing in Young People’. Adolescence is not the age merely of biological changes but also a stage where energy and enthusiasm are at the peak. The need is to target this age group so that population at any given place becomes an opportunity. This age group is not the largest in the population structure but is also a working generation which can bring desirable changes. Young minds should be ignited so that they are able to contribute to society in a constructive manner. Population dynamics are much about reproductive choices which should not be forced. Human rights based and gender responsive choices are vital for sustainable development. Access to reproductive services, voluntary family planning, curbing infant mortality, reducing maternal mortality, etc. can be some of the measures in reaping the demographic dividend.

Environmental Stability

Population growth puts increasing pressure on planet's resources, like land, water, earth's atmosphere contributing to climate change and challenging environmental sustainability. With changing times, the population grew, needs were manifold and all this led to severe environmental degradation. During last several decades, the consumption patterns have changed much in urban as well as rural areas. They have become more resource demanding and short lived. Changes in consumption pattern have greater influence than rising population. As we become wealthier due to economic growth, we tend to consume more. Hence, inspite of the greening of production of goods and delivery of services, the overall impact of consumerism is more. Growing industrialization and urbanization has improved the life of humans but ecosystem health is in peril. The energy, resources and materials that we use have direct or indirect

influence on environment. Environmental pollution is taking a toll on the health of human beings. El Nino events have become more common and droughts have increased in frequency and intensity. One of the important challenges in the current era is to restore the ecological balance without which the survival of human life is at stake. In the wake of an unsustainable environment where the planet is at the risk of several natural disasters, the economy of countries is going to suffer and globalization will take a back seat. The challenge is to infuse environmental sensitivity among the masses and adopt green lifestyle for healthy planet as well as healthy people.

Gender Equality

Sustainable development encapsulates the idea of satisfying the needs of both men and women.(Warth & Koparanova, 2012). Although government's effort got access to reproductive choices and methods yet the number of unwanted pregnancies and unsafe deliveries is on the rise in the third world countries. Many countries have increased contraceptive use by giving women an expanded choice of contraceptives so as to allow them to have wider choices and have greater control over their fertility. It is pertinent to involve men's participation in family planning. Education of girls is linked to the success of family planning measures. It is important to Gather and Disseminate Gender-Sensitive Information for active involvement of women. Building women's capability is required to make them take their own independent decisions. Greater equity, including between men and women and among other groups, is not only essential in itself, but also important for promoting human development. (UNDP 2013).

Poverty Eradication

Elimination of poverty and food insecurity, access to adequate clothing and housing, are dependent on higher levels of consumption. High birth rates are a function of poverty related to lack of education, lack of reproductive care services. World is experiencing rapid economic

crunch. Economic inequalities between nations have grown like never before. Disparity between the rich and the poor continues to grow even within and between nations. There is a pressure to develop and achieve economic well being for everyone. In this attempt there is ruthless and unplanned destruction of natural resource base. Such a kind of resource depletion provides short term benefits but causes long term damage to environment. Poor people who do not have enough food are not able to avail the reproductive facilities. They also tend to produce more children to have more hands to earn. This creates unsustainability.

According to the UN Millennium Development Goals report 2014, India is home to the largest number of poor with one-third of the world's 1.2 billion extreme poor living here. It also had the highest number of under-five deaths in the world in 2012, with 1.4 million children dying before reaching their fifth birthday. Extreme poverty in China came down from 60% in 1990 to 16% in 2005 and 12% in 2010. In India poverty reduction was coming down from 49.4% in 1994 to 42% in 2005 and 32.7% in 2010. According to UN projections, world population is going to be 8 billion in 2025, 9.3 billion in 2050 and will stabilize between 10.5-11 billion. We will need to feed 5 billion additional people. Chronic hunger and malnutrition are already the greatest risks to health worldwide. One in seven people does not get enough food to be healthy and lead an active life. As the world population grows, it will be a challenge for food production to keep pace, yet we continue to lose arable land. About 35 percent of the world's people now face chronic water shortages. As the population grows, more water is needed for agriculture and industry, as well as for domestic uses. Countries with the highest number of hungry people are also having high fertility rates. This increases the challenge of adequately meeting nutritional needs. In urban areas access to food is there but supply of food depends on income and ability to purchase. Drought resistant varieties, increased agricultural productivity, etc can be employed to address the issue of food security.

Conclusion

Thinkers and researchers are pondering on the issue of providing basic amenities to the fellow citizens in times of population increase. We are living in an era where neither the air nor water is pure. The food that we consume is contaminated. Millions live in congested places with filth and dirt all around. All this makes life of a common man miserable on the planet. The challenge is to provide healthy living conditions to the masses. Good quality of life comes with education, financial stability and social justice. In this regard, when population trends are changing the world over, it is a challenge to provide equal growth opportunities to every individual. One of the foremost challenges is to educate the children especially the girl child so that they can make informed choices in the long run. An uneducated country can never progress and this comes out to be the biggest challenge.

Population can be a nation's biggest asset. For the all-round progress of a large nation, it is essential that its entire people contribute significantly to diverse fields like agriculture, industry, service sector, etc. Development plans and strategies should keep human component in centre and all the policies and programmes should be directed towards their well being. It is recognized that most of the population growth in future will take place in urban areas where the poor are forced to live in unhealthy conditions and the lifestyle of the rich is crossing all limits. Sustainable development is possible by ensuring universal accesses to reproductive rights, providing gender equality and ensuring environmental sustainability.

References

Warth Lisa & Malinka Koparanova (2012) Empowering women for sustainable development Discussion Paper Series.

UN (1992). Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-

14 June 1992, Annex I: Rio Declaration on Environment and Development, A/CONF.151/26 (Vol. I), 12 August 1992, New York, NY.

UN (1994). Report of the International Conference on Population and Development, Cairo, 5-13 September 1994, A/CONF.171/13, 18 October 1994, New York, NY.

UN Habitat (2010). State of the World's Cities 2010/2011: Cities for All: Bridging the Urban Divide, Nairobi.

UN Chronicle (2012) Role of "Women in Surveying" in Environmentally Sound and Sustainable Development, Gender Equality and Sustainable Development Vol. XLIX No. 1 & 2



Workshop on Environmental Sustainability and Modelling

13th - 15th May, 2014

Compiled by: Ms. Tanima Basu & Ms. Anshu Baranwal *

Introduction

Pop-Envis organized three days workshop on Environment Sustainability and Modelling. The principal objective of this workshop was to create knowledge and capacity building for the students and teachers on issues related to environment and population especially on solid waste management and environmental modelling.

Participants:

A total of seventy seven (77) students from M.Sc., M.Phil. and Ph.D. with various background ranging from Mathematics, Statistics, Social Sciences from different academic institutes in Mumbai including International Institute for Population Sciences (IIPS), Tata Institute of Social Sciences (TISS) and National Institute of Industrial Engineering, Powai participated in this workshop. Faculties from IIPS also attended the workshop.

Inaugural session:

The workshop was inaugurated with lighting the lamp by Prof. F. Ram, Director, IIPS, Dr. M. K. Kulkarni, Registrar, IIPS, and Dr. Aparajita Chattopadhyay, Pop-Envis Coordinator, IIPS, Mumbai.



Prof. F. Ram, in his inaugural speech, discussed the relationship between population and environment. With the interesting example of Maha Kumbh Mela, which takes place every twelve years in India, he explained how population and mismanagement are causes of environmental pollution. In 2001 Maha Kumbh almost 28 million people took bath in the auspicious river Ganga whereas in 2013 the number increased slightly to 31 million but the amount of waste generated in 2001 was much more than in 2013. In 2013 the waste management was efficient, resulting less environmental pollution. He concluded that population, culture, and technology-these three are the most important aspects to manage environmental pollution.

Dr. Aparajita Chattopadhyay, Coordinator of POP-ENVIS, welcomed all the guests and participants, elaborated the objectives of the workshop and introduced the experts to the participants. She told that this is the first workshop after rejuvenation of POP-ENVIS project, in 2013 May. She also explained the future plans of the project.



She briefed the objectives:

1. Creation of website on Population and Environment with regional language interface.

2. Monthly compilation of News items on Population and Environment.
3. Identification of information/data gaps in the specified subject areas and action taken to fill these gaps.
4. Database creation on Population and Environment.
5. Publication of Pop-Envis bulletin.
6. To establish and operate a clearing house to answer and channel queries related to the allocated subject.
7. To establish linkages with information users, carriers and providers from among government, academia, business and Non-Governmental Organizations (NGOs).
8. Awareness generation and field action of environment - population related issues.

The three main future agenda of POP-ENVIS are:

1. Site suitability analysis for waste disposal in Mumbai.
2. Organizing community level awareness program by disseminating information related to Population and Environment to local schools and colleges, slum areas.
3. Generating environmental awareness and health check to the slum dwellers. Also to create primary database.

In this context she shared and discussed one of the POP-ENVIS funded student's initiative on Knowledge Dissemination and Interaction with the Slum Dwellers at Mankhurd, Mumbai.

Teaching Session:

Experts for the workshop were Dr. Amiya Kumar Sahu, Dr. D.B. Naik, Dr. T. Jayaraman, Dr. Samapti Guha and Dr. Faujdar Ram.

Lecture I : Dr. Amiya Kumar Sahu

Dr. Amiya Kumar Sahu, president and founder of the National Solid Waste Association of India (NSWAI) delivered the first lecture of the workshop on “**Integrated Municipal Solid Waste Management for Sustainability, Environmental Impact and Assessment in Municipal Solid Waste**”. He pointed out several important aspects of solid waste management. According to him the chain is like **Generation, Segregation, Collection and Storage, Transportation, Treatment and finally Disposal** for solid waste management. Solid waste is going to increase with time as the sources of this are households, vegetable market, restaurants, hotels, and commercial places etc which are likely to increase with time. Hence holistic approach is needed to address this problem.



'Segregation at source' of wet, dry and toxic materials is key to handle solid waste. This segregation is necessary at each level of waste collection: household, community and finally at disposal points. After collection and storage of this waste it should be properly transported for recycling. For bio-degradable waste composting by different methods (Vermicomposting, Window, In-Vessel, Bio-bin) can transfer these into useful compost. Construction and Demolition waste can be used in reclamation, recovery of sand. Plastic, Metal, Glass, Paper waste can be recycled by different methods like Refuse Derived Fuel (RDF) using boiler, Biomethanation, Glasification, Pyrolysis, Incineration etc.

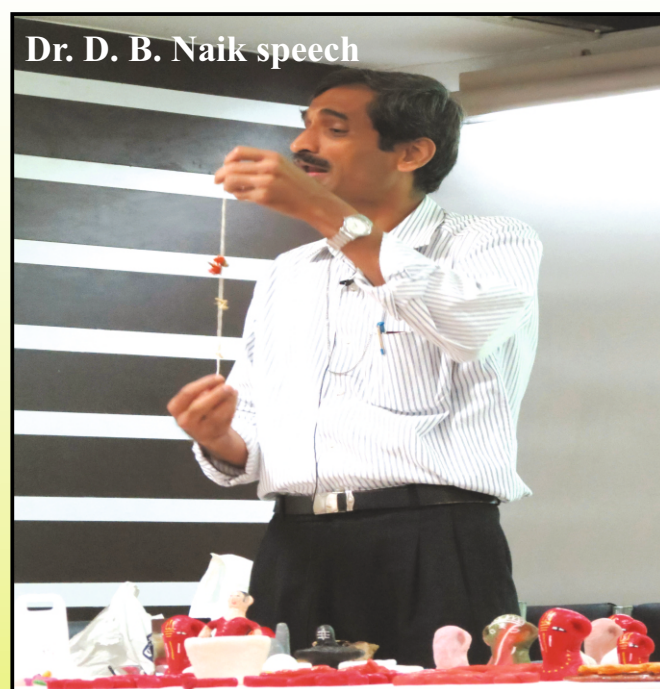
He further suggested '**4R Principles for Zero Waste**' by Reduce, Reuse, Recycle and Recover. *Zero waste is a rather new concept which consider waste as resource.* Though zero waste may seem to be a linear system, in real it is a cyclical one leaving no waste to dispose hence no landfill. He concluded with the hope that this concept can be a reality as well as will be responsible for sustainability if the stake holders (municipality, financial institutes, NGOs, private sectors, service users), Factors (Technical, Environmental, Financial, Policy/Legal, Institutional and most importantly Socio-cultural) and the Waste System work in sync.

The Discussion session was quite interactive with a lot of questions coming up from the participants and it lasted for almost one hour. Some of the questions are: How the typical Indian mind set can be changed to dispose of garbage properly? What is the percentage of pollution contributed by Household waste? What is sick building syndrome?

Lecture II : Dr. D.B. Naik

In the evening session of the first day Dr. D.B. Naik, Head, Applied Radiation Chemistry Section, Radiation and Photochemistry Division BARC, Trombay , delivered a very interesting lecture on “**Towards Clean Environment**” with some spectacular demonstration as well. He particularly emphasized on recycling of thermocol (Styrofoam) and papers. Thermocol is not often recycled because of its low scrap value and it does not bio-degrade and also resistant to photolysis. Thermocol is usually disposed of through volume reduction by thermal compacting or can be broken into small pieces (granulation) and remoulded into fresh items. Dr. Naik has found a new way of disposing of thermocol by reducing its volume. Acetone can be used to reduce its volume by 97-98%. He showed that one third part of a large bottle of Acetone can absorb almost two bag-full of thermocol. Once thermocol is reduced in volume a semi-solid (clay like substance) substance is formed which can be given different shapes and used as decorative items. Similarly small paper pieces which are not usually sold out can be stored and then soaked

in water to form a paste like substance. This again can be given different forms (nameplate, incense stick stand, decorative items, small basket etc.) using some adhesive (like fevicol).



Second Day (15th May 2014)

Second day of the workshop had three lectures delivered by Dr. T. Jayaraman, Professor, School of Habitat Studies, TISS, Mumbai, Dr. Samapti Guha, Associate Professor, School of Management and Labour Studies, TISS, and Dr. F. Ram, Director and Sr. Professor, IIPS, Mumbai.

Lecture III : Dr. T. Jayaraman

Prof. T. Jayaraman discussed on “**Modelling for Climate Change**”. Set of variables are studied in climate change like temperature, distribution of temperature over the year, perspiration etc. These variables are affecting climate and human society as well. According to Prof. Jayaraman environment is somehow anthropocentric issue, hence anything that is affecting environment is of human interest. As wellbeing of human being is very much dependent on Environment and Climate Change, its study has gained a lot of importance in recent times. According to Inter-governmental Panel on Climate Change (IPCC) report, three issues that need attention are:

1. Science of climate change
2. Impact of climate change and
3. Role of man to reduce emitting gas to nature.



Interaction with Dr. Jayaraman

To understand relationship between climate change, environment, nature and human being mathematical

modelling is used. There are different kinds of human, environmental problems that are dealt by mathematical equations; of which some are simple and solvable and some are complex in nature. Real need for modelling arises due to the complex problems where one has to consider all the possibility that may happen in this complexity (eg. Evolution cannot be reversed and it is a complex and one directional in time phenomena). There are usually two types of modelling used in economics

1. Optimization: Obtaining a solution to a set of algebraic equations with some constraints (inequalities) eg. Problems dealt in linear programming like assignment or transportation problem.
2. Simulation: Extrapolation from past data using regression formula for new values of exogenous variables eg. Statistical modelling.

Alongside complexity, non-linearity is also a reason for modelling. And the third complexity is feedback i.e. situation where output influences the input. Feedback can be positive or negative in nature and because of its presence linear thing becomes non-linear. In other features of modelling Prof.T. Jayaraman discussed parameters of model, different range of parameters and how the values of parameters can be fixed. In an example of dynamic modelling he briefly discusses the famous Predator-Prey Model (by Lotka 1910 and Volterra 1926).



After the tea break Prof. T. Jayaraman explained how using modelling some important problems may be answered. In his paper **“Climate Change and Agriculture: Current and Future Trends and its Implication for India”** he has explained how change in climate may affect crop production in different parts of the World. Using present data and modelling (here simulation) he showed that crop production is likely to be affected by increase in temperature and drop in water level. Hence it can be said that the consequence of using crop modelling with climate model may determine how climate will affect crop production in future.

Lecture IV : Dr. Samapti Guha

Evening session started with the discussion of the paper **“Women Micro Entrepreneurs in Slums of Mumbai”** by Dr. Samapti Guha, of School of Management and labour studies, TISS, Mumbai. In this study she has collected primary data of women entrepreneurs staying in slums of different parts of Mumbai and discussed about their socio-economic environment and background characteristics. As a concept, microenterprise development, has been considered as a tool for poverty alleviation and women empowerment. Almost 94.94% of all the Micro, Small and Medium Enterprises (MSME) are Micro enterprises. Gross output contribution of Micro Enterprises is 44.24% of total MSME output in India and 70% of total employment in MSME is Micro Enterprises.



Almost 14% of micro enterprises are owned by women. The most interesting finding of her study is that unlike other

entrepreneur, income of the women in micro entrepreneur decreases as their age increases.



Lecture V : Dr. F. Ram

Dr. F. Ram, Director and Professor, IIPS, Mumbai delivered the last lecture of the workshop entitled **'Issues on Environment and Population'**. He elaborated the topic with the example of core demography and periphery demography. While the periphery group, mainly consisting of developing countries, supports 80 percent of world population, the developed nations, have high resource demand. The luxurious life style of the people of core demography results in more power consumption, more production of consumer goods which results in higher Green House Gas (GHG) emission and hence environmental pollution, whereas the periphery group is suffering more because of the environmental pollution. Not only the garbage (be it scrap, electronics or chemical) is being dumped in developed countries who are as well suffering from the GHG effect and global increase in



temperature. Global warming and climate change is affecting this periphery group more adversely since they do not have the resources to cope with the change. To sustain the environment these core and periphery demography management is essential. He further argued that increase in Life Expectancy at Birth (LEB) do not depend on real per capita income (i.e. economic development) after a certain point. He concluded that population, culture and technology-these three are the most important aspects to manage environmental pollution and help making our development sustainable.

Valedictory Session:

Mrs. Sudha G. gave vote of thanks to the experts, faculties and the facilitators of the workshop and congratulated the participants for successful completion of the workshop. Each participant was given a certificate for attending the workshop.

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Environment Day Celebration: Painting

Name : Jyothika Murugan Class : VIII
School : Swami Ramkrishna Paramahans High School, Mumbai



Environment Day Celebration

Introduction

As a part of the environment day celebration, Pop-Envis conducted competitions for students of class VI to IX on 19th and 21st June 2014. The principal objective of this competition was to create knowledge and capacity building for the students on issues related to *environment and population*.

L.V.A Sarvodaya Vidyalaya & Swami Ramkrishna Paramahans High School, Govandi, Mumbai participated in the program.

There were around 88 students who took part in the competition from both the schools. We conducted four competitions – Essay Writing (Environment in our Locality), Painting (Environment Today), Slogan Writing (Environment) and Craft from waste material. Chart paper for painting, A4 sheet for slogan, pen, pencil, eraser and refreshment for students were sponsored by the Pop-Envis Project.



Three best performers were selected from the above mentioned four categories and were awarded prizes and certificates.

Winner of Essay writing:

1st : Neha Mahendra



2nd : Aishwi Amit Jawale



3rd : Tripathi Ritesh Rajesh



Winner of Slogan writing:

1st : Vikrant B Sawant



2nd : Prachi Ramesh Palav



3rd : Sonia S Dhakane



Winner of Painting:

1st : Sachin Sharma



2nd : Jyothika Murugan



3rd : Jyoti Soni



Winner of Craft from waste:

1st : Rajak Anuj Kumar Vinod



2nd : Chavan Harsh Sunil



3rd : Yadav Sahil Kaustubha



Smart Cities for India

Amrapali Mukherjee *

A. What is smart city?

Across the globe, many countries are taking efforts to make their cities smart. These cities use a mix of existing and new technologies to reach diverse objectives more efficiently. Some cities are also being designed to be smart from the beginning, to provide its citizens cost efficient services, be environment friendly, economically vibrant and attractive to the world. These cities have social infrastructures, information system and equipment compatible to receive, process and act upon huge amount of real time data among themselves. In this respect, the smart city can also be thought of as a System of Complex IT & Electronic Systems.

Main objective of a smart city is to achieve the so called triple bottom line viz. People, Profit and Planet. Specifically, a smart city should achieve the following objectives:

1. Efficient delivery of basic services such as energy, healthcare, water, education, waste disposal and communications
2. Providing opportunities for economic growth of the city
3. Ensuring safety and security to its residents and country
4. Creating sustainable, intelligent and multimodal transport systems
5. Creating sustainable social and residential infrastructure
6. Nurturing creative and cultural space

Meeting all these objectives at the same time can be challenging, especially for a developing country like India. Therefore, country and city specific challenges need to be overlaid upon these seemingly overwhelming objectives given above.

B. Difficulty in Indian Scenario

India has (or should have) twin goals towards creating a smart city. First, to create model new cities, as citadel of economic growth, high quality of life and environment friendly. Second, to make the older cities smarter, efficient and sustainable, step by step. Meeting both these goals at the same time appears difficult, limited by both financial constraints and bandwidth constraints. The feasible alternative would be to create a couple of templates of smart cities covering both these goals.

One major roadblock to smart city development is the amount of huge population, unregistered residents, ad-hoc tenements and extra-legal consumers in any of the Indian cities. These being the reality, the objectives need to be curtailed.

C. Prioritising Objectives for Indian Scenario

Objectives for development of the first goal, i.e. model new cities should be as under (in the order of priority):

1. Providing opportunities for economic growth of the city

2. Efficient delivery of services such as energy, healthcare, water, education, waste disposal and communications
3. Creating sustainable social and residential infrastructure
4. Ensuring safety and security to its residents

Model new cities (such as Dholera, Gujarat) should be built afresh, distant from the bigger cities. This will enable it to build an economy that harnesses the local products and developing a network that uses skill sets and intelligence of the neighbouring population. Also, this gives the opportunity to create the cities as green cities.

It may be noted that “transport systems...” has been eliminated from the first goal as creation of public transport systems may be time consuming and constantly evolving. Thus, this can be built at a later date. Also, the “security aspects...” of the smart city should be built in consonance with the National Security Grid under making. However, it may be easier to install security system specific requirements in a new city than those of the older cities.

Objectives for development of second goal, i.e. older existing cities should be as under (in the order of priority):

1. Ensuring safety and security to its residents
2. Creating sustainable, intelligent and multimodal transport systems
3. Efficient delivery of services such as energy, healthcare, water and communications
4. Substituting existing social and residential infrastructure by sustainable ones

Given the economic importance of the older cities, safeguarding them should be the first priority for any administration. Also, “economic growth...” should be taken up later as these cities already have thriving economies.

D. Main components

The first two components of “new” and “old” smart cities each are briefed below:

a. Providing economic growth

Opening a company, branch or shifting offices is currently a bureaucratic nightmare. The smart city can considerably lessen this effort by evaluating if they require so many approvals; making the forms etc. available on the go as a single stop shop. Similarly, the smart city can bridge the gap between demand and supply of skills by making the universities, poly-techniques and other agencies interfacing over an IT platform with the organisations requiring the skills. Same is true for supply of goods and services which will be permitted within the city limits, e.g. office supplies, legal infrastructure. For a new model city, this should be the top priority as these will make the businesses germinate and thrive at the least agency costs.

b. Delivering safety and security

Two layered IT structure can be conceptualised to deliver the safety and security to its residents. The top layer, connects to the national grid, to capture all kinds of security information including disaster management information, terrorist

activities, intelligence, crime database etc. This layer, on proper authorisation, can upload and download relevant information to the bottom layer. The bottom layer should capture local information such as CCTV cameras in public places, institutions along with provision of uploading the information from local devices such as bank security system, hospital management system, fire safety networks etc. This will reduce the response time to react to any incident as well as take preventive steps if necessary. Medic can play a brilliant role by propagating safety and security rules, laws and helpline numbers.

c. Delivering basic services

Energy, healthcare services, water, waste disposal, education and communications work on economisation of scarce resources, namely electricity, doctors, nurses and bandwidth. A smart city should be able to detect the energy requirement of one sector (cluster of residential or commercial blocks) and dynamically draw from other sectors. The same should ebb and flow dynamically with season, activity levels and accommodating other variations. Renewable energy resources are least utilized in India and can be harnessed with effective technology and cost subsidization.

Similarly, seamless flow of patient data to healthcare services, GP to speciality hospitals to caring homes to dispensary. In this system, a citizen may just require single identification number and his/ her entire data can be seen at any healthcare facility.

d. Creating sustainable multi-modal transport

Traffic snarls at most of our cities are notorious due to limitation of road spaces, encroachments and other issues. Also, a variety of modes such as two wheelers, auto-rickshaw, taxi, public bus, private cars and private buses ply in tandem. Thus, a smart city should have an IT platform, linked to the individual modes of transport, enabled with updatable city maps, GPS etc. Traffic should be controlled dynamically based on real time information on jams, repair work, accidents etc. Warnings can be issued well in advance based on traffic analytics. People using private vehicles can be imposed with higher road taxes on certain days of a week. Shared vehicles such as auto-rickshaws, taxis, minibuses can be introduced at different points. Such vehicles can pick up passengers from prescheduled locations. Booking of these vehicles can be done over internet or telephonically to make the system more efficient and environment friendly.

E. Partnerships Required

The project of this size can never be completed without a partnership mind-set from all concerned. These are twofold: One, key stakeholders, especially in case of older cities, require to be won over towards building the smart ecosystem. Government agencies, political parties, unionised workforce, hawkers, shopkeepers, taxi and auto unions, residents should discuss the issues jointly to achieve consensus on issues and their resolution. Two, network of system integrators, IT platform developers, utility companies, service providers to create a robust smart city platform to facilitate interoperability of plethora of subsystems onto it.

It is possible to bring in smart city concept to India provided it is both adapted to Indian conditions and implemented in phases based on city specific priorities.

MUMBAI MANGROVES – DWINDLING NATURAL RESOURCE

Mangroves are various types of trees up to medium height and shrubs that grow in saline coastal sediment habitats in the tropics and sub tropics – mainly between latitudes 25° N and 25 ° S. They are considered as natural barriers between the land and sea. The mangrove biome, or mangal is a distinct saline woodland or shrub land habitat characterised by depositional coastal environments, where fine sediments (often with high organic content) collect in areas protected from high-conditions tolerated by various mangrove species range from brackish water, through pure sea water (30 – 40 ppt(parts per thousands), to water concentrated by evaporation to over twice the salinity of ocean water (up to 90 ppt).

Mangrove forests are extremely important coastal resources, which are vital to our socio – economic development. They act as coastal protection from tsunamis and tropical storms, help to hold coastlines together by trapping sediments in their roots (*Kathiresan; Spalding et al., 2010; Stone et al., 2008*), keep groundwater clean by preventing seawater from entering inland, and stop the spread of metal pollution by absorbing heavy metals in their sediment (*Kathiresan*). Mangroves are also considered as a good potential source of recreation and tourism for humans.

Mangroves in India account for about 3% of the world's mangrove vegetation and are spread over an area of 4,661.56km² along the coastal areas of the country. Sundarbans in West Bengal accounts for almost half of the total area under mangroves in India. Mangroves cover a large number of wildlife diversity in India. According to *Kathiresan and Gasim (2005)*, mangrove forest ecosystem in India includes 920 floral species and 3023 faunal species which is the largest mangrove biodiversity in the world.

Table. Type of Mangrove forest and species ecosystem in India.

Sr.No.	Groups	No. of Species
Flora		
1	Mangroves	39
2	Mangroves associates *	86
3	Sea Grasses	11
4	Marine Alga **	557
5	Bacteria	69
6	Fungi	103
7	Actinomycetes	23
8	Lichens	32
Fauna		
9	Prawans and Lobsters	55
10	Crabs	138
11	Insects	707
12	Molluscs	305
13	Other invertebrates	745
14	Fish Parasites	7
15	Fin Fish	543
16	Amphibians	13
17	Reptiles	84
18	Birds	426

* Plants that occur in the coastal environment and are also found within mangroves.

** Include phytoplankton and seaweeds.

Source: *Kathiresan and Qasim, 2005.*



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iip-env@nic.in**

Assessment of Maharashtra state from 1987 – 2013 carried out by Forest Survey of India (FSI) pertains that for the past eight years the mangrove cover seems to be stable. Hence, we should take an initiative to protect this stable resource from declining.

Mangrove cover Assessment in Maharashtra

State (Year)	1987	1989	1991	1993	1995	1997	1999	2001	2003	2005	2009	2011	2013
Maharashtra (Sqkm)	140	114	113	155	155	124	108	118	158	186	186	186	186

Source: India State of Forest report 2013

Mangrove cover in Maharashtra has been categorized into very dense (canopy density of more than 70%), moderately dense (canopy density between 40-70%) and open mangrove cover (canopy density between 10-40%). Major mangroves can be seen today in Mumbai along the Vasai Creek, Thane Creek, Manori and Malad, Mahim - Bandra, Versova, Siwari, Mumbra - Diva and few more places. These are also under immense pressure due to significant increase in anthropogenic forces.

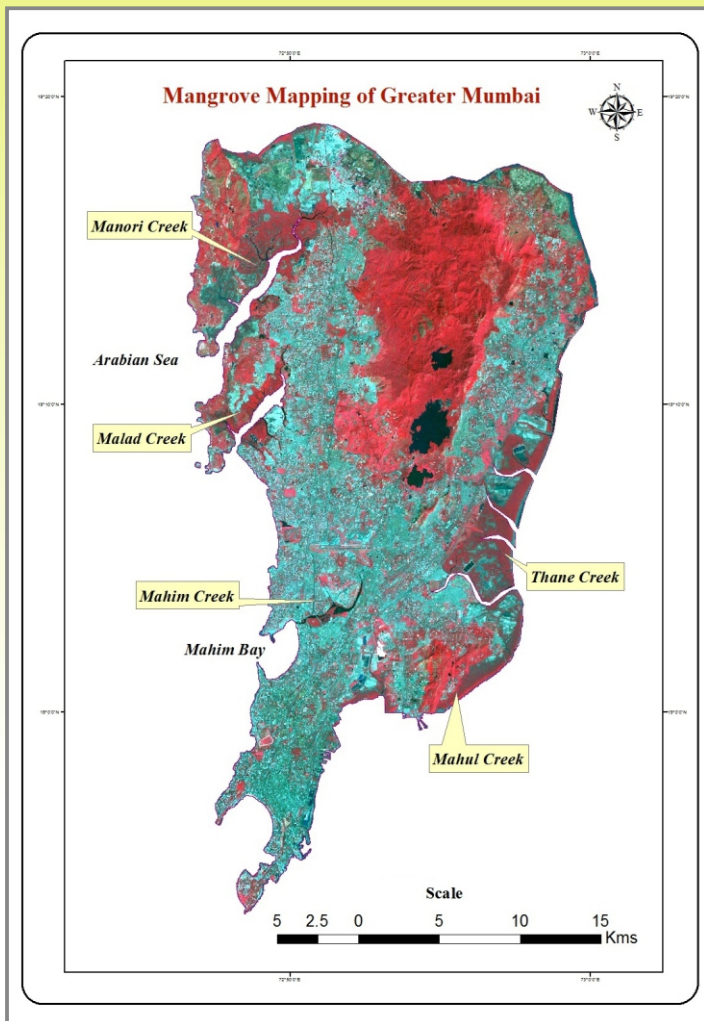
District wise mangrove cover

District	Very Dense Mangrove	Moderately Dense Mangrove	Open Mangrove	Total
Mumbai City	0	0	2	2
Mumbai Suburb	0	23	20	43
Raigarh	0	10	52	62
Ratnagiri	0	12	11	23
Sindhudurg	0	2	1	3
Thane	0	22	31	53
Total	0	69	117	186

Source:- India State of Forest report 2013

On the global scale, mangrove areas are becoming smaller or fragmented and their long-term survival is at great risk (Duke et al. 2007). Spalding et al. (2010) argue that mangroves are more valuable economically per unit area than any other land use, including tourism, aquaculture, and agriculture. Unfortunately, Rapid developments like housing, industrialization, pollution and increasing population of Mumbai has resulted into degradation of mangroves. Mumbai mangroves are under constant flux due to both natural and anthropogenic behavior. Considering the benefits of the people and the environment, and their threatened condition, we recommend the following policy/strategy plans to implement to conserve the stable resources for environmental sustainability.

- a. Environmental and socio-economic improvements should go hand in hand.
- b. The government should implement strict guidelines / rules for the sustainability of the ecosystem.



- c. Real time monitoring of mangrove ecosystem through remote sensing technology should be implemented to know the status of mangrove growth and cover.
- d. Effective local community participation for safe guarding the ecosystem.
- e. Disseminate knowledge about mangroves and its uses to the general public to increase the mangrove cover.
- f. Adopt policy for identifying and restoring degraded mangrove community.
- g. Conservation, restoration and development of mangrove ecosystem should go hand in hand.

References:

Kathiresan and Qasim, S.Z. (2005) Biodiversity of Mangroves Ecosystem, Hindustan publishing corporation, New Delhi, 251 pp.

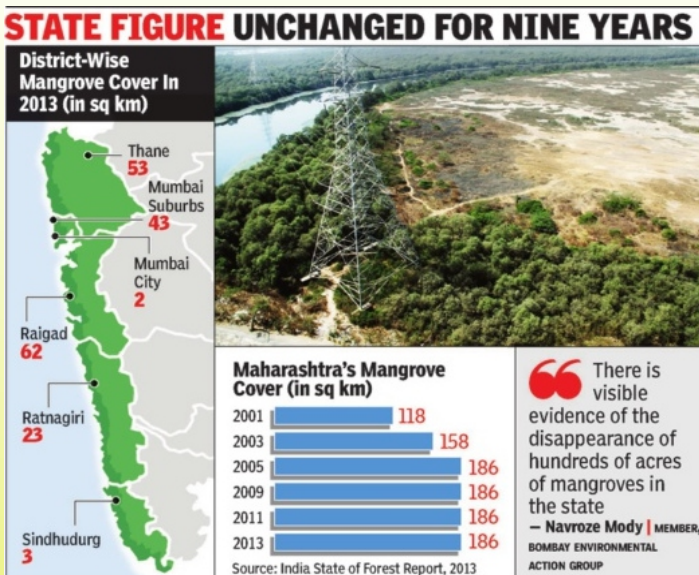
Spalding, M., Kainuma, M., & Collins, L. (2010). World Atlas of Mangroves. Washington DC: Earthscan

News on Mangroves

1. Battle for Mangroves - Report says mangrove cover untouched, activists aghast

Aug 05, 2014: The Times of India (Mumbai)

Maharashtra's mangrove cover has remained unchanged at 186 sq km for nearly a decade, according to an environment ministry report that was questioned by activists and forest officials alike.



Titled India State of Forest Report 2013, the report has been prepared by the Dehradun based Forest Survey of India by using remote sensing data. It says that India's mangrove cover measures 4,628 sq km or 0.14% of the total area; “compared with the 2011 assessment, there has been a net decrease of 34 sq km.” The drop has been noted in West Bengal on account of exclusion of creeks and in Gujarat.

In Maharashtra, the report states, mangroves are spread over 186 sq km—the same figure proffered in every State of Forest Report since 2005. This constancy in the statistic is hard to understand, an official in the state forest department conceded. As per satellite mapping by

the state, “we have 30,000 hectares, or 300 sq km, of mangroves. Of these, 17,000 hectares are on government land and 13,000 hectares on private land,” said N Vasudevan, chief conservator of forests (mangrove cell). Vasudevan said there is under-reporting of mangrove cover in Sindhudurg and Ratnagiri districts, which have 2,000 hectares and 6,000 hectares of the plants, respectively. In Mumbai and Navi Mumbai, 5,469 hectares of mangroves have been notified as reserved forests. “Ever since mangroves on government land were notified as protected forest, they have flourished. The losses were largely on private and revenue land,” Vasudevan said.

Environmentalists too called the 2013 report inaccurate, but, unlike officials, they felt the Maharashtra figure in it was inflated. Navroze Mody of the Bombay Environmental Action Group said there is evidence of the disappearance of hundreds of acres of mangroves. D Stalin of Vanashakti said, “The loss of mangroves in Thane is huge.

2. German help for mangrove sanctuary plan

Aug 5, 2014: The Times of India (Mumbai)

The state forest department has tied up with a German government agency , GIZ, to create a marine interpretation centre (MIC) along the Airoli coast of the Thane creek. A unique urban mangrove sanctuary for the public to enjoy open wetland spaces is to be created by the centre. The MIC is expected to be ready by next year.

“MIC will be akin to the Nehru Science Centre in Worli; only , it will be on a grander scale covering the northern tip of Thane creek, and dealing with environmental science and wetlands,” chief conservator of forests (mangroves cell) N Vasudevan said on Monday . “It can be an ideal place for students and the public at large who want to know and enjoy nature.”

Vasudevan said the MCI would fund itself by charging for entry . “We also plan a smaller centre on the Ratnagiri coast,” Vasudevan said. The detailed planning is to happen later in the year, when GIZ officials visit the state to meet forest officials.

GIZ works closely with the Association of German Chambers of Industry and Commerce and the Chambers of Commerce abroad. It also works with different countries for environment preservation while offering managerial expertise.

Elsie Gabriel of Young Environmentalists Programme Trust, which held a mangrove plantation drive recently , said the MIC was great idea to sensitize people about the importance of a green coast.

Environment Day Celebration: Slogan

- ✓ *We were born to help the world, not to destroy it. Then why are we destroying the environment?*
- ✓ *Less pollution is the best solution.*
- ✓ *Green Environment is Clean Environment.*
- ✓ *Save Earth, Save Life.*

(Written by : Students of VIII and IX std.)

Name : Vikrant B. Sawant

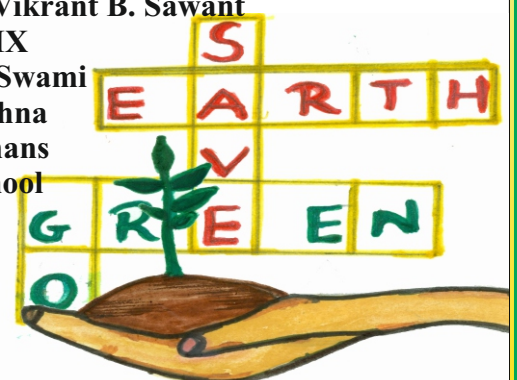
Class : IX

School : Swami

Ramkrishna

Paramahans

High School



Conferences

1. ICERE 2015 : International Conference on Environment and Renewable Energy

Conference: 20-21 May 2015, Vienna, Austria

Website: <http://energy.conference-site.com/>

Registration is open. Please submit your abstracts.

ICERE 2015, is to bring together innovative academics and industrial experts in the field of Environment and Renewable Energy to a common forum.

2. The Fifth Asian Conference on Sustainability, Energy and the Environment 2015

Conference: Rihga Royal Hotel, Osaka, Osaka Prefecture, Japan
i. Saturday, June 13, 2015 - Tuesday, June 16, 2015 (All Day)

Website: <http://iafor.org/iafor/conferences/acsee2015/>

This international and interdisciplinary conference will again bring together a range of academics and practitioners to discuss new directions of research and discovery in sustainability, energy and the environment. As with IAFOR's other events, ACSEE2015 will afford the opportunity for renewing old acquaintances, making new contacts, and networking across higher education and beyond.

Abstract Submission Deadline: February 15, 2015

Registration Deadline for Presenters: May 15, 2015

3. International Conference on Renewable Energy and Sustainable Environment (RESE – 2015)

Conference : 3rd August 2015 to 5th August 2015 , India, Pollachi

Website: <http://www.drmcet.ac.in/conference>

This conference will bring together the main stakeholders to examine the current challenges and to understand the options available for green living. The major source of non-renewable energy is fossil fuel but with associated environmental problems. The challenges are evident. Industry needs reliable and affordable energy to become productive and competitive. At the same time, it has to find an appropriate balance between its growing demand for energy and the urgent need to protect the environment. Research in this field has grown over the years to find alternate and affordable energy sources with minimal impact on the society.

Deadline for abstracts/proposals: 1st February 2015

4. 7th International Conference on Sustainable Development and Planning

Conference: 19 - 21 May, 2015, Istanbul, Turkey

Website: <http://www.wessex.ac.uk/15-conferences.html>

Registration is open. Please submit your abstracts.

The Conference addresses subjects of regional development in an integrated way as well as in accordance with the principles of sustainability. It has become apparent that planners, environmentalists, architects, engineers, policy makers and economists have to work together in order to ensure that planning and development can meet our present needs without compromising the ability of future generations.

Problems related to development and planning affect rural and urban areas, and are present in all regions of the world. Accelerated urbanisation has resulted in deterioration of the environment and loss of quality of life.

5. **4th International Conference on Disaster Management and Human Health: Reducing Risk, Improving Outcomes**

Conference: 20 - 22 May 2015 , Istanbul, Turkey

Website: <http://www.wessex.ac.uk/15-conferences/disaster-management-2015.html>

Registration is open. Please submit your abstracts.

This series of conferences originated with the need for academia and practitioners to exchange knowledge and experience on the way to handle the increasing risk of natural and human-made disasters. Recent major earthquakes, tsunamis, hurricanes, floods and other natural phenomena have resulted in huge losses in terms of human life and property destruction. A new range of human-made disasters have afflicted humanity in modern times; terrorist activities have been added to more classical disasters such as those due to the failure of industrial installations for instance.

6. **The 3rd Environment Asia International Conference**

Conference : 17th to 19th June 2015, Bangkok, Thailand

Website: <http://www.tshe.org/environmentasia-2015/>

The Thai Society for Higher Education on Environment (TSHE) has truly realized the importance of transborder environmental issues and international cooperative efforts. Therefore, we will be organizing the 3rd Environment Asia International Conference on “Towards International Collaboration for an Environmentally Sustainable World”. This conference will bring together scientists, experts, policy makers, researchers and students to discuss and address the issues of the environment together with building international networks and cooperation for an environmentally sustainable world.

Abstract Submission Deadline: November 30, 2014

Quotes on Environment

- ✓ “It is horrifying that we have to fight our own government to save the environment.”
— **Ansel Adams**
- ✓ “A nation that destroys its soils destroys itself. Forests are the lungs of our land, purifying the air and giving fresh strength to our people.”
— **Franklin D. Roosevelt**
- ✓ “Nature shrinks as capital grows. The growth of the market cannot solve the very crisis it creates.”
— **Vandana Shiva**

News on Population and Environment

A. Government sets up committee to review environment-related laws

September 3, 2014 | ET Bureau

NEW DELHI: The environment ministry has set up a committee headed by former cabinet secretary TSR Subramanian to review environment-related laws and statutes even as it marked the Narendra Modi government's 100 days in power.

In an order issued on Friday, the ministry has specifically listed five laws — the Environment (Protection) Act, 1986, Forest (Conservation) Act, 1980, Wildlife (Protection) Act, 1972, The Water (Prevention and Control of Pollution) Act, 1974 and The Air (Prevention and Control of Pollution) Act, 1981 — for the committee to look into and suggest amendments to ensure that these laws meet their objectives. **Read More.....**

Source : http://articles.economictimes.indiatimes.com/2014-09-03/news/53522598_1_green-laws-ministry-regulator

B. Ozone pollution in India kills crops that could feed starving population

September 04, 2014 | Click Green

In one year, India's ozone pollution damaged millions of tons of the country's major crops, causing losses of more than a billion dollars and destroying enough food to feed tens of millions of people living below the poverty line. **Read More.....**

Source : <http://www.clickgreen.org.uk/analysis/general-analysis/125048-ozone-pollution-in-india-kills-enough-crops-to-feed-94-million-each-year.html>

C. FIGHTING FOR GREENS - Lokhandwala Lake a birdwatcher's paradise lost?

September 04, 2014 | The Times of India

Garbage Stifling Lake's Spirit, Say Experts

Over the last five years, naturalist and bird watcher Sunjoy Monga has spotted 102 species of birds over and around Lokhandwala Lake. But on Thursday morning, all he could see was a heavy layer of garbage coating the edge of the lake. Lesser whistling ducks and spot-billed ducks, which are usually seen in droves, were fewer. **Read More....**

Source : <http://epaperbeta.timesofindia.com/Article.aspx?eid=31804&articlexml=FIGHTING-FOR-GREENS-Lokhandwala-Lake-a-birdwatchers-paradise-05092014008065>

D. Now, security for water distribution

September 05, 2014 | The Times of India

AURANGABAD: For the first time in the history of Aurangabad Municipal Corporation, security personnel are guarding the elevated water reservoirs to streamline water distribution in the city. Aurangabad City Water Utilities Company Limited said the move is to avoid any untoward incident. **Read More...**

Source : <http://timesofindia.indiatimes.com/city/aurangabad/Now-security-for-water-distribution/articleshow/41742106.cms>

E. Smoky fires raise risk of respiratory diseases, early death

September 4, 2014 | The Hindu

Some three billion people — a third of the world's population — are exposed to “toxic amounts” of pollution produced when households burn plant material, animal dung and coal for cooking, lighting and heating. As a result, these individuals are at a greater risk of respiratory diseases and an early death, according to an assessment just published. **Read More....**

Source : <http://www.thehindu.com/sci-tech/science/smoky-fires-raise-risk-of-respiratory-diseases-early-death/article6376563.ece>

F. Govt forms four-minister panel to create environment regulator

September 05, 2014 | Express News Service

Summary: Environment minister Prakash Javadekar, transport minister Nitin Gadkari, power minister Piyush Goyal and chemicals and fertilisers minister Ananth Kumar have been told to look at long-standing proposals for a regulator and suggest the most viable structure. The regulator will take most operational work away from the ministry. **Read More...**

Source : <http://www.financialexpress.com/news/govt-forms-fourminister-panel-to-create-environment-regulator/1285714>

G. Ozone layer that started depleting in 1980s healing

September 11, 2014 | The Times of India

NEW DELHI: The protective ozone layer that started depleting heavily in the 1980's is on a recovery mode according to a new assessment by 300 scientists across the world released on Thursday.

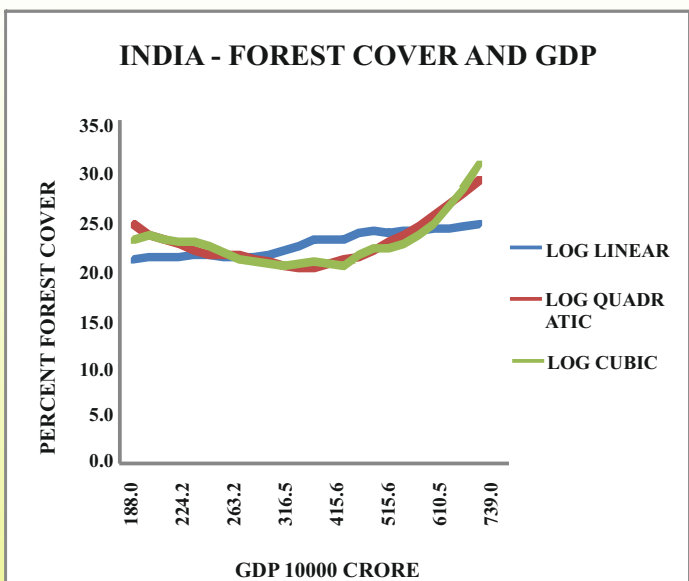
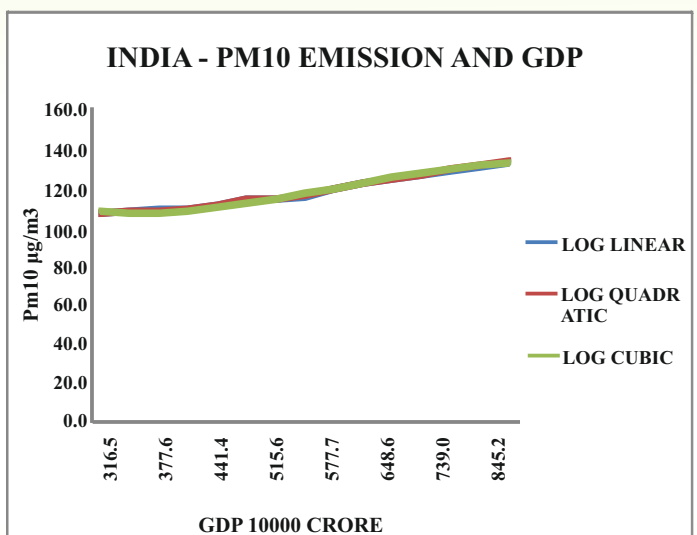
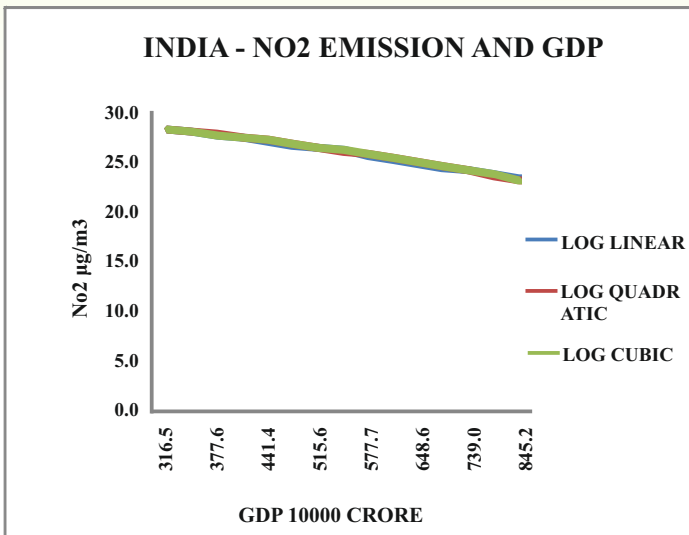
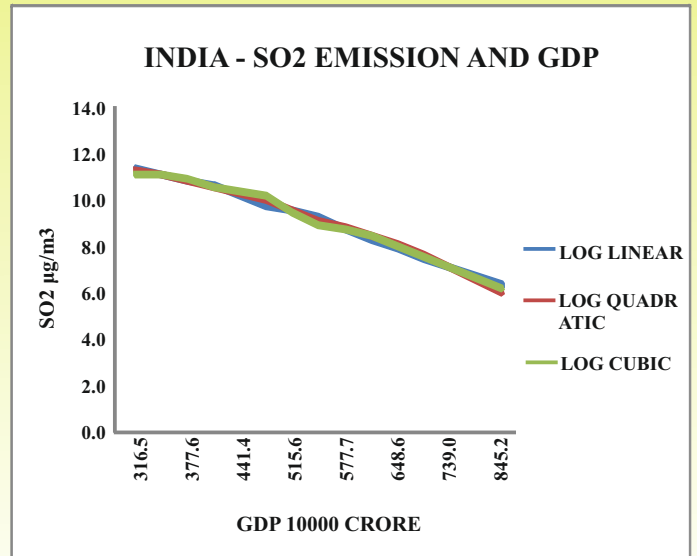
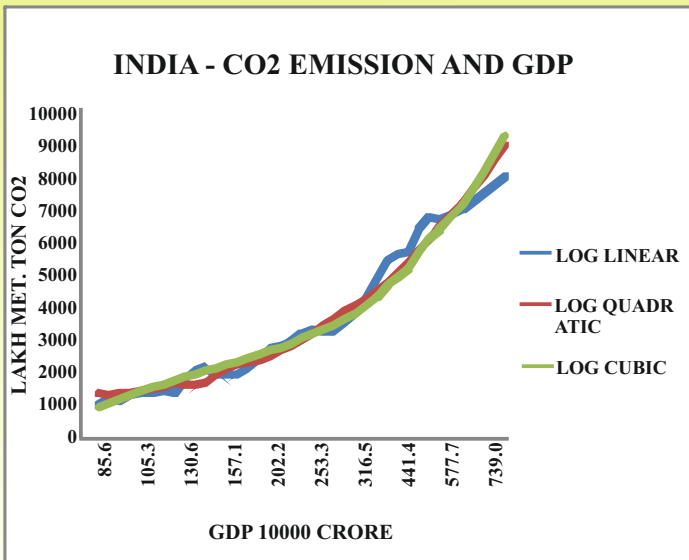
Assessment for Decision-Makers"-- a summary document of the Scientific Assessment of Ozone Depletion 2014 published by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) indicates that the ozone layer is expected to recover to 1980 levels before the middle of this century in many parts. **Read More....**

Source : <http://timesofindia.indiatimes.com/home/environment/pollution/Ozone-layer-that-started-depleting-in-1980s-healing/articleshow/42207512.cms>

Quotes on Environment

- ✓ “We're in a giant car heading towards a brick wall and everyone's arguing over where they're going to sit”
— David Suzuki
- ✓ “Look deep into nature, and then you will understand everything better.”
—Albert Einstein

Environmental Kuznets Curve of Selected Indicators 1980-2018



Announcement

**National Seminar on
“Population, Health and Inclusive Development in India”**

Dates: 3 - 5 February, 2015
Venue: Ahmedabad, Gujarat

CALL FOR ABSTRACTS / PAPERS



**International Institute for Population Sciences (IIPS)
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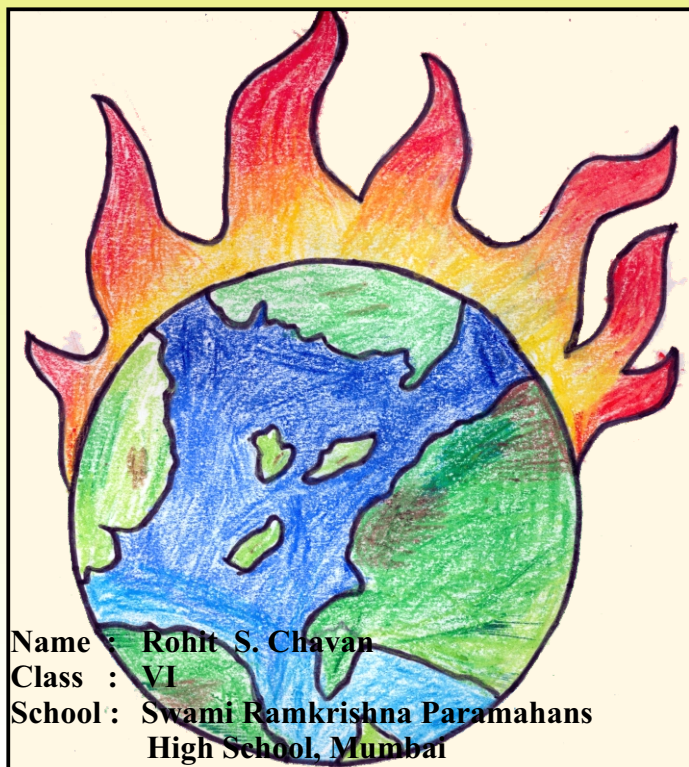


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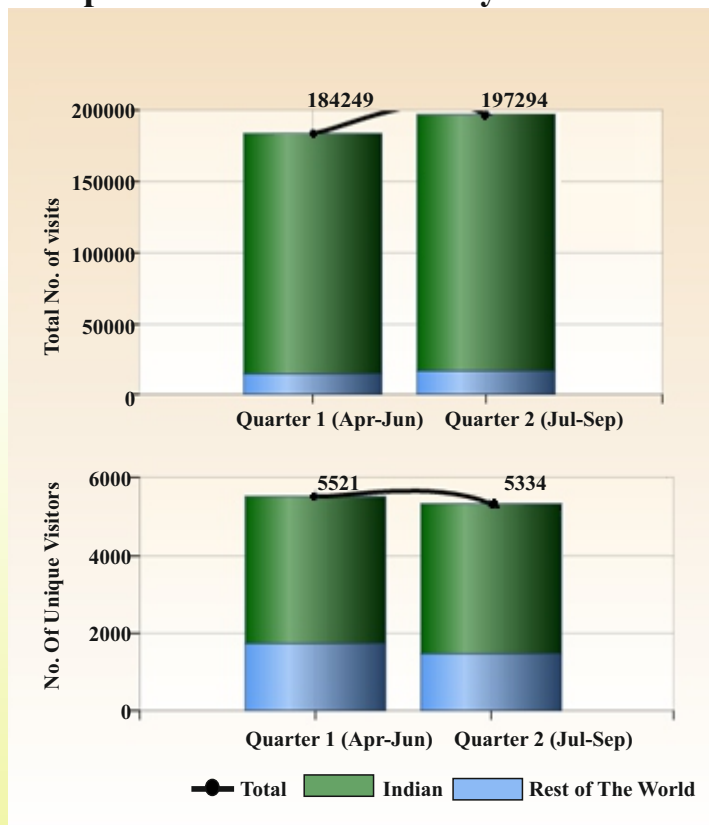
Indian Institute of Public Health Gandhinagar

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Environment Day Celebration: Painting



Pop-Envis Visitor Summary 2014-2015



Progress of POP-ENVIS (April - October 2014)

1. Website database, kids section, glossary, upcoming events, bibliography and major activities etc are added in both Hindi and English website.
2. Monthly compilation of News items on Population and Environment
3. Workshop on
 - Environmental Sustainability and Modeling (13th and 15th May, 2014).
 - Environment Day Celebration (19th & 21st June, 2014).
 - GIS and Its Applications (16th – 22nd July, 2014).
 - Gender, Development and Environment (11th - 14th August, 2014).
4. Pop-Envis Bulletin.
5. Celebration of Environment Day (June 2014).
6. Swachh Bharat Abhiyan (October-November 2014)

by Sikarwar Ankit Kumar
IIPS Mumbai



O... My Son....! Still you
are under my SHADOW....!

Environment Day Celebration: Painting



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