

**LECTURES ON
ENVIRONMENT AND SCIENCE
(ANNUAL REPORT - 2018)**



ORISSA ENVIRONMENTAL SOCIETY

ND-4, VIP Area, IRCVillage

Bhubaneswar-751015, Odisha, India

Telephone: 0674-2557423

Email: oesbbsr@rediffmail.com; oesbbsr@gmail.com

Website: orissaenvironment.com

Lectures on Environment and Science (Annual Report - 2018)

Compiled by : **Dr Sundara Narayana Patro**
: **Dr Lala Aswini Kumar Singh and**
: **Dr Jaya Krushna Panigrahi**

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Foreword



Orissa Environmental Society founded in 1982 has been actively engaged in promoting mass awareness for conservation of natural resources and environment. Study, research, documentation, publication, lobbying, liaison, persuasion, conference, seminar, workshop, colloquium, public meeting, issue based discussion and consultation, education, awareness programme etc are most of the activities of the Society. The Society honours its members, distinguished persons and scholars of the state with awards and felicitations. Dignified members and persons are accorded the honour as Patrons, and Fellows.

As on today, the Society has about 800 life members and institutional members who are motivated academics, technocrats, architects, planners, doctors, economists, development managers, bureaucrats, corporate houses, government and non-government institutions, and persons interested in conservation of biodiversity, natural resources and environment.

Among many of the successful programmes of the Society are the activities for Anugul, Similipal, Mahendragiri, and Chilika. Based on a research study by OES on the problems of fluoride pollution due to industrial activities a project for fluoride-free water supply to 11 villages in Anugul district was implemented in 2000-2001 under Orissa Environment Programme (Indo-Norwegian Cooperation). The Central Pollution Control Board has identified Anugul as an environment hot-spot due to industrial pollution. The Society launched an intensive campaign, to move Government of India and Government of Odisha that lead to the creation of the eighth biosphere reserve of the country in the Similipal Forest of the Mayurbhanj District (Odisha) in 1994. For the last several years sustained campaign is going on towards protection and conservation of the epic

fame Mahendragiri hill complex. Mahendragiri is studded with rare biodiversity and archaeological monuments. Efforts are made to impress upon appropriate authorities for recognition of this hill forest ecosystem as an Entity of Incomparable Value (EIV) and raise the status to a Biosphere Reserve and also to include in the list of Heritage Sites. The Society conducted a seminar on Chilika lagoon and brought out the proceedings serving as a base document to plan for its conservation through the Chilika Development Authority. This year a year-long programme has been undertaken to conduct awareness campaign on 'Beat Plastic Pollution', 'Conserve and Judicious Use of Water', 'Tree Plantation' in different schools in Bhubaneswar city and elsewhere.

An important flagship programme of the Society is holding of an annual meet of the scientists (OBC now OBPC). The Odisha Bigyan Congress (OBC) had its genesis in the year 1997 to endow with an apt platform to the scientific community of the State for deliberating on the advances in science and technology in diverse frontiers. From 2016 a little amendment has been there in the title of the Congress to make it Odisha Bigyan 'O' Paribesh Congress (OBPC) for focusing attention on the environmental challenges confronting the mankind at the present juncture. The Congress brings out the voluminous proceedings in shape of a book. A large number students and scholars use the platform provided by OBPC and the proceedings to communicate their work and achievements.

It is a matter of pride that the valuable monthly seminar lectures are compiled and published along with the annual activities report of the Society for the consecutive third year in 2018. I hope the Society will continue to do so in the coming years. The Annual Report published in shape of a book will have its referral value for the scholars, students and persons interested in the subject.

Dr Sundara Narayana Patro
President, OES

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1. Lectures on Environment and Science

Wildlife Scenario in Odisha: Saving our Biological Diversity *(Prasanna Dash Memorial Lecture: 29.10.2017)*

Saroj Kumar Pattnaik

We in Odisha have a few unique eco-systems like the Similipal, Bhitarkanika, Mahendragiri and Chilika which have rich and unique bio-diversity; we should not only explore the ones which have still remained unexplored, but also strive to save these unique tracts for our posterity.

President of the society, dignitaries on and off the dais and friends,

It indeed gives me immense pleasure to be here to deliver the Prasanna Dash Memorial lecture. I knew Sri Dash much before he became a minister from my ACF days. It was rare to find a political person so committed to the cause of environment conservation. I feel it a great honour to be talking on a subject that was so close to his heart.

As a child more than six decades back, my geography teacher described India as 'a small epitome of the world'. (*Odia-Bharata Pruthivira eka kshudra Pratirupa*). It is indeed amazing that only with 2.4% of world's land area, this country has almost all types of major ecosystems found all over the world; may it be the permafrost snow clad mountains of the Himalayas, deep alluviums of the Ganga and the Brahmaputra, the rain forests of North-east and the Western Ghats, the Thar deserts of Rajasthan, Temperate pine forests of the Himalayan slopes,

islands of Andaman, long coast line or estuarine mangroves; this country has them all. It is no wonder that each type of ecosystem boasts of biodiversity unique to them.

India is luckily still endowed with very rich wild life wealth besides its wild biological diversity in the form of its flora and fauna both cultivated and otherwise despite its population density and a human population of more than 130 crores. It holds 1.26 lakh life forms known to science out of less than 18 lakh of them seen in the entire world accounting for 7.8% of the globe. This diversity places India among the 18 mega diverse regions of the world, placing it in the sixth place. Of course, an estimate based on the work in Amazon valley places the number at 5 times of those identified so far. It indeed holds a lot of opportunity for our researchers and students of biological sciences and wild life managers to discover and catalogue them for the posterity to benefit from them. Countries all over the world are striving to save their bio-diversity. Despite that the extinction process continues unabated due to anthropogenic pressures of different forms. As far as this conference is concerned we are focusing our attention on the wild bio-diversity. Though we have not yet been able to achieve the goal of keeping 33% of our land area under forest cover, slightly more than 21% is under forest cover of different density and it is in the process of very slow rise. The remaining forest cover is still maintained in spite of huge cattle population, demand on forest land for agriculture, habitation, communication, power supply, irrigation, mining and urbanization. For a focused attention on wildlife conservation in general more than 700 protected areas in the form of more than 100 National Parks, more than 500 Wildlife Sanctuaries, about 100 Conservation Reserves and Community Reserves have been notified in different states. They are little more than 5% of the country's land area and about one-fourth of the forest area. To ensure harmonious existence of both man with his traditional life-style and wild life, so far 19 areas have been declared as Biosphere Reserves. For focusing on species specific conservation measures,

about 50 Tiger Reserves and 28 Elephant Reserves have been established in the country. There are many wetlands in the country. For providing protection to important ones receiving large number of migratory birds 28 of them have been notified as Ramsar Sites. Seven of the critical and threatened eco-systems, which deserve focused international attention, have been notified as World Heritage Sites by the UNESCO. For ex-situ conservation, many zoos, botanical gardens and biodiversity parks have been established. It is certainly not a mean achievement, considering that our country needs to feed 130 crore people and provide them shelter, fuel wood and other development needs. Every day the country needs to provide food for a huge number of cattle besides providing them shelter,

Despite all these efforts of the Union and State governments and untiring efforts of many universities, other institutions, voluntary organizations and dedicated institutions, depletion in the form of loss, degradation and fragmentation of the habitats, illicit removal of forest produce, poaching, draining out of wetlands, unregulated tourism and pollution is continuing. Global warming and climate change is also taking its toll of the biodiversity globally. Situation in India is also not different from elsewhere. Some of these factors can definitely be altered through efforts of all concerned including the central and state governments and the general public. The example of recovery of the status of one-horned rhinoceros, Asiatic lion, all the species of Indian crocodilians and Indian tiger are few of the many. This has happened to many nearly extinct species in different regions of the globe like European bison, Arabian Oryx, Prezwalski horse, Pere David's deer or Californian condor to name a few. We may have to work hard to save many more in the threshold of extinction not only in our state but also in the country and elsewhere. Species like vulture, pied horn bill, Indian pangolin, mouse deer, ratel, king cobra, brahminy kite and hill mynah etc certainly need attention of all concerned in our state. Despite the long efforts gharial is still struggling to reestablish in Odisha. Tiger status is not quite encouraging.

Similarly are the great Indian bustard, hard footed barasingha, sangai. Wild buffalo, Blyth's tragopan, Monal pheasant etc need urgent attention in the country to recover. Many plant species besides invertebrates are also becoming rarer and rarer and may become extinct before we know them; causing irreparable loss before we fully understand their need to the mankind and the eco-system. Even many sub-species and hybrids; whether natural or artificially induced, are of great value to the human kind.

As far as our state is concerned, we have 397 species of mammals, 479 species of birds, 120 species of reptiles, 20 species of amphibians and 288 species of fishes, besides having several taxa of lower organisms known to science. The state also boasts of at least 134 species of orchids. To protect them in their wild habitat the state has 19 sanctuaries and 2 National Parks (one of them continues to be proposed), besides having 2 Tiger Reserves, 2 Ramsar Sites, 3 Elephant Reserves and 1 Biosphere Reserve. The Protected Areas account for 10.37% of state's forest area and 5.36% of the land area.



Black buck in Bhetnoi area of Ganjam, Odisha



Bagagahana, the heronry in Bhitarkanika, Odisha



Ridley Turtles mating offshore, Gahirmatha coast, Odisha

Exploration for unknown species, their habitat requirement and the causes for decimation need very serious study, particularly by the universities and other competent institutions. Otherwise mankind shall be poorer before we know what has been lost. We could have lost a medicine for a lethal disease, or lost a germplasm of a species that has the ability to banish hunger, or could have lost a species that can withstand severe water scarcity and extreme heat caused due to climate change from the earth before we know it. Sometimes our ignorance regarding the means of natural propagation of a species can cause the extermination of a species. To give an example, we foresters hold the notion that grazing can be detrimental to many species of plants and animals. But studies conducted by some scientists prove the opposite in certain regions.

The dedication and hard work of the researchers, biologists, foresters and field workers shall go a long way to discover many taxa, particularly of lower orders, know the status of many species to work out their conservation strategy and establish their probable economic use.

We in Odisha have a few unique eco-systems like the Similipal, Bhitarkanika, Mahendragiri and Chilika besides others which have rich and unique bio-diversity; we should not only explore the ones which have still remained unexplored, but also strive to save these unique tracts for our posterity. For the purpose it is essential to create awareness among general public and the planners besides preventing many decimating factors; though sometimes very difficult. I sincerely hope the dedication of the members of this Society will certainly make it happen.

Thank you.

Sri Saroj Kumar Pattnaik

Former Addl. PCCF (Wildlife) and
Chief Wildlife Warden, Odisha



Sri Saroj Kumar Pattnaik, IFS (Retd.) was born on the 1st of December 1941 in Keonjhar (Odisha) and after schooling and college education from different parts of Odisha, graduated in Science from the Utkal University in 1962 and completed post graduation in forestry from the Indian Forest College, Dehradun in 1965 when joined the Odisha State Forest Department. Sri Pattnaik held different posts in the department till his retirement as the Chief Wildlife Warden of the state in 2001. During the long service career he held charge of the famous Nandankanan Biological Park for long 14 years in two spells. He was involved with the first ever capture of a tusker 'Agasthi' by tranquilization in 1982 with legendary Padmashree Saroj Raj Choudhury of "Khairi" fame. Due to his love for wild animals, he was involved in many more such risky and daring rescue operations. He was Hon. Secretary of the Nature and Wildlife Conservation Society of Odisha (NWCSO) for about 14 years and is now its President. He is also the Chairman of Center for Biodiversity Conservation. He was the Chairman of the Odisha State office of WWF-India (2002-2007). In 1988 Sri Pattnaik became the founder President of the Indian Zoo Directors' Association. He has been member of the Central Zoo Authority thrice besides being a member of its' Technical Committee till 2017. He has designed several enclosures including safaris in different states and is the lead author of the book 'Designing Enclosures for Indian Zoos' published by the CZA. He was Governing Body Member of the Wildlife Institute of India and was Member of Steering Committee of Project Elephant, Government of India and had evaluated many Tiger Projects on behalf of the Project Tiger. He has been in the State Board for Wildlife of Odisha for four

times and is continuing as such now and is also Member of State Board of Wildlife of Chhattisgarh. He has been Adviser and consultant to several state governments besides the World Bank, JICA on matters of biodiversity conservation, eco-tourism, zoo development etc. Besides authoring a book – “Trumpets and Roars’ based on his experience, he has co-authored some books on wildlife, environment and zoo management and has more than 90 scientific and popular papers to his credit. He has visited several countries to study different aspects of wildlife, zoo management and forestry practices there besides attending international conferences. In recognition of his contribution to wildlife management Sri S. K. Pattnaik has been awarded the “Biju Pattnaik State Wildlife Award (2009), Distinguished Scientist Award by the Zoological Society of Orissa (2001), Sabuja Barta Samman by The Green Life Movement, India (2001) and Life Time Achievement Awards by the Association of Indian Wildlife Veterinarians (2011) and Desham, Kolkata(2014). In recognition of his distinguished service carrier he has been appointed as a Member of the Central Empowered Committee of the Supreme Court of India and is continuing to hold the post.



Environmental Appreciation in our Himalayan Expeditions

(Date of presentation: 03.12.2017)

Susanta Kumar Das

Adventure Sports

Adventure Sport is an outdoor sport or game that can be classified into three segments: a) Land based; b) Water based and c) Aero based. Expedition in the Himalayas or in high altitudes is a land-based adventure sport.

Important land based adventure sports are: Mountaineering, Trekking, Snow Skiing, Cycling and Rock Climbing. Important water based adventure sports are: Kayaking, Canoeing, Wave surfing, Scuba diving, and Sailing. Popular aero based adventure sports are Paragliding, Hot air ballooning and Para-sailing.

Adventure sports are popular in western countries. Adventure sport is gaining popularity in India but in Odisha it is still in its infancy. However, for its promotion, several States have adopted different Adventure Sport policies.

Himalayan Expeditions- a form of Adventure Sport

Himalayan expedition is a type of land based 'Adventure Sport' which carries with it the message of awareness to conserve and leave nature clean and serene. Ever since Tenzing Norgay and Edmund Hillary reached the Everest in the year 1953, Himalayan Expeditions have become very popular. Ms Bachendri Pal is the First Indian Woman atop Mt. Everest. She achieved the feat on 23 May 1984, and is globally acclaimed for her courage and achievements.

Himalayan expedition is generally a non-competitive, expensive, life-risked and a technical sport which needs specific equipments and gear. It requires training and experience along with physical and mental fitness. Unlike other conventional sports no spectators are present to encourage the mountaineers.

Preparations for Himalayan Expedition

For an expedition along the Himalayas one needs proper planning, a practical budget, selection of a precise route, a skilled environment-oriented leader with firsthand knowledge about the place, people and biodiversity. The various preparations concern the following aspects.

- a) Selection of place/route in Himalayas
- b) Target group and selection of members
- c) Leadership qualities
- d) Planning and budget
- e) Firsthand knowledge about the place, people and its biodiversity
- f) Wilderness first aid and medical facilities
- g) Knowledge of wilderness first aid in Himalayas
- h) Safety measures

Hazard Evaluation & Precaution

Certain hazards in Himalayas are unforeseen, and emergency situations include avalanche, rock falls, glacier lake outburst floods (GLOF), and earthquake. Where available, previous statistics on hazards anticipated along the route should be consulted. The members of the expedition should be acquainted with safety measures and rule of the wilderness.

Reduction of risk effects is possible by way of mental acceptance of the expected risks, avoidance of the risks, prevention and mitigation for reducing the outcome. Some of the means to accept and handle risks depend on common sense, preparedness with planning, insurance and access with acceptance of aid.

Expedition & Environment

During the expedition, the team members pass through remote environments and unfamiliar cultures. It is the duty of the expedition member to care, conserve and respect the nature, local myths and the legends. The members of the expedition should be encouraged to examine and interpret the environment from different aspects and perspectives according to their interest- physical, geographical, biological, sociological, historical and spiritual.

Duties towards the Himalayan Fragile Eco-System

The Classical Sanskrit writer and poet, Kalidasa, wrote, "The Himalaya is the great measuring rod of the Earth". Fragility in Himalayan eco-system is due to the natural and human causes. Trekkers and mountaineers should take care of the factors causing danger to the fragile eco-system and contribute in protecting the endangered flora & fauna of the Himalayas.

Some of the most endangered wildlife species available in the Himalayan region are the Snow Leopard (*Panthera uncia*), Clouded Leopard (*Neofelis nebulosa*), Himalayan Wolf or Tibetan wolf (*Canis lupus filchneri*), Red Panda (*Ailurus fulgens*), Himalayan Tahr (*Hemitragus jemlahicus*), Monal Pheasant (*Lophophorus impejanus*), Himalayan Quail (*Ophrysia superciliosa*) and Temmnick's Tragopan (*Tragopan temminckii*).

Leave No Trace Ethics

Mountaineers and trekkers should follow the seven principles of "Leave no trace ethics" in Himalayan expedition. These are:

- 1) Plan ahead and prepare
- 2) Trek and camping in durable surfaces
- 3) Dispose of waste properly or to carry back with you
- 4) Leave what you find-, do not displace
- 5) Minimize campfire impact
- 6) Respect wildlife
- 7) Be considerate of others

Man Made Threats to the Himalayas during Expedition

Many Himalayan peaks including Mt. Everest have witnessed environmental pollution due to human dimensions originating with thousands of mountaineers and trekkers who visit Himalayas every year.

Heaps of garbage, plastic and tin containers give ugly appearance to the beautiful landscape. Governments are spending large amount of money in cleaning the environment after each expedition season.

Need of Restriction in Himalayan Expedition

Himalayan expeditions need to be restricted by the local/district administration keeping in view the carrying capacity of the area, fragility of the eco-system, and the threats from environmental damages and pollution. It is necessary to develop and implement proper mechanisms in this regards, as well as initiate penal provisions for people causing nuisance during the expedition.

The Odisha Missions to the Himalayas

Aims and Objectives

The mission is to empower the youths with values of adventurism, discipline, team spirit and leadership to undertake adventurous events in spite of the hazards involved. Our expeditions in Himalayas are theme-based to create awareness for conservation and keeping the Himalayas green, clean and undisturbed, following the objective of leaving nothing behind any expedition. People who inspired our success include Padmashree Bachendri Pal, the legendary mountaineer and the first Indian woman to scale Mt. Everest in 1984; Padmashree C.P. Vohra, the first civilian to climb Mt. Everest in 1965 and the leader of the first Indian Expedition to Antarctica, former D.G., Geological Survey of India; Col. Prem Chand, KC, VSM,

the Hero of Kanchenjunga who scaled the peak in 1977 and is known as “*Snow Tiger*” among the mountaineers; and Kusang Sherpa, the World Record Holder for scaling Mt. Everest for five times from different sides.

Mission Sakhyam in 2010

Ten visually impaired boys of Odisha had participated in Saurkundi Pass (12,900ft.) expedition in Himalayas and proved that they are able like others.

Mission Shikhar in 2012

Five differently able persons from Odisha participated in an expedition to Mt. Stok Kangri (20,172 ft.) in Leh-Ladakh region and proved that disability was no disadvantage for them.

Mission Zanskar in 2014

Four brave hearts from Odisha including a girl participated in a trek to the frozen Zanskar River and covered a distance of 72 kms in extreme weather condition where mercury dropped to - 40°C and created an illusion of mini Antarctica.

Mission Roop Kund in 2017

Lake-Roop Kund is situated in Gharwal Himalayas in Chamoli district of Uttarakhand at an altitude of 16,000 ft. It is a mysterious lake where the remains of thousands of human skeletons are found, the origin of the skeletons is unknown. The expedition was undertaken with eight participants from Odisha.

Roop Kund is a shallow lake, with a depth of about two metres. Ancient human skeletal remains are visible at its bottom when the snow melts. This high altitude glacier lake is also known as ‘Skeleton or Mysterious Lake’. The trekking team reached the unreached part of the mysterious lake on 10th October, 2017 at 8 am after four days of strenuous and adventurous trek from the base camp enrooting Didina, Bedini bugyal and Baghuabasa.



The skeletal remains at Roop Kund

There are many theories and opinions about the skeletal remains in Roop Kund. They range from purely spiritual to scientific explanations. The skeletons date back to 9th century A.D. (1200 years old). Some say that they belong to Japanese soldiers who died here during World War II. Studies have determined that they are of people from an Indian tribe, who died here in the 9th century because of a severe hailstorm.



With Sushanta Kumar Das, the Odia expedition team at Roop Kund, October 2017

There is a growing concern about the regular loss of skeletons and it is feared that, if steps are not taken to conserve them, the skeletons may gradually vanish in the years to come and with it. It is reported that tourists visiting the area are in the habit of taking back the skeletons in large numbers and the district administration has expressed the need to protect the area. It has been reported that tourists, trekkers, and curious researchers are transporting the skeletons on mules. Governmental agencies have made efforts to develop the area as a regulated eco-tourism destination in an effort to protect the skeletons. The team members had created awareness amongst the trekkers and locals to protect the skeletal remains for coming generation and to conserve the biodiversity of the area and to keep the Himalayan eco-system undisturbed leaving no trace of human interference. The district administration had appreciated the efforts made by the team members for creating awareness among the masses.

Summary

Several expeditions have been conducted in Himalayas to empower the youths of Odisha with values of adventurism, discipline, team spirit and leadership. This includes the awareness and responsibility to conserve and keep Himalayas “green” and “clean”. Two of our expeditions were named ‘Mission Sakhyam’ in 2010 and ‘Mission Shikhar’ in 2012 in which the participants were physically challenged, and they have proved that they are able like others and disability has no disadvantage for them. And, they all deserved such inclusion in the world of “Adventure Sports”. The illustrated talk briefed about the environmental aspects of ‘Mission Sakhyam’ and ‘Mission Shikhar’. The trekking team from Odisha tried for creating awareness to care, conserve and respect the nature, local myths and legends. They strictly followed the seven principles of “Leave no trace ethics” in order to prevent environmental damages. All mountaineers/agencies need to follow the mountain manners to keep intact the fragile eco-

system of the Himalayas. It is felt that the Himalayan expeditions need to be restricted from the point of view of carrying capacity of the place and the fragility of the eco-system. Development and implementation of proper mechanism and initiation of penal provisions in violation of rules is required to stop nuisance activities by unprofessional mountaineers/agencies that cause environmental damages.

Susanta Kumar Das

Former Faculty, Wildlife & Adventure Tourism,
Regional College of Management, Bhubaneswar
E-mail: dassusanta.wl@gmail.com
Phone: 9437629450



Sri Sushanta Kumar Das is an MA with LLM degree but is better known for his activities in wildlife conservation through WWF-India and as Joint Secretary of the Nature and Wildlife Conservation Society of Odisha of the State Forest Department. His interests got him an 'A'-grade Judge in Sport Climbing from IMF (2015), another A' grade in Basic Course in Water Sports from Regional Water Sports, Pong Dam, Himachal Pradesh, and certificate in Open Water Scuba Diving by PADI, Australia. As a Member, Indian Mountaineering Foundation, East Zone Committee, Kolkata, and Resource Person in National Himalayan Trekking Expeditions organised by YHAI, New Delhi from 2003-2008, Sri S. K. Das has been a person for the Himalayas, with some unique adventure activities as Chief of the 'Mission Sakhyam', 'Mission Sikhar', 'Mission Zanskar' and "Mission Roop Kund". He was Programme Coordinator in Biju Patnaik Himalayan Expedition- 2016 to Mt. Rudugaira (19,100ft.) at Gangotri Region of Uttarakhand during Sept.-Oct. 2016 organised by the Dept. of Sports & Youth Services, Govt. of Odisha. Sri Das served as a Faculty in Wildlife & Adventure

Tourism, Dept. of MBA, Regional College of Management, Bhubaneswar. He is the Founder Member, Ski-Mountaineering Federation of India, Manali, Himachal Pradesh, and the Asst. Area Director, Special Olympics Bharat-Odisha. Sri Das is serving in secretarial capacities with the Sport Climbing Association of Odisha and the Sport Climbing Federation of India. When free from his interests in sports, adventure and tourism he functions as a free-lance Tax- Consultant.



View of Nandadevi Range, Gharwal Himalayas from camp in Bedini Bugyal, Uttarakhand during Roopkund expedition-2017

Environmental Perspectives of Crop Protection in India: Theory and Reality

(Date of presentation: 04.02.2018)

Rajasekhara Rao Korada

Summary

For over five decades, we are witnessing nearly irreversible changes in the environment that affected the soil, flora and fauna both in land and water ecosystems, making the future generations vulnerable for unknown ill effects, apart from the known health problems. Since the introduction of agricultural chemicals in controlling the pests (insects, diseases, weeds and rodents), all the crop protection measures to combat the pests were singly aimed at using pesticides than depending on other measures of control. This has changed the natural balance of environment as many pesticides polluting the soil, water and rivers. The products once known for using them only as last resort in crop protection are nowadays used as first and immediate alternative to any ecological or sound pest management methods. Integrated pest management (IPM), also known as integrated pest control (IPC) is a broad-based approach that integrates practices for economic control of pests. IPM aims to suppress pest populations below the economic injury level (EIL). The UN's Food and Agriculture Organization (FAO) defines Integrated Pest Management (IPM) as "the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically

justified and reduce or minimize risks to human health and the environment.” IPM emphasizes the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms. Entomologists and ecologists have urged the adoption of IPM pest control since the 1970s. IPM allows for safer pest control. The introduction and spread of invasive species can also be managed with IPM by reducing risks to environment while maximizing benefits and reducing costs. The problems of environmental degradation are compounded with availability of pesticides in every village, easy to use and rapid results encouraged the farmers to shift to pesticides. Whereas, other ecological methods are cumbersome, labour intensive, and make the farmers to depend on local agricultural research institutions, etc are making these safe methods unattractive. Only after the recent craze for organic products, farmers are following the safe ecological methods as the produce fetches higher prices. Now-a-days, even the fruits and vegetables are sprayed with pesticides and the use of harmful chemicals for early ripening of the fruits is making humans vulnerable.

History of Crop Protection

Shortly after World War II, when synthetic insecticides became widely available, entomologists in California developed the concept of “supervised insect control. The concept was based on the knowledge of ecology and the analysis of projected trends in pest and natural-enemy populations. The approach formed much of the conceptual basis for the “integrated control” that University of California entomologists articulated in the 1950s. Other tactics, such as host-plant resistance and cultural manipulations, became part of the framework for ‘Integrated Pest Management’. IPM combined the skills of entomologists, plant pathologists, nematologists and weed scientists. In India, the IPM practices to manage pests on crops and other areas were encouraged to take place from 1980s but the farmers adopted pesticides primarily to control the pests.

Table. Transition phases in pesticide usage in India

Decade	Emphasis
1960	Introduction, protection without consideration
1970	Products with better performance efficacy, environment and toxicology
1980	Shift from efficacy to environment and non-target effects, late 80's resistance management
1990	Shift to clean environment, IPM and Resistance Management
2000	Alternative to chemicals, biopesticides, and biocontrol agents
2010	Combination products, new generation pesticides, Bt, etc.

Present status in India

In 2013, an expert committee was setup to examine the continued use of neo-nicotinoid pesticides registered in India. Neonicotinoid are insecticides that affect the central nervous system of insects, resulting in paralysis and death. The mandate of the Committee was to review 66 pesticides which are banned, restricted or withdrawn in other countries but continue to be registered for domestic use in India. The committee submitted its report to the Central Government in 2015. The use of eighteen pesticides that may involve risk to human being and animals, are banned from use. These pesticides are Benomyl, Carbaryl, Diazinon, Fenarimol, Fenthion, Linuron, Methoxy Ethyl Mercury Chloride, Methyl Parathion, Sodium Cyanide, Thiometon, Tridemorph, Trifluralin, Alachlor, Dichlorvos, Phorate, Phosphamidon, Triazophos, and Trichlorfon. In India, glyphosate is the most commonly used weedicide (First Post, 2018). But the California Superior Court ruled that Roundup, which contains glyphosate, was the cause of cancer for Dewayne Johnson, a school groundskeeper, and it ordered Monsanto, the manufacturer of the weedicide, to pay \$289 (US dollars) million in damages.

Ecological control

Ecological control seeks to achieve successful pest management where pest population is effectively kept below damaging levels. It is done through an understanding of the complexities of ecosystem interactions, followed by application of such understanding. A report of the National Research Council (1996) has called for development of “ecologically based IPM,” incorporating the components of (1) safety to the environment, the crop, the producer, fish and wildlife, etc.; (2) cost effectiveness; (3) long-term sustainability; and (4) consideration of the ecosystem as a central focus.

Species diversity and stability

The term biodiversity has become popular in discussions about the complexity in agricultural and other human dominated ecosystems (Stinner et al., 1997). Altieri and Nicholls, 1999 defined biodiversity as: “all species of plants, animals and microorganisms existing and interacting within an ecosystem.” In agro ecosystems, this includes phytophagous species (pests and non-pests), natural enemies, pollinators, and decomposers including earthworms and soil microbes. The effective environment of a species includes all those components that impact upon it, and this may include a diverse array of other populations when one constructs food webs even for simple habitats. Species diversity is measured for the numbers and proportion of each species present in an ecosystem, and it in turn reflects the number of links in a food web.

Pesticide residues

Pesticide contamination of both surface and ground waters can affect aquatic animals and plants, as well as human health when water is used for public consumption. Increased use of chemical pesticides has resulted in contamination of the environment and is associated with a wide spectrum of human health hazards that range from short-term impacts such as headaches and

nausea to chronic impacts like cancer, reproductive harm and endocrine disruption. Pesticide residues in food and crops are a direct result of the application of pesticides to crops growing in the field, and to a lesser extent from pesticide residues remaining in the soil.

Pesticide residues in food grains, vegetables, and fruits

Pesticide residue refers to the pesticides or metabolic products of the pesticides that may remain in food grains, vegetables and fruits after they are applied to crops. Many of these chemical residues, especially derivatives of chlorinated pesticides, exhibit bioaccumulation which could build up to harmful levels in the body as well as in the environment. The most consumed pesticides for vegetables, fruits and food grains in India include sulphur, endosulfan, mancozeb, phorate, methyl parathion, monocrotophos, cypermethrin, isoprothion, chlorpyrifos, malathion, carbendazim, butachlor, quinalphos, copper oxychloride, and dichlorvos (Source: <https://indiaforsafefood.in>). The “maximum residue level” is the highest level of a pesticide residue that is legally tolerated in or on food or feed when pesticides are applied correctly. In India, Food Safety and Standards Authority of India sets the “maximum residue limits” (MRL) for pesticides in crops, foods, vegetables and fruits. The Food and Agriculture Organization and World Health Organization have recommended residue limits for bioresmethrin, bromophos, Carbaryl, chlorpyrifos-methyl, deltamethrin, dichlorvos, etrimfos, fenitrothion, fenvalerate, malathion, methacrifos, permethrin, phenothrin, pirimiphosmethyl and pyrethins used for the protection of grains.

A study was conducted as part of the central scheme ‘Monitoring of Pesticide Residues at National Level’ is operational since 2005. According to the report on levels of pesticide residue in food items for the year 2013-14, out of total 16,790 samples analysed, 509 samples were found to be above maximum residue limit (MRL) as prescribed under Food Safety

Standard Authority of India (FSSAI) under Ministry of Health and CODEX. The higher levels of pesticides were found in samples of veggies, fruits, spices, rice, wheat and other food items. Most of the vegetables showed relatively higher pesticide residue in rainy season followed by summer and winter seasons. The samples were collected from various wholesale and retail markets located at different parts of the country and analyzed by 25 laboratories (Economic times, 2015).

Cucumber was the crop with the highest number of pesticide residues with predominant presence of methomyl, metalaxyl, and imidacloprid. Methomyl is a carbamate insecticide with restricted use because of its high toxicity to humans. The other pesticide residues found in cucumber samples were boscalid, chlorpyrifos, cyprodinil, fenhexamid, imidacloprid, metalaxyl and tebuconazole.

Many commodities contained more than one residue per product, up to 9 residues in grapes and tea were determined, up to 5 - 9 residues in citrus fruits like orange, mandarins, lemons, peaches, pears and up to 3 - 5 residues in pomegranates, plums, cucumbers, tomatoes, strawberries. The most frequently detected pesticide residues were imazalil, thiabendazole, chlorpyrifos, maneb group, procymidone, methidathion, lambda-cyhalothrin, carbendazim, iprodione, orthophenylphenol, vinclozolin, endosulfan, pyrimethanil, fenhexamid, prochloraz, cyprodinil, boscalid.

Apples, papayas, sweet peppers and strawberries were among products with the highest percentage of samples with residues above MRL, found in the Brazilian pesticide residues monitoring program. High level of pesticide residues in pears, grapes, citrus fruit, peppers, cucumbers, tomatoes, carrots were obtained in Lithuania.

A study on the levels of pesticides in soft drinks available in the market indicates pesticide residues 24 times higher than Bureau of Indian Standards (BIS) norms. The levels of pesticide residue lindane exceeded the BIS standards by 140 times in some

samples. Heptachlor, which is banned in India, was found in 71 per cent of the samples, at levels four times higher than BIS standards. Chlorpyrifos was found 200 times more than the BIS standard in a sample manufactured in Thane. The average amount of pesticide residues found in all the samples was 24 times higher than the BIS standards for total pesticides in soft drinks (Source: The Hindu).

Toxic effects of pesticide residues on human health

Many pesticides achieve their intended use of killing pests by disrupting the nervous system. They may produce acute effects manifesting as meiosis, urination, diarrhea, diaphoresis, lacrimation, excitation of central nervous system and salivation. Specific effects of pesticides can include damage to the central and peripheral nervous systems, cancer, allergies and hypersensitivities, reproductive disorders and disruption of the immune system. Some broad categories of effects of pesticide residues are as below.

- Neuronal damage due to cholinergic neuronal excitotoxicity and dysfunction
- Development of cancer
- Reproductive disorders including hormonal malfunction in male

Preventive measures to reduce pesticide residues in food grains, vegetables, and fruits

Worldwide trade has increased expansion of pesticide residues in different areas of the world and it's the issue of public health concern. Some of the strategies which can be used to minimize pest and disease problems and reduce pesticide residues in food grains, vegetables and fruits are as below.

- **Organic farming:** the frequency of occurrence of detectable pesticide residues was four times higher in non-organic crops than organic crops;

- **Washing food products:** washing with water and various chemical solutions for domestic and commercial applications is necessary to decrease the pesticide residues;
- **Processing food products:** examples are washing, peeling, canning or cooking that the majority of foods receive prior to consumption; pesticide residue levels in fruit and vegetables may change due to processing, such as peeling, boiling, frying, fermentation, grinding; boiling may remove 35 - 60% of organophosphate residues and 20 - 25% of organo chlorines; husking and immersing of fruit and vegetables are reported to reduce pesticide residues especially organophosphates;
- **Rational use of pesticides:** it involves selection of correct pesticides, dosage rates, dilutions, timing, and frequency of application, treatment intervals, and method of application, precautions, and limitations; such practices can be useful to reduce pesticide residues in food products; in many cases, there may not be any need of a pesticide, particularly where cultural or biological methods are effective;
- **Use of natural pesticides and biopesticides:** Bio-pesticides are derived from micro-organisms and other natural sources, and are biodegradable; examples are extracts and compounds from Neem tree.

Implementation and amendment of pesticide-related laws

In India, the agriculture ministry regulates the manufacture, sale, transport, distribution, export, import and use of pesticides under the Insecticides Act, 1968. The Act is intended for replacement with the Pesticide Management Bill (2008) when accepted.

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Dr Korada Rajasekhara Rao

Principal Scientist-Entomology,
Division of Crop Protection,
ICAR-National Rice Research Institute,
Cuttack, Odisha; and
In-Charge, Regional Coastal
Rice Research Station (CRRRS),
Naira, Srikakulam, Andhra Pradesh.
E-mail: rajasekhararao.korada@gmail.com;
korada.rao@icar.gov.in;
Mobile: +91-889 558 5994, 08917223043



Dr Korada Rajasekhara Rao, 48 was born in Visakhapatnam, Andhra Pradesh and completed his B.Sc. (Agri) and M.Sc. (Agri) by 1993; then obtained his Ph.D. in Entomology in 1997 from Acharya NG Ranga Agricultural University, Bapatla, Guntur, Andhra Pradesh. His Post Doctoral Research was on Insect pheromone Isolation, identification and structure activity relationship and Pheromone Biosynthesis Activating Neuropeptide (PBAN), conducted during 2007-08 at Wageningen University & Research in The Netherlands under Department of Biotechnology's Overseas Associateship Program (presently DBT CREST AWARD), Govt. of India. Dr Rao got selected for Agricultural Research Service (ARS) of ICAR and is working as Principal Scientist (Entomology), Crop Protection division, National Rice Research Institute, Cuttack since June 2017. Earlier to it, he worked in different capacities from Scientist to Principal Scientist at ICAR Research complex for NEH Region during 1997 to 2004; Central Tuber Crops Research Institute, Regional Centre, Bhubaneswar during 2004 to 2017. Dr Rao acquired specialization in host-plant chemical interactions, ecology, olfactory receptors, insect pheromones, and host plant resistance. Dr Rao has quite a few very significant contributions to his field of research. Some of the awards which Dr Rao received are the Norman Borlaug International Science and Technology Fellowship Award by United States Department of Agriculture-Foreign Agricultural Service (USDA-FAS) for conducting research at Louisiana State University, Baton Rouge, USA during 2012; the DBTs overseas Associateship Award 2007-2008 (presently DBT CREST Award for doing post doctoral research); and the Royal

Dutch Fellowship during 2004, for undergoing training in Integrated Pest Management and Organic Farming at Centre for Development Innovation, Wageningen University and Research, The Netherlands. Dr Rao has over 50 Research papers; and functioned as PI for the DBT project, Nanotechnology, and Management of Borer pests.

Comment:

We depend heavily on plant kingdom for our need of food, fuel, fiber, timber, medicines and even Oxygen supply. Few can conceive that a simple Tulsi plant at the courtyard imbibes coherence to a family; where as lack of it in urban home weakens the “Familyness”. Therefore, protection of plants is a sacred duty, an absolute must, and not just a professional practice of a section of scientists. Plants need protection from (a) paucity of water and drought, (b) nutrient deficiency in soil and (c) attack of pests, infection and disease. The measures undertaken by us to meet these challenges are by: (a) irrigation through dams, reservoirs, canals and ground water pumping, (b) use of chemical fertilizers and (c) the application of herbicides, pesticides and insecticides. Long term impacts of the above three measures are very well understood. Our plant protection activity is an anthropocentric measure meant for exploiting the Plant Kingdom purely to benefit us. Exploitive measures of any kind, ultimately lead to damage of the exploitee and exploiter equally. That is why we find: (a) dams, reservoirs and canals, which divert natural flow of water and interfere with the hydrologic cycle have led to numerous environmental problems; b) application of chemical fertilizers has broken the health of the soil, the very basic life supporting system of the plants and resulted with rampant water pollution; and (c) the use of pesticides has boomeranged into various episodes of animal and human poisoning (vide: recent Farmers’ death in Maharashtra, rampant children paralysis in Kasarogad district of Kerala due to Endosulphan use, and damage of aquatic life).

Received from:

Prof. K. C. Sahu, Retired Professor, IIT-Bombay

E-mail: sahu_kc@yahoo.com, Mumbai, 30th Jan., 2018

Pisciculture for Augmenting India's Food and Nutrition Security

(Date of presentation: 04.03.2018)

Jitendra Kumar Sundaray

Status in India- a Glimpse

Fisheries and aquaculture play important role in providing food and income in many developing countries, either as a stand-alone activity or in association with crop agriculture and livestock rearing. Once upon a time called as a begging bowl, India transformed itself to a net food exporter and world's second largest food producer. However, India stands 67th position in the recent Global Hunger Index released by the International Food Policy Research Institute. About 190 million Indians end their day with chronically undernourished; and 22% of children below five years are undernourished. In spite of various targeted programmes and initiatives by the government, the socio-cultural inequalities in the society push us back in the race. Amidst all setbacks, we must put our concentrated efforts to boost the food production to feed more than 1.2 billion people. Fish is a super food and poor man's food by its superior nutritive value and affordability. India made a remarkable stride in fisheries and increased the production to 12 folds during the past few decades. Global demand for fish is growing due to a combination of population growth, urbanization and increasing wealth. With only very modest increases in yields from capture fisheries forecast, rising demand must be met by aquaculture. India's per capita fish consumption is presently 6.5 kg, which is expected to be 9 kg by 2030. Fish consumption is improving due to the increasing trend in urbanization, purchasing power of the middle-income group.

In order to ensure the availability of the affordable form of protein, aquaculture is considered a viable panacea.

The Upcoming Global Scenario

The World Bank recently concluded that per capita fish supplies will increase the fastest in rich countries and in those parts of the world, such as China, where aquaculture thrives, leading to growing regional disparities between supply and demand. Demand and consumption are likely to increase throughout Asia, but while the World Bank predicts increases in fish supply in Latin America, declines in consumption are likely (i.e. exports will increase). Most worrying, however, are the projected declines in consumption in sub-Saharan Africa, where, levels of food and nutrition insecurity and poverty are the highest in the world and per capita consumption of animal source protein is the smallest of any region. Because fish makes up such a high proportion (32%) of animal-source foods in this part of the world food and nutrition security are especially vulnerable to both supply and demand side changes. The World Bank (2013) estimates that per capita fish supplies in sub-Saharan Africa is likely to shrink by 1% per annum, from 6.8 kg in 2010 to 5.6 kg in 2030, by far the lowest in the world (global average = 18.2 kg).

The global aggregate wealth generated from both aquaculture and fisheries in marine and freshwater environments is unquantified but, based on an estimate of US\$ 225 to 240 billion for marine capture fisheries alone, is likely to be of the order of US\$ 500 billion per year. The sector's economic output provides important contributions to poverty and food security.

Nutritional Benefits from Fish

The harvest, sale and processing of fish contribute indirectly to food security by increasing purchasing power at individual or household level and also regionally, and nationally. Demand for fish is expected to increase substantially, at least in

line with other animal-based foods, particularly in South and South-east Asia. Current global per-capita supply of fish is 17 kg per year; nearly half comes from aquaculture. The availability of fish is unevenly distributed, with supply constraints faced by some undernourished populations in developing countries with high dependence on fish, particularly in sub-Saharan Africa, the least developed countries of South and South East Asia, and small island states in the Pacific Ocean. Developed and developing country perspectives on the links between fish and health differ considerably. In developed countries the major focus has been on fish safety and the health benefits of polyunsaturated fatty acids from fish and fish oil, which are thought to lower blood pressure and reduce risk of heart disease. In developing countries, the focus has been on the role of fish in tackling under-nutrition, maternal and child health. Although fish is usually linked to food security concerns through analysis of its contributions to protein supply, it is much more important as a source of micronutrients and lipids. More than two billion people in the world are undernourished through deficiency in essential vitamins and minerals, especially in vitamin A, iron and zinc. These deficiencies are especially important at key stages of human life (pregnancy, breastfeeding, childhood) and can have severe and often irreversible impacts for health and physical and mental development. This is the so-called 'hidden hunger'. Fish can potentially contribute to reducing micronutrient deficiencies and reducing this health burden. Some fish species – in particular the small fish important in the diets of the poor – have high nutrient content, including some of polyunsaturated fatty acids (such as 'Omega-3'), vitamin A, iron, zinc and calcium. These fish can therefore be used as a key component in strategies aimed at reducing essential fatty acid and micronutrient deficiencies in developing countries. Although fish availability per capita is increasing globally, it is decreasing in much of sub-Saharan Africa. Moreover, there are concerns that the farmed fish most affordable to the poor are of less nutritional value. A combination of diet, food preparation and intra-household distribution can result in reduced and less

equitable benefits from farmed fish than from the previously-consumed wild-caught small fish that are most nutritious eaten whole.

Pisciculture/Aquaculture can empower women and improve household nutrition:

While a large number of women work in the aquaculture sector, their contributions are mostly unrecognized, unrecorded and undervalued, largely due to lack of collection of gender disaggregated data. A further important finding with wide societal implications is that engagement of women in aquaculture improves their access to and control over resources and increases household consumption of fish. However, prevailing gender norms were often found to impede women's efforts to participate in aquaculture, especially when enterprise oriented, by restricting access to information and skills, limiting contact with other value chain actors and preventing them from spending sufficient time on aquaculture to ensure productive, profitable fish ponds. Aquaculture can significantly impact on such economic and social indicators as employment, GDP and homestead incomes, and income distribution at national levels and significantly reduces poverty. These can be extremely important in terms of impacts on local economies and on poverty alleviation. The impacts of nutrition education on fish purchases and on intra-household distribution of fish among poor and socially marginalized people need to be taken on priority. Links between species, farming methods and fish nutrient content and between farmed fish consumption and health remain poorly understood and these need to be discussed and implemented at the earliest.

Technological Offerings

ICAR-CIFA has a variety of technological offerings in its basket to augment the fish production: Technology packages for more than thirteen fish species, Jayanti Rohu- a genetically improved strain of Rohu which gives 19 percent additional

growth in a year; CIFABROOD™- a brood stock diet helps in providing good quality egg ; FRP hatchery – a portable small size hatchery facilitates to undertake breeding programs even in hilly terrains; CIFAX- a therapeutic formulation to combat disease problems in fish. In addition, ICAR-CIFA advocates different approaches to the state governments and other stakeholders to maximise the fish production such as system diversification and species diversification concepts where the former focus upon to standardise different kind of aquaculture systems ranging from back yard ponds to super intensive systems, aquaponics and later concept thrusts upon bringing more species into culture system in order to increase per unit productivity of the water and culture system.

Blue Revolution Scheme

To ensure the availability of good quality cheap protein and for the development of fisheries in the country, the union government has envisaged the ambitious Blue Revolution Scheme with various approaches. ICAR-CIFA as a knowledge partner facilitates the Blue Revolution scheme with the technological backup and policy advocacy for the freshwater aquaculture sector. The comprehensive efforts by different agencies created a momentum in the aquaculture development scenario in the country. New skill development programs were launched especially in aquaculture to bring out a vibrant skilled workforce and support the budding enterprises in aquaculture.

Dr Jitendra Kumar Sundaray

ICAR-Central Institute of Freshwater Aquaculture
(An ISO 9001:2015 Certified institute)

Kaushalyaganga, Bhubaneswar, 751002, Odisha

Contact: jsundaray@gmail.com/919437166872



Dr. Jitendra Kumar Sundaray, born on 16th April 1970, is a Post Graduate in Zoology from Ravenshaw College. He obtained Diploma in Fisheries Science from ICAR- Central Institute for Fisheries Education, Mumbai during 1994 and PhD from Kyushu University, Fukuoka, Japan in reproductive physiology and molecular endocrinology. Dr Sundaray started his career as an Aquaculturist and worked in states like Goa, West Bengal and Odisha during 1994 to 1997 and then joined as a Scientist (Fish Breeder) in Central Institute of Brackishwater Aquaculture (CIBA) in 1997. He got elevated as a Principal Scientist in the year 2010 and was Officer-in-Charge of ICAR-CIBA, Kakdwip in West Bengal till April 2013. He joined as Head, Division of Fish Genetics and Biotechnology, ICAR-CIFA during April 2013. Since January 2017, he is working as the Director (Acting) ICAR- Central Institute of Freshwater Aquaculture, Kauaslayaganga, Bhubaneswar. One of the major research contributions of Dr Sundaray is discovery of the sex change mechanism in a protogynous fish species. His research group at CIBA is pioneer in captive maturation and breeding of different brackish water fin fishes in India. At present he is associated with selective breeding of Indian freshwater fishes, marker-assisted selection, and transgenic and molecular endocrinology. Dr Sunderay has authored more than 79 research publications in national and international journals; 17 conference proceedings, 22 book chapters, 30 extension brochures, 3 technology bulletins and has edited one book as chief editor and 3 books as associate editor. He has completed 7 projects as PI and is heading 4 external funded projects. He has visited Bangladesh, Singapore, Korea, Malaysia, Thailand, South Africa and Japan for academic exchanges. Dr Sundaray

is the recipient of Hiralal Chaudhary Young Scientist award, 2008 and Dr. V R P Sinha Gold Medal award, 2014 from ZSI. He is the chief editor of the Journal of Aquaculture; associate editor of Journal for Reviews on Agriculture and Allied Fields; member of executive council of *Indian Society of Coastal Agricultural Research, Canning Town* and President of the Association of Aquaculturists. He is a Patron and Fellow of Orissa Environmental Society and has the distinction of becoming Fellow of Zoological Society of India (ZSI) and Applied Zoologist Research Association (AZRA).



Nursery rearing experiments at Balasore for seabass



Farmer with bountiful harvest of rohu at Sunderban, West Bengal

Beat Plastic Pollution

(Date of Presentation: 06.05.2018)

Ashutosh Debata

Today's Reality is that plastic products have become an integral part of all our lives and they play an irreplaceable role in day to day activities. Plastic does not rust like iron; it is light weight, durable and strong, can be moulded into any shape, does not conduct electricity, transparent, and can be drawn into fibers. It is used in different sectors like transportation, medicines, electronics, building and construction, personal protection, innovative packaging etc.

Plastic waste generation has become invasive and unabating. It is a burning challenge to the existence of the society. There should be augmented activities to manage the global menace. Uncontrolled and haphazard dumping of plastic wastes in the outskirts of towns and villages has created abundant landfills which is not only impossible to reclaim but have serious environmental implications in terms of ground water pollution, and contribution to global warming. Burning of plastics leads to air pollution, climate change, and it is equivalent to vehicular pollution. Introduction of plastic products into environment upsets the existing ecosystems. In human being, there is functional disruption of thyroid hormone; and the respiratory problems generate dioxin which accumulates in the fatty tissues of animals. Plastics cause nuisance with blockage of drains and prevent the flow of waste material causing a host of bacterial diseases.

The reason for plastic pollution is linked to a highly consumeristic lifestyle that has led to the formation of a 'use and throw society' where things come cheap.

- Plastics never decompose. They remain for a long time in the environment. This leads to ecological degradation and ill effects.
- The collection, transportation & processing of plastic waste have become unscientific & chaotic.
- Uncontrolled and haphazard dumping of wastes in the outskirts of towns and villages has created abundant landfills not only impossible to reclaim but have serious environmental implications in terms of ground water pollution and contributing to global warming.
- High-energy ultra violet rays are needed to break down plastic.

Proactive and preventive control measures can be enforced so that pollution due to plastics can be prevented and the effects can be minimized. Some of these measures are:

1. Find Alternatives to Plastics
2. Follow the 6 R model: Refuse, Reduce, Reuse, Recycle, Restore and Rotting
3. Proper Waste Disposal
4. Government Policies
5. Community Education through Awareness.

Current Scenario of Plastic Waste

India has a high rate of plastics recycling at about +60%, while the world average is 15-20%. Recycling is a thriving business in India. India has per capita consumption of ~5 kg (2005) plastics. The rate is greater for urban areas; and it is set to grow rapidly, with world average 18 kg. Plastic in solid waste stream is the lowest at 0.5-4% because of recycling while the world average is 7-8%.

Vision- Indian Plastics Industry

- Consumption of Polymers @ 15%
- Compound Annual Growth Rate (CARG): 18.9 million tonnes
- Turnover of plastics Industries: Rs.1,33,245 crores
- Additional Employment Generation: 7 Million
- Requirement of Additional Plastics Processing Machines: 68113 numbers
- Additional Capital Investment: Rs.45,000 crores in Machines (2004-2017)

The planet is much better when it's clean and pollution is kept at a minimum or completely eradicated. People have to be ready to do what is necessary to make that happen. The business community has its role to play. Would they even operate their businesses when the earth is inhabitable? The investors, therefore, have a moral responsibility to ensure that the environment is conserved. Government must also perform its responsibility to the electorate by delivering on its mandate of keeping them safe and well. Policies to reduce plastic pollution should be enforced to forced compliance from individuals must also be done what is right to protect the environment and people themselves must strive to have a clean planet by recycling waste products, using green alternatives, managing disposal of wastes appropriately. When we all do what is necessary, we reduce plastic pollution and conserve the environment. Nearly all of the causes of pollution are the result of human actions. Changing our ways of life would help reduce it.

Policies to reduce plastic pollution should be enforced, and people themselves must strive to have a clean planet by recycling waste products, using green alternatives, managing disposal of wastes appropriately. When we all do what is necessary, we reduce plastic pollution and conserve the environment. Nearly all of the causes of pollution are the result of human actions. Changing our ways of life would help reduce it. Let us beat plastic pollution by refusing -reducing -reusing -recycling.

Prof. (Dr) Asutosh Debata

Director, Centre for Environmental Studies
Forest & Environment Department,
Government of Odisha, Bhubaneswar



Dr. Ashutosh Debata is working at present as Director of Centre for Environmental Studies, Forest and Environment Department, Government of Odisha. He was the faculty in Botany for four decades in Stewart's Science College and other Institutions. He was Visiting Professor of Environmental Science in Utkal University, Ravenshaw University. While serving as Principal of Stewart Science College he was the recipient of the award "Best Principal of India- 2010" instituted by Allahabad Agricultural University and AIACHE, New Delhi. Dr Debata has been honoured with many other awards and memberships in recognition of his professional achievements. He has published text books and reference books in Microbiology, Botany, Biotechnology and Genetics, and has earned reputation as a Science and Environment writer and communicator. He has guided many researchers on crops science and environmental education.



Communication received for discussion on “Go Green, Plastic is Obscene” Seminar

Date: 6th May, 2018

Use of materials has benchmarked history of human civilization, as **Stone Age, Iron Age** etc. and now we have the **Plastic Age**. However, the kind of **use or abuse of materials** makes crucial difference. **Stones**, originally used as primitive tool by Stone-Age Man, have been on use for building temples and carving of statues, but of late, is also a material of infamous “**Stone Pelting**” in Kashmir. So also **Iron**, discovered and used for making primitive agricultural implements, subsequently gave rise to spears & swords for fighting and later, to all modern war appliances and accompaniments every countries use today. Even the same **Stone** (LimeStones or Marble), which makes up Tajmahal, when processed to produce Cement, triggered the culture of large dams, high-rise buildings and unstoppable urbanizations, which are considered today, to be environmentally not benign (**Not Green but Obscene** in today’s terminology). Little do we realize that use/abuse of this limestone powder (called Cement) has given us **majestic Houses** but endangered “**Homes**” in Society..

The story of plastic is not different. Plastic, like cement is a **marvel of invention** of man and which sustains modern progress, provides comforts, safeguards health and hygiene in the society (Even we will be seated on plastic chair during the seminar). But the **abuse** of plastic in certain forms has boomeranged, particularly in many developing countries. Keeping in mind that “**The Gun does not kill, but the**

Gunner/Shooter does", Plastic as a material is not obscene but the abuser is.

Talking of plastic pollution: pollution is caused by an **agent**, called **pollutant**, in this case plastic. The definition of pollutant is: "**It is a resource out of place**", such as, a student not in class-room but loitering in street or an agricultural farmer not in village but living in an urban sprawl for livelihood. Besides, **a resource material when leaks from utility cycle into the environment, cause pollution.** This is equally true for plastic which litters our streets and clogs our drains and water channels.

Regulatory controls will only have limited impact and likely to end up in **corruption** at ground level downstream. The ideal action will be not to decry plastics or plastic products but avoid their **abuse** and our "**Throw-away**" habit and create a net-work of collection and recycling of discarded products and generate awareness in society.

K. C. Sahu (Life Member)
Powai, Mumbai

Water Crisis in Odisha - with Experiences from Japan

(Lecture delivered on 05 June 2018)

Nachiketa Das

Rivers in Odisha now face the problem of reduced water flow and drying up early. These issues can certainly be addressed taking clues from other countries like the USA and Japan.

I propose that the Government of Odisha carry out a comprehensive dredging of the entire length of the River Mahanadi and other major rivers of Odisha for their revival." There are several arguments in support of the proposal.

Hon'ble Dr B R Ambedkar, Labour Member to the Government of India, in his Presidential Address delivered at Cuttack on the 8th of November 1945 in a Conference organised to discuss development of the rivers of Odisha, had emphasised that the plan of embankments to manage the rivers is wrong and Odisha must adopt the methods the USA employed for the development of the rivers like the Missouri-Mississippi (p.249, Ambedkar's Contribution to Water Resources Development).

The vast water resources of the largest river of the USA, the Missouri-Mississippi is carefully managed by extensive river-engineering, which includes systematic dredging every year, carried out by the US Army Corps of Engineers.

Now in 2018, while the "Old man River" the Missouri-Mississippi continues to flow majestically, the largest river of Odisha, the once mighty Mahanadi, whose monsoonal flow right up to the middle of the twentieth century used to be comparable to that of the Ganges lies dead, all choked up, because of substantial siltation along its entire course. The

Mahanadi riverbed near the City of Cuttack today is probably at a higher elevation than the city, and the Ring-road embankment protects the Millennium City of Cuttack from the monsoonal floods. This massive siltation, moreover, has very drastically reduced the water holding capacity of the Mahanadi.

The Government of Odisha is aware of the problem of siltation that the Mahanadi confronts now. Last year the Chief Minister of Odisha, appealed to the Minister for Water-resources of the Union Government of India to make funds available for the dredging of the mouth of the River Mahanadi (Cited from article, *"Naveen Writes Gadkari to Deepen Mahanadi River Mouth"*, by: Sujit Kumar Bisoyi, March 22, 2017, The Times of India). Some islets that formed on the River Mahanadi, near the Jobra Anicut of the City of Cuttack are being removed by dredging (Islets may endanger Jobra barrage at Cuttack. June 23, 2015. Orissa POST). Access to the source of Sasan Canal that originates from the Hirakud Reservoir of the Mahanadi was dredged in 2008 (Cited from the article, *"Dredging in Hirakud reservoir in progress"*, June 15, 2008, OneIndia).

In this connection, it may be mentioned that the Government of Assam have decided to de-silt the mighty Brahmaputra River by dredging to mitigate the severity of the annual floods (Cited from news: *"Assam to Start Dredging of Brahmaputra to combat floods"*, August 23, 2016, LiveMINT).

It is proposed that the Government of Odisha take a decision to dredge the entire length of some 400 km of the River Mahanadi, right from the Hirakud Dam in Sambalpur to the river mouth at the Bay of Bengal near Paradip. The approximate volume of sand to be dredged for the 400 km long, 1 km wide, 3 m deep stretch of the Mahanadi will be around 1.2 bcm (billion cubic meters). The cost of this Mahanadi dredging project will be around USD1.2billion calculated at the rate of the dredging cost of USD1 for 1cubic meter.

Some of the dredged sand and silt near the City of Cuttack could be used to very substantially strengthen the Ring-road

embankment and create water front property by reclaiming a portion of the presently silted up course of the Mahanadi adjacent to the City. The Government of Odisha could also float a tender inviting bid for the export of the river sand, which is angular as opposed to the well rounded aeolian desert sand, and has a huge demand all over the world.

Hirakud Reservoir that has lost some 30 per cent of its capacity to siltation must also be dredged. The dredging of Hirakud Reservoir, however, must be preceded by a detailed bathymetric study of the reservoir. Other major rivers of Odisha like the Subarnarekha, the Budhabalanga, the Salandi, the Baitarani, the Brahmani, the Birupa, the Kathjodi, the Kuakhai, and the Rushikulya are all silted up and require dredging for their revival. If we do not revive these major rivers of Odisha, they will die, and once rivers die civilisations die. So let us revive these moribund rivers and save this land.



Micro-dams in Japan for water management

Professor Dr Nachiketa Das

M.Sc. JNU; Ph.D. Glasgow, Scotland, UK;
C-2-31, Kendriya Vihar, Tamando,
Bhubaneswar, Odisha-752054
Cell Phone: +91 7894202243
Email: nachidas@hotmail.com



Prof. Nachiketa Das, the Professor of Geology (retired) and Former Dean of Earth Sciences from Ravenshaw University is Professor and Dean at Centurion University, Bhubaneswar from March 2016. He received his education at Puri Zilla School and Utkal University; was a recipient of national scholarships at different stages, as well as the Commonwealth Academic Staff Scholarship later. Prof. Das was Postdoctoral Fellow, Harvard, USA; and Promoter and Director of Hiroshima Energy & Minerals Kabushiki Kaisha, Japan. Prof. Das has rendered services to several national committees of the Department of Science and Technology either as Member or the Chairperson; holds Membership of several associations in Australia, USA, UK and India; and has been listed in internationally consulted Who's Who. Prof. Das has served at Jawaharlal Nehru University- New Delhi, the Harvard University, CSIR-Government of India, La Trobe University in Melbourne and from April 2010 is continuing as Visiting Professor at the Department of Bio-recycling, Hiroshima Kokusai Gakuin University, Hiroshima, Japan. Presently, Professor Das is an overseas citizen of India living as a permanent resident of Japan and holding the status of citizenship of Australia.

Discussion points:

1. River Mahanadi holds rich biodiversity. The second wildlife sanctuary of Odisha state, the Satkosha Gorge Sanctuary, was Gazetted in May 1976 for conservation of aquatic fauna-flora focusing on Gharial (*Gavialis gangeticus*) and Mugger crocodile (*Crocodylus palustris*). Now the sanctuary is a Tiger Reserve, and extends from the southern river bank into the area of Mahanadi-Baisipalli Sanctuary. The region is also in the Mahanadi Elephant Reserve. Besides, the entire course of Mahanadi, particularly around Mundali and beyond, form noticeable retreats for large fresh water turtles and wetland birds. The conservation activities in the river and on the banks of Mahanadi have long drawn international attention. Therefore, a dredging proposal, which could possibly solve the problem of water flow, when executed should be completed within short durations and in phased manner without causing long periods of stress on biodiversity.
2. The catchment area has to be taken care of with result-oriented plantations for quality tree cover and soil conservation measures. Stand-alone dredging cannot be a solution.
3. Major tributaries call for urgent conservation action in order to keep Mahanadi live.

Energy and Environment

(Date of Presentation: 05.08.2018)

Mayadhar Swain

Energy is a key infrastructure for development. It is the raw material needed to fuel any country's economic growth. Societies use energy for transportation, manufacturing, illumination, heating and air conditioning, and communication; for industrial, commercial, and domestic purposes. Energy resources may be classified as primary resources, where the resource can be used substantially in its original form, or as secondary resources, where the energy source must be converted into a more conveniently usable form. Out of all forms of energy, electricity is the most convenient to use and hence its generation and utilization is increasing day-by-day. As a result, the power generation industry is now a massive global industry, and it inevitably has an impact on the environment.

Due to large availability of coal and other ancillary considerations, thermal power contributes about 65% of total electricity generation in the whole world. But it causes environmental pollution in many ways. Emissions that result from combustion of coal include carbon dioxide (CO₂), carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen oxides (NO_x), particulate matter (PM), ash and heavy metals such as mercury. Nearly all combustion byproducts have negative effects on the environment and human health.

- CO₂ is a greenhouse gas, and it contributes to the greenhouse effect.
- SO₂ causes acid rain, which is harmful to plants and to animals that live in water. SO₂ also worsens respiratory illnesses and heart diseases, particularly in children and the elderly.

- NO_x contribute to ground level ozone, which irritates and damages the lungs.
- PM results in hazy conditions in cities and scenic areas, and coupled with ozone, contributes to asthma and chronic bronchitis, especially in children and the elderly. Very small, or fine PM, is also believed to cause emphysema and lung cancer.
- Heavy metals such as mercury are hazardous to human and animal health.

The most debated issue of thermal power plant today is the release of CO_2 to the atmosphere. It is a greenhouse gas and is the main culprit for global warming and the related climate change. A warmer climate could lead to rising sea levels, the spread of tropical diseases in previously temperate climates, crop failures in some regions and the extinction of many plant and animal species, especially those in polar or alpine areas. Of particular concern is the fact that global warming is already causing the polar ice caps to melt, thus discharging large



amounts of extra water into the world's oceans. The situation could get much worse over time. Even small changes in sea levels could wipe out entire coastal regions. This is because the coastlines are shallow slopes, not firm walls; so a rise in water level of just tens of centimeters would erase kilometers of wetlands and beaches.

To mitigate this, almost all countries have agreed to reduce emission of CO₂ to the atmosphere. It is to be noted that coal is used in thermal power plants and also in iron and steel plants, cement plants and many other plants. But the share of coal-use by thermal power plants is more. In India it is 91%.

India has signed the Paris Agreement to reduce the emission of CO₂. The key features of India's Paris targets are:

- Reduce energy emissions intensity by 30% to 35% from 2005 levels by 2030.
- Increase the share of non-fossil fuel energy to 40 percent of India's energy mix by 2030.
- Create an additional carbon sink of 2.5 billion to 3 billion tons of carbon dioxide equivalent through increasing forest and tree cover by 2030.

India has taken many steps in this direction. One noteworthy step is increasing of renewable energy like solar power and wind power.

In conclusion, it can be said that we want both energy and good environment. Hence, a proper balance between the two is required.

Er. Mayadhar Swain

Director, School of Electrical Engineering,
KIIT University, Bhubaneswar
Email: mayadhar2002@yahoo.co.in
Phone: 09438693724



Born on 08-02-1956, Sri Mayadhar Swain obtained his degrees of B.Sc. Engineering (Electrical) and M.E. (Water Resources Development). Er. Swain worked in NTPC, TTPS, OHPC and MECON in different capacities. Presently he is the Director, School of Electrical Engineering, KIIT University, Bhubaneswar. Er. Swain worked in the fields of design, operation, maintenance, consultancy and project management in thermal power, hydropower and renewable power. His noteworthy works include renovation, modernisation and augmentation of 2x32 MW units of Hirakud Hydro Power Plant, and of 4x9 MW Jaldhaka Hydro Power Plant, West Bengal. The installation of 20.6 MW sinter cooler waste heat recovery power plant at RINL, Visakhapatnam is also unique as it is the first and only such plant in India. He has published 35 technical papers, mostly on power in National Journals. Er. Swain has authored 50 popular books in Odia on science, engineering and mathematics. He has also published more than 500 articles in different magazines and newspapers, mostly on science and stories for children. He writes columns in different daily Odia newspapers on contemporary issues. Er. Swain has been honoured with awards from Bigyan Prachar Samiti- Cuttack, Odisha Bigyan Academy, Govt. of Odisha, the Rajadhani Book Fair, Bhubaneswar Book Fair, Utkal Sahitya Samaj and All India People's Science Congress. Er. Swain is a Fellow of the Institute of Engineers (FIE), and Member of Odisha Bigyan Academy, Utkal Sahitya Samaj and Bigyan Prachar Samiti, Cuttack.

Green Transport Prospects in Odisha

(Date of Presentation: 02.09.2018)

Dillip Ray

Abstract: Vehicular emission and pollution no more remain the other man's concern. It has become everybody's concern in urban areas of Odisha. The conflict between development and destruction is visible during debates over automobile pollution. To address the fast rising populations of human and vehicle, and the pollution there from in Odisha, the prospects of green transportation loom large over urban Odisha. The technology, policy issues, governance and mass sensitization need to be addressed with high priority by the state.

Issues: Quality air over urban India is becoming scarce. It no more remains a free good. Population explosion, industrialization, technology upsurge, transport development etc. have knocked down the tolerance limit of some of the major human settlements in the country in recent years. Today urban Indians have much less quality air to breathe and more polluted air to inhale. Vehicular pollution accounts for the single most major share in pollution load in many cities. It is followed by industrial pollution. Auto pollution has begun to grip selected pockets of urban Odisha in recent years.

Dimension in Odisha: Transport development precedes or succeeds economic development. It is an offshoot of diversified trade, commerce, infrastructural, industrial and other socio economic activities in the state. Among the major modes of transport system, Odisha lagged behind in railways with only 2606 km length of rail, and a low rail density of 16 kames / 1000 sq.km. Six districts such as Boudh, Deogarh, Kandhamal,

Kendrapara, Malkangiri, Nawarangpur are yet to have any rail track. Airways and waterways modes are equally cramped with low growth. The state has one international airport, 19 air strips and 16 helipads. There is one major port in Paradip and 13 potential minor ports in Ganjam, Puri, Jagatsinghpur, Balasore and Bhadrak in 480 kms long coast line. Inland water transport operates only in six routes of Chandbali and Balugaon region with motor launch services for passenger transportation.

Road transport is the major mode of transport system in the state and it accommodates an overwhelming proportion of freight and passenger traffic. Automobiles have profoundly influenced the lifestyle of people. The way they move and the way they work may die them out of accidental and pollution risks. Road transport contributes remarkably to economic growth with more than 6% share to state GDP and contribute to social reorganization, desirable human settlement, socio cultural integration and improved quality of life. It is also the symbol of conflict between development and destruction. The state cannot compromise development, but it can minimize the negative impacts due to accidents and pollution hazards on road.

Road transport bears a skewed characteristic in Odisha. By the end of fiscal year 2017-18, the state had 74.32 lakh registered motor vehicles (MV) out of which 70.81 lakh vehicles ply on roads. The 2-wheelers comprise 80%, light motor vehicles 7.1%, goods carrying trucks, tempo vehicles 5.2%, vehicles like tractor, trailer, trekker about 2.1%, and the auto rickshaws and other categories of vehicles constitute about 0.7% of total vehicles. The numbers of motor vehicles are rising alarmingly, by 8.66 lakh annually in the state. Revenue generation to state exchequer from transport sector is Rs.1544 crore. It shares about 5% of state GDP. The sector has generated huge employment potential in terms of direct and indirect, skilled and unskilled manpower.

Odisha has a road network of 2.56 lakh kms of which only 15% are surfaced. On average, the road length increases

by 0.6% annually while MV population rise disproportionately with road space, by 13%. Many factors like road, vehicle, human and environmental errors lead to fatal road accidents. In the year 2017, 4790 people died, more than 11000 people got injured in about 10000 road accidents, with a very high fatality rate of 45 deaths per 100 accidents. Besides, pollution risk in automobile sector has also emerged as every body's concern, particularly in urban areas.

Automobile Pollution

Automobile pollution is the offshoot of following factors:

- Explosive growth of heterogeneous mixture of vehicles and traffic on roads;
- Poor quality of vehicles, road and road users;
- Inefficient burning of fuels and lower quality of fuels;
- Deficient traffic management system and technology;
- Concentration of motor vehicles in large cities; and
- Exposure of larger percentage of population that lives and moves in open

The hazardous impact of toxic automobile emissions on human health and nature are wide open. It not only distorts the balanced equation among man, society and environment, but also plummet the quality of life significantly. Air pollution is the excessive concentration of foreign matter in the air which adversely affects the well being of an individual or causes damage to the property. Since air pollution is caused mainly by rapid industrialization, some critics comment on air pollution as "the price of industrialization". Air pollution caused by automobiles has been described as the "disease of wealth". Vehicles through their emissions and noise, cause air pollution. Both the diesel and petrol driven vehicle cause air pollution but the pollutants vary in composition and proportion due to difference in the modes of operation of the two types of engines. Petrol driven emission contain more carbon monoxide, hydrocarbons and lead. So it is more hazardous. Diesel driven

emissions produce more smoke contributing to concentration of particulate matter and offensive odour in atmosphere. Emissions from 2 stroke engines like mopeds, scooters, motor cycles etc. contain more pollutants than their 4 stroke counterparts. In 2 stroke engines lubricants are added to fuel and these engines are comparatively less fuel efficient.

Primary Pollutants

The automobiles, as we know, use internal combustion (IC) engine comprising of two types i.e. Spark Ignition (S.I.) engines using petrol and Compression Ignition (C.I.) engines using diesel as fuel. Again both these types are classified as 2-stroke and 4-stroke engines. The reaction of fuel with air (oxygen) that occurs in an IC engine should ideally produce carbon dioxide, water and energy. But in practice, apart from carbon dioxide and water, the automobile emissions contain:

- Carbon Monoxide (a product of incomplete combustion of fuel)
- Unburnt hydrocarbon (petrol, diesel and lubricant constituents which are not burnt)
- Nitrous Oxide (a product of high temperature reaction between Nitrogen and Oxygen in an IC engine)
- Sulphur Dioxide (SO₂)
- Small quantity of lead (when leaded petrol is used) and
- Smoke (carbon rich particulates).

Health Hazards

The health hazards of automobile emission are critical and wide open.

- CO (Carbon Monoxide)--Causes physiological stress on heart patient; elevated carbon level in haemoglobin; visual difficulty, paralysis, coma and death. Severe CO problem occurs in the cities where vehicle emissions are concentrated between rows of tall buildings;

- NO_x (Oxides of Nitrogen) – form acid in lungs; cause bronchitis, eye irritation, frequent smog formation can damage structures and property;
- Lead (BP) – cause central nervous system defects and behavioural defects; anemia, irreversible brain damage, miscarriage, still births and deaths of the newborns. Animals which feed on plants near highways with heavy traffic also show lead poisoning symptoms;
- Sulphur Dioxide (SO₂) – cause coughs, shortness of breath, bronchitis, fatigue;
- Ozone (O₃) – causes throat irritation, fatigue, pulmonary edema, less crop yield, adverse effect on rubber and textile fabrics.

Noise Pollution

Vehicles also generate noise pollution. Sub rule (2) of Rule 20 of the Motor Vehicle (Amendment) Rule 1993 stipulates that every vehicle shall conform to noise standards as indicated below:

- Petrol 2 and 3 wheelers, cars - 80-82 Db
- Diesel LMV and 3 wheelers (of different gross vehicle weight)-- 85-91 Db

Pollution Profile in India

India's transport sector consumes 35% of total liquid fuel. Road transport alone consumes more than 80% fuel. The sector contributed 87% of total CO₂ emission (2007). In New Delhi the total SPM (suspended particulate material) generated from vehicle emission in winter and summer are respectively 25% and 9%. Whereas, 4% and 28% of CO₂ generated from road dust are in winter and summer respectively in the City. Extensive use of personalized petrol vehicles like 2-wheelers, cars etc, auto rickshaws, absence of ideal modal split towards mass transport system, bad maintenance and use of vehicles engines, and auto emission below standing condition of vehicles etc. cause more pollution on roads.

Green Transport System

Congestion, health risk, stress emerged out of automobile emission call for the introduction of viable alternative ingredients in green transport system. Some of the major alternative components, technology, sources and development in green transport system are highlighted as follows:

1. Use of bicycle,
2. Facilitate pedestrian habit,
3. Use cycle bus for school children - in operation in European countries (Photo source: Google.com)



4. Electric operated vehicle (EV)
5. Hybrid electric vehicle (HEV) – Electric battery and IC machine combination
6. Plug in HEV (PHEV) – Battery is primary and liquid fuel is of secondary use

These alternative sources will ensure fuel economy, low emission, energy security, and less reliance on petroleum etc. It has to be made cost effective.

Other major action components towards Green Transport System

These are as follows:

1. Modification of engine design and operating variables
2. Use of gas (LPG/CNG) and engines driven by electric and solar power. Benefits of LPG/CNG are that these are excellent knock resistant, have zero evaporative emission, cause low CO₂ emission, low ozone formation and low air toxic emission etc.
3. Use of pollution control equipments in vehicles (catalytic converter); for example, treatment of exhaust gases after emission from the engine
4. Control of evaporative emission
5. Infrastructural development: It includes and covers aspects like construction of more and more improved roads, interchanges, intersections and flyovers. Besides, better traffic management can reduce the pollution load.
6. Mass transport need to be promoted with ideal modal split.

Legislative control

Legal provisions to meet the societal demand in respect of vehicular pollution are made under Air (Prevention and Control of Pollution) Act, 1981, Environment Protection Act 1986 and Motor Vehicle Act 1988. In order to upgrade the quality of

vehicles and minimize air and noise pollution the following provision are made under the Motor Vehicle Act 1988: Section 41(8), 44,53,59,110, and 115(under CMV Rule 1993). These acts and rule relate to:

- Renewal of registration certificate,
- Compulsory inspection,
- Suspension of registration
- Fitness and its periodical renewal,
- Age of MV, construction,
- Equipment and maintenance of motor vehicles with respect to speed, the emission of smoke, visible vapour, sparks, ashes, reduction of noise and standards of air pollutants. It stipulates standards for emission of smoke, vapour etc. for the motor vehicle.

Suggestive remarks for green transport initiatives in Odisha

1. More well equipped service stations and garages for routine testing of vehicles for emissions may be recognized as authorised testing stations, for periodical checking of vehicles under 116 (1 of Motor Vehicle (Amendment) Rule, 1993 and get “Pollution under Control” certificate as required under Rule 115(7).
2. Provision of regular training with handy kits for enforcement officials and MVIs to detect vehicles violating the stipulated emission standards.
3. Timely and proper preventive maintenance of vehicles by vehicle owners.
4. The 2-stroke engines are much more polluting than 4-stroke engines. So 3-wheeler tempos and auto rickshaws should be restricted in cities.

5. Polluting vehicles, personalized in specific need to be discouraged to ply on roads by way of introduction of pollution tax.
6. Frequent checks with penalty for buses and auto rickshaws with starting condition of engines for long time etc. at bus and tempo stoppages.
7. Overcrowding and overloading by stage carriages and trucks need to be minimized.
8. Use of air horns should be banned.
9. Restrictions should be imposed on the selling of such items.
10. Vehicular pollution control laboratories should be set up by the Transport Department with skilled team for regular monitoring, enforcement and vehicle check up.

Acknowledgements

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The emission from petrol vehicles is normally tested by Gas Analysers which measures the Carbon Monoxide amount of the exhaust. The emission from diesel driven vehicle is tested by Smoke Meters to measure the smoke density of the exhaust from diesel vehicles.

Dr Dillip Ray, MPhil (Econ), PhD (Econ)

Email: dillip.ray.ctc@gmail.com

Phone: 9437850088



Dr Dillip Ray is the Joint Director, Odisha Livelihoods Mission, Panchayati Raj and Drinking Water Department, Government of Odisha, Bhubaneswar. Born in 1959 and educated in Cuttack, Dr Ray obtained his MPhil (1986) and PhD (1997) degrees from Utkal University. Research fields of Dr Ray cover forest economics, poverty, road transport management, traffic survey, road safety, policy, Gross State Domestic Product (GSDP), economic survey, environment statistics, agriculture etc. His work sphere has also seen him planning aspects of regional imbalance, economic sectoral planning, District Human Development Indices, and micro plan on forestry. Dr Ray has conducted planning and evaluation of activities related to plantations, biodiversity, traffic surveys, road safety, livelihood, state economy, agriculture, land use, Central & State statistical schemes and training modules. He has delivered his skill as resource persons in several national and international forums and the All India Radio and Doordarshan. He has rendered editorial services for the Journal of Transport Dept ('Gati-Pragati'), Planning & Convergence Department, Odisha, and 'Tathya' & 'Samikshya' of Directorate of Economics & Statistics. Dr Ray is a life member of the Orissa Economics Association and Orissa Environmental Society, and is active with the environmental awareness campaigns.



Our Sacred River - Bahuda

*(Based on Bahuda Basin Stakeholders Consultation Workshop,
Date: 30 November, 2017)*

Sundara Narayan Patro

The Bahuda River originates at Luba from the Singharai Hills (above 1500 meters ht) of Mahendragiri hill complex on the Eastern Ghats in Gajapati District of Odisha State. It comes under the Mohana Assembly Constituency.

River Bahuda

Odisha State is bounded on the east by the Bay of Bengal and its 480 km long coastline extends from the mouth of Subarnarekha River touching West Bengal to the south of Bahuda River in Odisha. Many rivers flow through the State originating either from the State itself or from the neighbouring States. Bahuda is one of the seven major rivers of Odisha, while the six other rivers are Mahanadi, Brahmani, Baitarani, Budhabalanga, Rushikulya and Subarnarekha.

The Bahuda River (19°4'0"N, 84°45'0") originates at Luba from the Singharai Hills (above 1500 meters ht) of Mahendragiri hill complex on the Eastern Ghats in Gajapati District of Odisha State. It comes under the Mohana Assembly Constituency. It flows in Odisha up to 55 km in the north-east direction, and 17 km in the south-east direction before entering Andhra Pradesh to flow for 18 km. Then it turns north-east for 6 km in Odisha before meeting the Bay of Bengal near the Sunapurapeta Village in Odisha. The total distance the river traverses is 96 km (78 km in Odisha and 18 km in Andhra Pradesh). Its prominent tributaries are Poichandia Nalla, Bogi Nadi, Batrada Nalla and Kantajura of Kanteijodi Nalla. The river effectively caters to 23,000 acres of land covering more than 90 villages. It has the

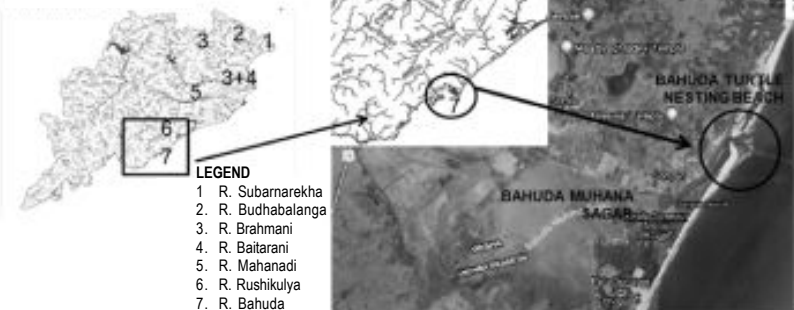
catchment area of 1,118 sq km (Odisha 890 sq km and Andhra Pradesh 228 sq km). The annual estimated rain fall received varies between 900 to 1500 mm.

Bahuda is a sacred river; there are 34 Brahmin Sasans and 5 Baruni Snan Ghats on its bank at different places. Mythologically and spiritually the river has been compared with Ganges River for purity and sweetness of its water. The significance of the river is that right from the source to the sink it identifies itself as the lone river and does not merge with any other river. It is now in transition from perennial to a seasonal river; the flow of water and water carrying capacity is getting reduced as the river bed is becoming shallow. It suffers from infestation of invasive weeds and encroachment. The water is getting polluted due to release of household garbage, drainage water, bathing of human beings and domestic cattle, open defecation, silt and dust from stone quarries, and escape of agro-chemicals and pesticides in the water-runoff. As its result the e-flow of water suffers.

Utilisation of Bahuda Water Resource

The river is intercepted by Baghalati Dam and Kalingadola Diversion Weir with provision of irrigating (ayacut) 5,400 hectares and 6,500 hectares respectively. Another interception is Poichandia diversion weir of 1502 ha. A Mega Lift Irrigation Project is under construction at the upstream of Kalingadola Diversion Weir to provide irrigation facility to 14 villages under

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4 panchayats under Digapahandi and Chikiti Block with about 400 beneficiaries. For raising crops and vegetables water is available during the monsoon season, but the rabi crop suffers due to lack of adequate irrigation facility. As there is decrease of monsoon rainfall the river bed is becoming shallow losing its water holding capacity; it is suggested to construct some more diversion weirs to harvest water during monsoon and make available for irrigation. About 600 ha land is being irrigated by Lift Irrigation facility (LI Points). This benefit needs to be extended to the farmers in every village along the river basin. About two lakhs people of all the villages located along the river basin are getting the benefit of drinking water.

The watersheds, upper catchment areas, and the river banks are denuded of vegetation cover. Massive plantation is suggested. The species suggested are Ficus, Mango, Jack fruit and other broad leaved native species. It is observed that after the super-cyclone in 1999 the monsoon rainfall has decreased. Many of the standing trees were uprooted and destroyed during the cyclone. From the sources of personal collections, official documents and internet downloaded literature it is understood that in 1975 there was an agreement between Odisha and Andhra Pradesh to make available 1.5 tmc of water to Srikakulam District in Andhra Pradesh from the Baghalati Medium Irrigation Project. But it has never been an issue so far. Increase in the height of the dam may require the matter to be reviewed.

Bahuda Turtle Nesting Site

Bahuda River Mouth is emerging as one of the ideal sites for nesting of the endangered Olive Ridley Sea Turtle (*Lepidochelys olivacea*). The Olive Ridelies are Schedule I species under the Wildlife (Protection) Act, and are listed as 'endangered' in the IUCN Red Data Book, in the 'Appendix-I' of CITES (Convention on International Trade in Endangered species of wild Flora and Fauna), and also listed in the CMS (Convention on Migratory species). India being a signatory

nation to all these conventions has the responsibility of protecting this Species of sea turtle and its nesting beaches, breeding, feeding and congregation areas, as well as its migratory pathways in the sea. The proposed construction of a captive port by JSPL at the Bahuda River Mouth, and establishment of an Energy and Oil City by Greenko group at Sonapur in the near vicinity of the river mouth may attract impact studies of such developmental activities on the ecosystem and environment in the serene Bahuda River Mouth and its environs.



Dr Sundara Narayana Patro

President, Orissa Environmental Society

snpatro11@gmail.com



Dr Sundara Narayana Patro was born on 27 August 1944 in his native village Nuapada in Ganjam District and had his education to become a Botanist with PhD on ecological aspects of shifting cultivation. During his 35 years of education service in Government of Odisha Dr Patro taught Botany to students up to MPhil in a number of colleges of Odisha. Dr Patro's research ranged through natural habitat, biodiversity conservation, ethno-botany and industrial pollution impacts. Dr Patro dedicated his life for the cause of conservation and management of nature and environment through his profession as well as association with a number of organizations at the state, nation and international level championing causes of science, environment, culture and issues of the civil society. For five years he was the Coordinator of Indo-Norwegian Cooperation Programme on Environment in Odisha. He initiated the foundation of Orissa Environmental Society in October 1982 and has been sensitizing people on science and environmental issues and influencing government policies by way of interactions. The OES launched an intensive campaign for creation of Similipal Biosphere reserve and has launched sustained campaign towards giving status of a biosphere to Mahendragiri hill complex on the Eastern Ghats. The Bhubaneswar Chapter of Indian Science Congress Association was founded by him as the Founder Convener in 1996. The Government of Odisha honoured Dr Patro in 2009 with the state level Biju Patnaik Award for Wildlife Conservation; and in 2016 felicitated as "Senior Scientist of Odisha". He is Ashoka Fellow. The 'House of Nature, Environment and Society Trust' (HONEST) founded with award money received by Dr Patro from different sources is also promoting awareness on a number of issues related to environment, human population, development projects, community participation and sustainable future.

Beat Plastic Pollution Campaign in Schools

Dr. Pradeep Kumar Rath and Sri Raghunath Prusty
Life Members, OES



Dr Pradeep K. Rath



Sri Raghunath Prusty

[The Orissa Environmental Society conducted a series of Awareness Programmes in various Schools in Bhubaneswar. These programmes were anchored by Dr Sundara Narayan Patro- President and OES-life members Dr. Pradeep Kumar Rath and Sri Raghunath Prusty. The members of OES congratulate and complement the special endeavour— Editors]

On the occasion of the World Environment Day on 5th June, 2018, the United Nations Environment Programme (UNEP) declared the theme 'Beat Plastic Pollution' calling for concerted action in the part of the nations all over the world to save mother earth from devastating effects of 'Plastic Pollution'. The special awareness programmes conducted by OES in different educational institutions focused on seminar discussions on problems of 'plastic pollution' and methods for its prevention. Other subjects that were also discussed at the awareness programmes ranged on 'conservation and economic use of water' and the 'sapling plantation'. One of the striking features

was the pledge administered by the President-OES to the participants for care and protection of environment. The chronological event of these awareness programmes is presented below.

24/08/2018: St. Xavier's High School, Khandagiri: after deliberations, the students were led through to take the pledge and work for maintaining the environment clean n green.

26/08/2018: Swami Sivananda Centenary English Medium Residential School, Khandagiri: Swami Jagannathananda and Swami Shiv Chidananda of the School participated and deliberated on the occasion with OES; the students were administered the pledge to work for maintaining the environment clean n green.

27/08/2018: DAV School, Pokhariput, Bhubaneswar; After deliberations on plastic pollution and environmental issues a pledge was administered by OES to the students to work for a clean n green environment for better life on the planet.

01/09/2018: Hi-tech Medical College, Bhubaneswar: The plantation programme in the premises of the College and discussions on environmental issues was inaugurated by Dr. Bijoy Kumar Pattnaik, Principal of the College. Sri Prakash Chandra Jena, Joint Secretary, OES was instrumental in organising the programme with active cooperation of the College Authorities, especially Mr. Suresh, PET.

03/09/2018: Aurobindo Institute of Integral Education, Khandagiri, Bhubaneswar: The awareness programme on plastic pollution, economic use of water and its conservation, and the plantation programme was organised by the Orissa Environmental Society in the premises of the institute. The students were apprised about the ill effects of plastic pollution. Dr. Sundara Narayan Patro, President administered pledge to the students to be part of the endeavour to create and maintain a 'clean n green environment'. The awareness programme was

followed by plantation of Sal saplings in the School Premises. Sri Rabindra Nath Padhi, Principal of the Institute collaborated to make the entire range of programmes meaningful as well as successful.

08/09/2018: Santanu English Medium School, Chintamaniswar Mandir Road, Bhubaneswar: The programme was undertaken to highlight and create awareness on issues concerning plastic pollution. Dr Patro, President-OES administered the oath to the students and teachers to work for keeping our environment clean and livable. The programme was followed by plantation of a variety of saplings to keep the environment green.



Pledge administered by Dr S. N. Patro, President-OES to the students and teachers on one of the occasions

11/09/2018: DAV School, Kalinganagar, Bhubaneswar: In its continued mission of creating awareness among the students regarding ill effects of plastic pollution and awareness on the subjects of water conservation and plantation, the OES-programme was organized with the school authorities. One of the most significant parts of the programme was oath administration to the students and teachers for creation and upkeep of a clean and green environment for quality life on the earth. The School authorities felicitated the members of the OES in recognition of their sincere and continued endeavour for a clean and healthy environment.

22/09/2018: Kendriya Vidyalay-5, Kalinganagar, Bhubaneswar: The awareness cum plantation programme was conducted with active participation of the Principal and teachers of the School. The OES team underlined the ill effects of plastic pollution and motivated the participants about their role to contain such pollution, and also understand environmental issues of water conservation and plantation. Smt. Biraja Mishra, Principal impressed upon the students to put sincere effort in the light of the addresses by the guests to better our environment for a wholesome life on this planet. Dr. Patro administered the pledge to the students to take initiative for making our environment clean and green.



25/09/2018: Govt. High School, IRC Village, Bhubaneswar: The speakers impressed upon the students to be aware and make others aware about the ill effects of plastic pollution and to do their bit in an effort to contain the same. The speakers also dwelt up on other environmental issues pertaining to water conservation and plantation. Dr Patro administered the pledge to the students and teachers to work for a better environment in order to get a healthy and wholesome life on this planet.

02/10/2018: Institute of Agricultural Sciences, Siksha O Anusandhan University, Bhubaneswar: On the auspicious occasion of Gandhi Jayanti and Sashtri Jayanti that also coincide the 'Swacchata hi Seva fortnight', the Orissa Environmental Society in league with the Institute of Agricultural Sciences under the Siksha O Anusandhan University organised a plantation programme at its campus-4 in Bhubaneswar. The occasion was graced by Dr. D. P. Ray, Former Vice Chancellor of Orissa University of Agriculture and Technology, Bhubaneswar, who is presently the Principal Advisor of SOA. Dr Sundara Narayan Patro, President of OES, Dr. Bijay Kumar Sahoo, Dean of the institute, many professors, young faculties and students of Institutes along with Sri Prakash Chandra Jena, Joint Secretary of OES participated in the plantation programme. A discussion on plastic pollution and the means for its reduction took place with reference to the ban of plastic products in five municipal corporations of Odisha along with Puri.



Bioplastics have a Promising Future - Campaign through Interview

J. K. Panigrahi

Jaya Krushna Panigrahi, the secretary of Orissa Environmental Society (OES), HoD of Zoology & Environment Department of an institute in Bhubaneswar, is one of the first environmentalists to initiate plastic ban. In a tete-a-tete with Orissa POST, he talks about various aspects of plastic ban and its implementation at ground level. The excerpts:

DIPTI RANJAN DAS, OP

OP: How do you view the role of plastics in meeting various human needs in retrospect?

In the second half of 20th Century, invention of materials used in plastic manufacturing was considered a blessing for the

mankind as it fittingly suits to our manifold requirements. To its advantage, it has properties like light weight, low cost, flexible, transparent, corrosion resistant, chemically inert, strong and durable, with exceptional barrier properties as regards the liquids. Two scientists, Karl Ziegler of Germany (for polyethylene) and Giulio Natta of Italy (for polypropylene) were awarded Nobel Prize in 1963 for synthesis of polymers used vastly in plastic production. From automobiles and electronic gadgets to packaging and toy-making, plastics have versatile applications. However, its excessive use, and the consequent severe environmental and health hazards posed by plastics have been a cause of concern for the humanity at this juncture.

OP: How do you see the plastic ban imposed by the state government in five municipal corporations and Puri?

It is a timely and sensible ini-



Jaya Krushna Panigrahi



tiative taken by the government when the world community is focusing its attention to get rid of the adverse impact of plastic pollution and to find out appropriate substitutes. The UNEP (United Nations Environment Programme) had aptly chosen the theme of this year's World Environment Day as 'Beat Plastic Pollution' to raise awareness on the issue across the

out appropriate substitutes. The UNEP (United Nations Environment Programme) had aptly chosen the theme of this year's World Environment Day as 'Beat Plastic Pollution' to raise awareness on the issue across the

globe by sensitising people. The Union government notified the Plastic Waste Management Rules, 2016 with a view to reducing the use of synthetic plastic materials (produced from petroleum, natural gas and coal) streamlining their efficacious management and promoting eco-friendly alternatives of plastics. The present initiative by the state government is part of the inventiveness to be extended to the whole state within the next two years, as declared.

OP: What are the alternatives to the plastic carry bags and whether these are now available in local markets?

We can use materials such as cotton, jute and paper that are biodegradable and to some extent more durable plastic bags, as were being used 20/30 years back. Plates manufactured from leaves and the likes are very good substitutes to be used in social functions as disposables. Bio-plastics or green plastics made from plant materials like corn starch, cellulose and polylactide acid (PLA) is natural recyclable material which has been

successfully produced and these hold a lot of promise for the future. A lot of scientific research is going on to find out cost-effective, eco-friendly substitutes at the earliest. Research in biotechnology is also progressing to develop new strains of bacteria which can degrade the synthetic plastics. The most vital issue at the moment is to alter our mindset and boost our commitment to reinforce the quality of our environment by staying away from plastic use.

OP: In spite of the ban, polythene carry bags are still available in the market. How can this be prevented?

The onus of success of the ban lies on the commitment of the implementing authorities of the government, the manufacturers, the vendors and people in general. Enhancing public awareness on the issue is one aspect and strict implementation of the rules with exemplary punishment is needed. It may take a little more time, but we should not look back and have to go ahead with positive approach. Many states are already on the

move. The municipal bodies are required to organise awareness programmes, and the print and electronic media can help in spreading the messages. The 4Rs of waste management – reduce, reuse, recycle and recover – should be at the top of our agenda to combat plastic menace.

OP: OES is a premier organization of the state working in field of environment protection. What are your initiatives to make the movement a success?

The OES is actively involved in organising various programmes for environment protection and conservation of natural resources of the state since its inception in 1982. It is spearheading the plastic ban movement by carrying out a number of awareness programmes in educational institutions, especially at various schools in Bhubaneswar. Our views on the issue are also focused in print and electronic media to motivate the people. The OES has also held discussions on the issue with the authorities of Bhubaneswar Municipal Corporation.

'Trash' of 1982 and 2018

(Extracts from first person account from the USA)

Lala Aswini Kumar Singh

From mid-1970s I was introduced to the *disposable single-use ball pens* easily available in Angul bus-stand, and had admired the inventor who was carrying us way ahead into the future.

Next it was the period 1980s, when I was not adequately introduced to the many other articles that had found way into the life style of a 'use and throw society'. I had gone from a pure village and forest background at Gharial Research and Conservation Unit-Tikarpada to teach wildlife at the Government of India Institute at Hyderabad and then on an FAO Fellowship first to the USA to study wildlife management.

It was then my first introduction in July 1982 to a *disposable styrofoam can* to drink water. I was staying in Baton Rouge in a log house at the Rockefeller Wildlife Refuge in Louisiana, USA. Mr Ted Joanen, a highly respected Alligator Biologist was my trainer and host. On the first day itself, after having a safe lunch of rice and chicken curry, I collected water from a filter, drank it; *didn't know whether or not to throw the container away into the trash-bin*. As I would have done with a tumbler of glass or bell metal at home, I washed and kept the styrofoam tumbler near the water tap.

Mr Joanen was noticing my hesitations. He had then tipped that *the society was shifting, where possible, from the formal ceramic and glassware towards quick and cheap use of disposable paper, plastic and styrofoam*. It was much easy and cheaper during a time when per hour **cost of engaging worker was increasing** for maintenance of kitchen utensils and dinning

ware. I hadn't asked about the methods for disposal of solid wastes at that time. I didn't realize then that the plastic and disposable wares would become a menace and create *worldwide concern after forty years while searching ways to save wildlife and the naturalness of ecosystems* with reduced use of plastic and wise handling of trash.

Next month I was to stay inside Okefenokee swamps in Georgia for about a week in a 'Trailer House' that stood on iron wheels supported on stone pieces. The rubber tyres had been removed. The trailer house had impressed me very much. Until the typical Indian relatives prevailed, I lived for a long time with a desire to ultimately have one trailer house for my family and move from one sanctuary to the other. Yaah, things don't work in real life the way it is in the American swamps!

The **Trailer House in Okefenokee** was fitted with AC, had light from electricity, with space for field lab, a relaxing sit-out with sofa-set, sleeping accommodation tiered for six, a kitchen with gas connection, and the bath rooms. Mr Howard Hunt, the Herpetological Curator of Atlanta Zoo had advised and guided me to purchase canned food, juice, bread, butter, cheese, noodles, water bottles, disposable kitchen bag, etc. in the city before we proceeded to the swamps. Mr Hunt had a personal van and a collapsible canoe which he carried to the swamp. The refrigerator in the kitchen of the Trailer House already had enough bread, butter, egg etc. for one person's consumption. Howard had returned to Atlanta and came back to pick me out of Okefenokee at the week end. The instruction was that I consume the food already available there and leave what I brought for the next occupant. Great! *After the stay I carried the waste bag from kitchen in our pick up and threw it in the nearest and specified dump yard.*

After 36 years, in August 2018 I came for a short visit mostly to Chicago, Illinois State in north USA. I became familiar with methods of collecting household wastes including my granddaughter's baby diaper and the convenience of disposing

these out of the apartment. That is not much different from what I practice back home, except that I will search on the net for similar *disposable large kitchen bag with tying straps*, and would wish for better way of systematic and regular removal of wastes from all localities.

By this time the world has come to recognize the menace caused by plastics and disposable products in all the ecosystems that surround us. During dolphin and seal shows at Shedd Aquarium they create *very powerful and interesting awareness about plastic menace in Chicago, USA and world*

Chicago is indeed a beautiful city with architectural marvels. During visits to public places of interest or walking along residential areas, the signage and various trash collection points attracted my attention. For a moment it was a bit



Image. Ecotrash is a type of automatic compacting receptacle at a fast food restaurant, 'Chick fill A', downtown Chicago. The compactor is great for small incremental trash deposits. The trash door is 'motion sensed' – it pulls in the trash tray inside. Every year **each compactor saves 6960 trash bags, reducing plastic use**". A compactor can hold 300 gallons (40.1 cft) of compressed trash. On right: common kitchen trash bag with strap.

awkward for my daughter and son-in-law to see onlookers watching me take photographs of trash bins; people using the bins with utmost discipline and obedience. Later both of them cooperated and took photographs of my interest, while I was doing baby care. I produce a few photographs that will speak of social concern for trash disposal in Chicago.

Three Broad Types of Trash

- **Compost:** Green Waste Grass & Leaves (loose, not bagged) Lawn Clippings Pruning & Weeds Small Cuttings From Bushes & Shrubs Twigs & Small Branches Wood Chips.
- **Recycle:** Cardboard Detergent Boxes, Cardboard Egg Cartons, Food Boxes, Aluminum / Tin Bottles and Jars, Paper Bags, Magazines, Newspapers, Office Paper, Phone Books, Cleaning Products, Milk / Water Jugs, Soda Bottles, Plastic Bottles, etc. Aluminum products (like soda, milk and tomato cans), Plastics (grocery shopping bags, plastic bottles), Glass products (like wine and beer bottles, broken glass), Paper products (used envelopes, newspapers and magazines, cardboard boxes) can be recycled and fall into this category.
- **Landfill:** Remaining items that cannot be recycled or composted; Trash Animal Waste Disposable Diapers Food Waste Drinking Glasses Glass or Ceramic Plates Palm Fronds & Cactus Plastic Baggies Plastic Wrap Soiled Napkins & Paper Plates Foam Egg Cartons Waxed Paper Window Glass & Mirrors Plastic Grocery Bags.

Here are seven ways we can make a difference.

1. Reduce Use of Single-Use Plastics
2. Recycle Properly
3. Participate in (or Organize) a Beach or River Cleanup
4. Support Bans
5. Avoid Products Containing Microbeads
6. Spread the Word
7. Support Organizations Addressing Plastic Pollution

California Approves bill to limit Straw use in Restaurants

September 20, 2018

California in USA has become the first state to implement a partial ban on plastic straws. Dine-in restaurants will no longer be allowed to automatically provide customers with straws. Customers who need plastic straws will have to request them. Restaurants that violate the ban will receive warnings first, and repeat offenders will be fined at a maximum of \$300.

“Plastic has helped advance innovation in our society, but our infatuation with single-use convenience has led to disastrous consequences. Plastics, in all forms—straws, bottles, packaging, bags, etc.—are choking the planet,” California’s governor Jerry Brown said in a statement.

Straw-pipe history:

Year 1888; a man named Marvin Stone wrapped strips of paper around a pencil, glued them together, and soon had an early prototype of paper drinking straws. The product was patented in 1990. Gradually plastic drinking straw have come in the scene.

In just the U.S. alone, one estimate suggests 500 million straws are used every single day. One study published earlier this year estimated as many as 8.3 billion plastic straws pollute the world’s beaches. Eight million tons of plastic flow into the ocean every year, and straws comprise just 0.025 percent of that.

Based on:

<https://www.nationalgeographic.com/environment/2018/07>



Image: 1 A



Image: 1 B



Image: 2



Image. (1A,B)Shedd Aquarium, (2)Field Museum of Nat. History, (3, top)Buckingham Fountain, (4A,B; middle, bottom)Michigan Lakeside Road. **All places had trash bins placed in a clean surrounding, visible from a distance** (Photos: LAK Singh)

Dr Lala Aswini Kumar Singh, MSc, PhD

Former O-i-C, Central Crocodile Breeding
and Mgmt Trg. Inst. Govt. of India;
Retired Senior Research Officer (Wildlife)
Govt of Odisha;

Vice President (Env. & Awareness),
Orissa Environmental Society;

President- Utkal University Zoology Alumni Association

Email: laksinghindia@gmail.com

Phone: 91-9861092928 / 8763013671



Image 5: Trash bins in Indira Gandhi International Airport, New Delhi
(Photo: LAK Singh)

Elephant Conservation Campaign



Er. Prakash Chandra Jena

Patron and Joint Secretary,
Orissa Environmental Society

Field activities for the year 2017-18 towards elephant conservation has been continued in collaboration with the Save Elephant Foundation Trust. The headquarters of the Trust is at Baripada, in the district of Mayurbhanj. The district takes pride of Similipal Tiger Reserve, Similipal Biosphere Reserve, Mayurbhanj Elephant Reserve (MER), and holds nearly a third to fourth of the elephant population of Odisha. MER receives migratory elephants from adjoining states of Jharkhand (Bihar) and West Bengal. Sri Jena and the Trust have pursued several awareness programmes and participated or assisted the Odisha State Forest Department during its anti-depredation activities. A summary of the activities undertaken during 2017-18 is presented below.



Sl.	Year of Activity	2017-18
1.	Name of the districts where activities like awareness, anti-depredation and other such training programmes were conducted (Number of programmes in parentheses)	Cuttack(3), Bolangir(3), Boudh(1), Subarnapur(1), Dhenkanal(2), Nayagarh(2), Keonjhar(2), Sundargarh(3), Sambalpur(3), Jharsuguda(1), Khordha(2), Angul(3)
2.	Name of Government Departments which participated in any manner	Forest & Env. Dept.; Home Dept., Energy Dept.; Agriculture Dept., Horticulture Dept.; Revenue Dept., Railway Dept.
3.	Total number of awareness/ anti-depredation programmes	26
4.	Total number of days used for save elephant programmes during the year	36
5.	Total number of participants	7200



World Health Day 2018
Universal Health Coverage (UHC):
Everyone, Everywhere
(Discussion held on 07 April 2018)
Orissa Environmental Society

The **World Health Day** is a global health awareness day celebrated every year on 7 April, under the sponsorship of the World Health Organization (WHO).



In 1948, the WHO held the First World Health Assembly. The Assembly decided to celebrate 7 April of each year, with effect from 1950, as the World Health Day. The World Health Day is held to mark WHO's founding, and is seen as an opportunity by the organization to draw worldwide attention to a subject of major importance to global health each year. The WHO organizes international, regional and local events on the Day related to a particular theme. World Health Day is acknowledged by various governments and non-governmental organizations with interests in public health issues, who also organize activities and highlight their support in media reports, such as the Global Health Council.

World Health Day is one of eight official global health campaigns marked by the WHO, along with World Tuberculosis Day, World Immunization Week, World Malaria Day, World No Tobacco Day, World AIDS Day, World Blood Donor Day, and World Hepatitis Day.

WHO News Release on World Health Day 2018

WHO Director General, Dr Tedros Adhanom Ghebreyesu's speech at the opening ceremony of UHC Forum, Tokyo on 14 December 2017:

Excellencies, honourable ministers, distinguished guests, ladies and gentlemen, it is an honour to be here today. I would like to thank Prime Minister Shinzo Abe for his leadership and for the \$2.9 billion of support for global health he announced today.

I want to tell you about a friend of mine who was diagnosed with cancer a few years ago. He was from a high-income country. He had two options. He could have been treated, but it would have cost him most or all of the money he had saved for his family's future. Or, he could forego treatment; allow the disease to run its course and die knowing his family would have a more comfortable life, even if he wasn't there to enjoy it with them. He chose the latter. He chose death because he could not afford the treatment that could have kept him alive. **This is an outrage. No one should have to choose between death and financial hardship.**

But the shocking truth is that this is a reality for millions of people every year. New data from WHO and the World Bank show that at least half of the world's population still does not have access to essential health services, such as having a skilled birth attendant, vaccinations for children or treatment for HIV. But even when health services are available, using them can mean financial ruin. As Jim said, 100 million people are pushed into extreme poverty every year because of health spending.

Let me put that into context for you. That's 3 people every second. We are here to say that we will not accept a world like that. Universal health coverage, based on strong health systems, is the best way to ensure that people can access the health services they need, without facing financial hardship. Strong health systems are vital for improving and protecting health.

But they're also the best defense against outbreaks and epidemics. But UHC is not a dream for the future. It is a reality now. Countries at all income levels are proving that UHC is achievable and affordable, with domestic resources. But to achieve the SDG target of UHC by 2030, we need 1 billion more people to have coverage every 5 years. We need many more countries to commit both to financial protection and to expanding service coverage. It takes unwavering political commitment because it's a political choice. But the prize is a healthier, safer and fairer world for all people.

Thank you so much.

Arigato gozaimasu

India Statistics

Total population (2015)	1,300,000,000
Gross national income per capita (PPP international \$, 2013)	5
Life expectancy at birth m/f (years, 2015)	67/70
Probability of dying under five (per 1 000 live births, 0)	not available
Probability of dying between 15 and 60 years m/f (per 1 000 population, 2015)	216/142
Total expenditure on health per capita (Intl \$, 2014)	267
Total expenditure on health as % of GDP (2014)	4.7

World Health Day Themes

2018: Universal Health Coverage: Everyone, Everywhere
2017: Depression: Let's talk
2006: Working together for health 2005: Make every mother and child count
2016: Halt the rise: beat diabetes
2004: Road safety
2015: Food safety
2003: Shape the future of life: healthy environments for children
2014: Vector-borne diseases: small bite, big threat
2002: Move for health
2013: Healthy heart beat, Healthy blood pressure
2001: Mental Health: stop exclusion, dare to care
2012: Good health adds life to years
2000: Safe Blood starts with me
2011: Anti-microbial resistance: no action today, no cure tomorrow
1999: Active aging makes the difference
2010: Urbanization and health: make cities healthier
1998: Safe motherhood
2009: Save lives, Make hospitals safe in emergencies
1997: Emerging infectious diseases
2008: Protecting health from the adverse effects of climate change
1996: Healthy Cities for better life
2007: International health security
1995: Global Polio Eradication

(Base source: Wikipedia-WHO, downloaded on April 2, 2017)

World Earth Day - 2018

OES Release: 22.4.2018

Our Earth is the only planet in the Universe where life is possible till date. It is very necessary to maintain the natural assets of the earth in order to continue the life on the earth. In the rush of the crowd, the most intelligent creature of God called human is slowly losing its humanity and forgot to take care of the planet that gave it life and started using its resources very ruthlessly.

In 1969 at a UNESCO conference in San Francisco, peace activist John McConnell proposed that a day be observed to honour the Earth and start its celebration from 1970. United States Senator Gaylord Nelson first organized the day in the name 'Earth Day' on April 22, 1970. Since then the April 22 has been observed as the Earth Day. There was a tragedy of the massive oil spill in Santa Barbara, California in 1969. This tragedy led Gaylord Nelson towards enhancing the public consciousness for the air, water and soil pollution as well as implementing the environmental protection measures.



Earth Day is an annual event celebrated worldwide on April 22 in order to increase the awareness among people about the environment safety as well as to demonstrate the environmental protection measures. Earth Day is devoted to the preservation of the harmony in nature and yet draws upon the triumphs of technology, the measurement of time, and instantaneous communication through space. May there be only peaceful and cheerful Earth Days to come for our beautiful Spaceship Earth as it continues to spin and circle in frigid space with its warm and fragile cargo of animate life. Earth Day events in about 195 countries are now coordinated globally by a non-profit organisation called Earth Day Network.

World Earth Day Theme
2018: End Plastic Pollution
2017: Environmental and Climate Literacy
2016: Trees for the Earth
2015: Water Wonderful World” and “Clean Earth - Green Earth
2014: Green Cities
2013: The Face of Climate Change
2012: Mobilize the Earth
2011: Clear the Air
2010: Reduce
2009: How Do You Get Around
2008: Trees Please
2007: Be kind to the earth - starting from saving resources



World Environment Day-2018

(Date of observation: 05.06.2018)

Orissa Environmental Society highlights

World Environment Day (WED), observed on 5 June every year, is the United Nation's principal vehicle for encouraging worldwide awareness and action towards the protection of our environment. First held in 1974, it has been a flagship campaign for raising awareness on emerging environmental issues from air, water and land pollution and global warming to sustainable consumption and wildlife crime. WED has grown to become a global platform for public outreach, with participation from over 143 countries annually.

The designation of 'World Environment Day' resulted from discussions on the integration of human interactions and the environment by the UN General Assembly in 1972. Two years later, in 1974 the first WED was observed with the theme "Only One Earth". Even though WED celebrations continued to be held annually, in 1987 the idea for rotating the centre of these activities began through selecting different host countries. The global host country for WED 2018 was India. Each year, WED has a new theme to advocate environmental causes and is adopted by major corporations, NGOs, communities, governments and celebrities worldwide.

WED Celebration Year-wise and the Global Host Country

Year	Theme	Host Country
2018	Beat Plastic Pollution	India
2017	Connecting People to Nature- in the city and on the land, from the poles to the equator	Canada
2016	Zero Tolerance for the Illegal Wildlife trade	Angola
2015	Seven Billion Dreams. One Planet. Consume with Care.	Italy
2014	Raise your voice, not the sea level	Barbados
2013	Think.Eat.Save. Reduce Your Footprint	Mongolia
2012	Green Economy: Does it include you?	Brazil
2011	Forests: Nature at your Service	India
2010	Many Species. One Planet. One Future	Bangladesh
2009	Your Planet Needs You - Unite to Combat Climate Change	Mexico
2008	Kick The Habit - Towards A Low Carbon Economy	New Zealand
2007	Melting Ice - a Hot Topic?	England
2006	Deserts and Desertification - Don't Desert Drylands!	Algeria
2005	Green Cities - Plan for the Planet!	United States
2004	Wanted! Seas and Oceans - Dead or Alive?	Spain
2003	Water - Two Billion People are Dying for It!	Lebanon
2002	Give Earth a Chance	People's Republic of China
2001	Connect with the World Wide Web of Life	Italy and Cuba
2000	The Environment Millennium - Time to Act	Australia
1999	Our Earth - Our Future - Just Save It!	Japan
1998	For Life on Earth - Save Our Seas	Russian Federation
1997	For Life on Earth	Republic of Korea

1996	Our Earth, Our Habitat, Our Home	Turkey
1995	We the Peoples: United for the Global Environment	South Africa
1994	One Earth One Family	United Kingdom
1993	Poverty and the Environment – Breaking the Vicious Circle	People’s Republic of China
1992	Only One Earth, Care and Share	Brazil
1991	Climate Change. Need for Global Partnership	Sweden
1990	Children and the Environment	Mexico
1989	Global Warming; Global Warning	Belgium
1988	When People Put the Environment First, Development Will Last	Thailand
1987	Environment and Shelter: More Than A Roof	Kenya
1986	A Tree for Peace	Canada
1985	Youth: Population and the Environment	Pakistan
1984	Desertification	Bangladesh
1983	Managing and Disposing Hazardous Waste: Acid Rain and Energy	Bangladesh
1982	Ten Years After Stockholm (Renewal of Environmental Concerns)	Bangladesh
1981	Ground Water; Toxic Chemicals in Human Food Chains	Bangladesh
1980	A New Challenge for the New Decade: Development Without Destruction	Bangladesh
1979	Only One Future for Our Children – Development Without Destruction	Bangladesh
1978	Development Without Destruction	Bangladesh
1977	Ozone Layer Environmental Concern; Lands Loss and Soil Degradation	Bangladesh
1976	Water: Vital Resource for Life	Canada
1975	Human Settlements	Bangladesh
1974	Only one Earth	United States

World Environment Day 2018

Theme: Beat Plastic Pollution

“Beat Plastic Pollution”, the theme for World Environment Day 2018, is a call for action for all of us to come together to combat one of the great environmental challenges of our time. The theme invites us all to consider how we can make changes in our everyday lives to reduce the heavy burden of plastic pollution on our natural places, our wildlife – and our own health.

While plastic has many valuable uses, we have become over reliant on single-use or disposable plastic – with severe environmental consequences. This World Environment Day partners from all corners of the society and the world have joined in raising awareness and inspiring action to form the global movement needed to beat plastic pollution for good.

INDIA 2018

As hosts to this year’s World Environment Day, Indian communities large and small are leading a global change to beat plastic pollution through civic engagement and celebration. With support from an inspiring cross section of Indian society, ranging from cricket pitches to board rooms, we’re witnessing an unprecedented national commitment to this global cause, with the promise to make this the largest and most consequential World Environment Day ever.

Global Plastic Pollution by the Numbers:

- 500 billion plastic bags used each year
- 13 million tonnes of plastic leak into the ocean each year

- 17 million barrels of oil used on plastic production each year
- 1 million plastic bottles bought every minute
- 100,000 marine animals killed by plastics each year
- 100 years for plastic to degrade in the environment
- 90% of bottled water found to contain plastic particles
- 83% of tap water found to contain plastic particles
- 50% of consumer plastics are single use
- 10% of all human-generated waste is plastic

Key Messages:

To beat plastic pollution, we need to entirely rethink our approach to designing, producing and using plastic products. This World Environment Day, our goal is to inspire the kind of solutions that lead to sustainable behaviour change upstream. We'll build on the global momentum to beat plastic pollution and use World Environment Day as a turning point to inspire innovators, activists and leaders worldwide to do more than just clean up existing plastics, but also focus our action upstream. Our goal is to foster the dialogue that leads to new models for plastic production and consumption. Individuals, the private sector and policymakers all have critical roles to play.

Plastic pollution is a defining environmental challenge for our time. In the next 10-15 years global plastic production is projected to nearly double. Avoiding the worst of these outcomes demands a complete rethinking of the way we produce, use and manage plastic. Individuals are increasingly exercising their power as consumers. People are turning down plastic straws and cutlery, cleaning beaches and coastlines, and reconsidering their purchase habits in supermarket aisles. If this happens enough, retailers will quickly get the message to ask their suppliers to do better.

While these steps are a cause for celebration, the reality is that individual action alone cannot solve the problem. Even if every one of us does what we can to reduce our plastic footprint

- and of course we must - we must also address the problem at its source. Consumers must not only be actors but drivers for the behaviour change that must also happen upstream. Ultimately, our plastic problem is one of design. Our manufacturing, distribution, consumption and trade systems for plastic - indeed our global economy - need to change.

The linear model of planned obsolescence suggests that items are designed to be thrown away immediately after use, sometimes after just seconds. This must end. At the heart of this is extended producer responsibility, where manufacturers must be held to account for the entire life-cycle of their consumer products. At the same time, the companies actively embracing their social responsibility should be rewarded for moving to a more circular model of design and production, further incentivizing other companies to do the same.

Changes to consumer and business practice must be supported and in some cases driven by policy. Policymakers and governments worldwide must safeguard precious environmental resources and indeed public health by encouraging sustainable production and consumption through legislation.

To stem the rising tide of single-use plastics, we need government leadership and in some cases strong intervention.

Many countries have already taken important steps in this direction. The plastic bag ban in place in more than nearly 100 countries prove just how powerful direct government action on plastics can be.

Calls to Action:

Governments must lead, enacting strong policies that push for a more circular model of design and production of plastics. This World Environment Day, we're calling on every government to enact robust legislation to curb the production and use of unnecessary single-use plastics.

The private sector must innovate, adopting business models that reduce the downstream impact of their products. This World Environment Day, we're calling on every plastic manufacturer to take responsibility for the pollution that their products are causing today, and make immediate investments in sustainable designs for tomorrow.

Citizens must act as both consumers and informed citizens, demanding sustainable products and embracing sensible consumption habits in their own lives. This World Environment Day, we're calling on every plastic consumer to exercise their buying power by refusing single-use plastics.

World Environment Day will seek to influence change in four key areas:

Reducing Single-Use Plastics 50% of the of consumer plastics are designed to be used only once, providing a momentary convenience before being discarded. Eliminating single-use plastics, both from design chains to our consumer habits is a critical first step to beat plastic pollution.

Improving Waste Management Nearly one third of the plastics we use escape our collection systems. Once in the environment, plastics don't go away, they simply get smaller and smaller, last a century or more and increasingly find their way into our food chain. Waste management and recycling schemes are essential to a new plastics economy.

Phasing Out Microplastics Recent studies show that over 90% of bottled water and even 83% of tap water contains microplastic particles. No one is sure what that means for human health, but trace amounts are turning up in our blood, stomachs, and lungs with increasing regularity. Humans add to the problem with micro-beads from beauty products and other non-recoverable materials.

Promoting Research into Alternatives Alternative solutions to oil-based plastics are limited and difficult to scale.

This doesn't need to be the case. Further research is needed to make sustainable plastic alternatives both economically viable and widely available.

Actions and Resolutions:

This World Environment Day is a culmination of years of effort by Member States aimed at focusing the world's attention and galvanizing action around plastic pollution. UN Environment and its Member States have been developing innovative science and forging new consensus on the complex relationships between plastics, society and the environment for decades. Most recently, the third United Nations Environment Assembly adopted resolution 3/7, which:

1. Stresses the importance of long-term elimination of discharge of litter and microplastics to the oceans and of avoiding detriment to marine ecosystems and the human activities dependent on them from marine litter and microplastics.
2. Urges all actors to step up actions to; "by 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution".
3. Encourages all member States, based on best available knowledge of sources and levels of marine litter and microplastics in the environment, to prioritize policies and measures at the appropriate scale to avoid marine litter and microplastics from entering the marine environment.

For more information about World Environment Day and Plastic Pollution, visit: www.worldenvironmentday.global

Further Reading:

2018 Ministerial declaration of the United Nations Environment Assembly at its third session: Towards a pollution-free planet

<https://papersmart.unon.org/resolution/uploads/k1800398.english.pdf>

2018 UNEA Resolution 3/7: Marine litter and microplastics

<https://papersmart.unon.org/resolution/uploads/k1800210.english.pdf>

2017 Pollution Report of the Executive Director

<https://papersmart.unon.org/resolution/uploads/k1708347e.pdf>

2017 General Assembly Resolution 71/312: Our ocean, our future: call for action

http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/71/312

2017 Assessment Combating Marine Plastic Litter and Microplastics: An Assessment of the Effectiveness of Relevant International, Regional and Sub-Regional Governance Strategies and Approaches

https://papersmart.unon.org/resolution/uploads/unea-3_mpl_assessment-2017oct05_unedited_adjusted.pdf

2016 UNEA Resolution 2/11: Marine plastic litter and microplastics

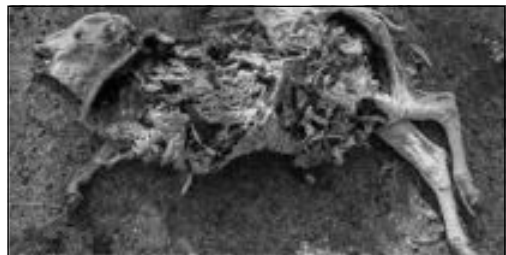
<https://documents-dds-ny.un.org/doc/UNDOC/GEN/K16/072/28/pdf/K1607228.pdf?OpenElement>

2016 Report: Marine Plastic Debris & Microplastics: Global Lessons and Research to Inspire Action and Guide Policy Change

<https://wedocs.unep.org/rest/bitstreams/11700/retrieve>

Plastic Pollution facts:

Each year, at least 8 million tonnes of plastic end up in the oceans, the equivalent of a full garbage truck every minute. In the **last decade**, we produced more plastic than in the whole **last century**.



We buy 1 million plastic bottles **every minute**

K. C. Sahu

Powai, Mumbai

Celebration of Environment Day 2018 –A protection to the “*Punyakoty*”





ବିଶ୍ୱ ଉତ୍ପାଦକରଣ ଓ ଆମ ଭବିଷ୍ୟତ

ଅମୂଲ୍ୟ କୁମାର ପଣ୍ଡା

ଇଂରେଜ ସଂସ୍କୃତୀୟ ବାଣିଜ୍ୟିକ ତଥା ଆଧୁନିକ ପରାମର୍ଶଦାତାଙ୍କ ବିଶ୍ୱାସନୀୟ ନିକଳ ଭାବେ ପରିଗଣିତ ପ୍ରାନ୍ତସିଂହ ବେକନ (୧୫୬୧-୧୬୨୬) ଏକ ଭିନ୍ନ ରୂପର ସ୍ୱପ୍ନ ଦେଖିଥିଲେ। ତାଙ୍କ ସ୍ୱପ୍ନ ଅନୁଯାୟୀ ସେ ଶପଥ ମଧ୍ୟ ନେଇଥିଲେ ଯେ କେତେକଣ ଭାଗ୍ୟବାନ, ଅତିମାନବୀୟ ବୀରପୁଞ୍ଜବଙ୍କୁ ନେଇ ନିଜେ ଏକ ଗୋଷ୍ଠୀ ଗଠିବେ ଏବଂ ଏହି ଗୋଷ୍ଠୀ ପ୍ରକୃତି ଓ ମଣିଷ ସମାଜ ଉପରେ ଆଧିପତ୍ୟ ବିସ୍ତାର କରିବ। ଏହି ପରିପ୍ରେକ୍ଷାରେ ସେ ପ୍ରାୟ ୪୦୦ ବର୍ଷ ପୂର୍ବେ କହିଥିଲେ, 'ପୃଥିବୀର ସୃଷ୍ଟି ମଣିଷ ପାଇଁ, ମଣିଷର ସୃଷ୍ଟି ପୃଥିବୀ ପାଇଁ ନୁହେଁ'। ତାଙ୍କର ଏହି ଭାବି ପ୍ରକୃତି ବିରୋଧରେ 'ସୁଖ' ଦେହ' ଖଜରା ଦେବା ପାଇଁ ମଣିଷ ଜାତିକୁ ପ୍ରୋତ୍ସାହିତ କରିଛି ବୋଲି ମନେହୁଏ। ବେକନଙ୍କ ପରବର୍ତ୍ତୀ ସମୟର ଶିଳ୍ପ ବିପ୍ଳବ ଏବଂ ଆଧିନୀତିକ ବିକାଶ ତଥା ଉନ୍ନତନର ଧାରାରୁ ସ୍ପଷ୍ଟ ହେଉଛି ଯେ ମଣିଷ ନିଜକୁ ପ୍ରକୃତିର ପ୍ରତିଦ୍ୱନ୍ଦ୍ୱୀ ଭାବେ ଦେଖିବାକୁ ପସନ୍ଦ କରୁଛି। ସୁତରାଂ ସେ ପ୍ରକୃତି ସହ ରାତିମତ ଯୁଦ୍ଧ କରୁଛି, ତାକୁ ପରାଜିତ କରି ତାର ଅନୁଗତ୍ୟ ହାସଲ କରିବାକୁ ପ୍ରୟାସ କରୁଛି। କିନ୍ତୁ ପ୍ରକୃତି ନିଜକୁ ମଣିଷ ପାଖରେ ସମର୍ପଣ କରୁନାହିଁ, ବରଂ ପ୍ରତିଆକ୍ରମଣ କରି ପ୍ରକୃତି ତାକୁ କ୍ଷତାକ୍ତ କରିଦେଉଛି; ବାସ୍ତବରେ ମଣିଷ ହିଁ ପରାଜିତ ହୋଇ ବ୍ୟସ୍ତବିବୃତ ହେଉଛି। ପ୍ରଶ୍ନ ଉଠେ ପ୍ରକୃତି ମାତା ତାର ତଥାକଥିତ ସର୍ବଶ୍ରେଷ୍ଠ ଅଧିକ ଅବଧ୍ୟା ସଜ୍ଜନ ପ୍ରତି ପରାହଂସ ହୋଇଯାଉନି ତ! ତେବେ, ଏବର ବିଶ୍ୱତାପନ ଏବଂ ଜଳବାୟୁ ପରିବର୍ତ୍ତନର ବିଷମୟ ପ୍ରଭାବକୁ ଦେଖିଲେ, ତାହା ହିଁ ମନ ହେଉଛି। ଏହାକୁ ପ୍ରକୃତିର 'ପ୍ରତିଶୋଧ' ବୋଲି ଅଭିହିତ କଲେ ଭୁଲ ହେବନାହିଁ। ପୂର୍ବା ପ୍ରାନ୍ତମୂଳେ ପୃଥିବୀ ଅତି ଉତ୍ପାଦ ଅବସ୍ଥାରେ ଥିଲା। ଧୀରେଧୀରେ ଏହାର ତାପମାତ୍ରା କମିଲା ଏବଂ ସମୟକ୍ରମେ ପୃଥିବୀ ପୃଷ୍ଠରେ ଅନ୍ୟ ସମସ୍ତ ଅନୁକୂଳ ପରିସ୍ଥିତି ସହ ଜୀବନକୁ ସୁଧାଇଲା ଭଳି ତାପମାତ୍ରା ମଧ୍ୟ ଉପଲବ୍ଧ ହେଲା। ପୃଥିବୀର ୪୫୦ କୋଟି

ବର୍ଷର ସୁବୀର୍ଯ୍ୟ ଇତିହାସରେ ଭିନ୍ନ ଭିନ୍ନ ସମୟରେ ଏହାର ବାତାବରଣ ହୁଏତ ଅତି ଗଷ୍ଟ ଥିଲା ବା ଅତି ଶୀତଳ ଥିଲା। ଏହାକୁ ଯଥାକ୍ରମେ ଗଷ୍ଟ ଯୁଗ ଓ ହିମ ଯୁଗ କୁହାଯାଏ। ପ୍ରକୃତିର ସୌଜନ୍ୟରୁ ଧରାପୃଷ୍ଠରେ ନିୟମିତ ବ୍ୟବଧାନରେ ଗଷ୍ଟ ଯୁଗ ଓ ହିମ ଯୁଗ ପ୍ରଚଳିତ ହୋଇଆସୁଛି। ବହୁ ବିଶାଳତ ଗଣନା କରି ମତ ଦିଆଯି ଯେ ଏବେ ଆମ ବିଶ୍ୱ ଅପେକ୍ଷାକୃତ ଶୀତଳ ରହିବା କଥା। ସୁତରାଂ ଏବେ ଦେଖାଯାଇଥିବା ବିଶ୍ୱ ତାପମାତ୍ରା ବୃଦ୍ଧି ଅତ୍ୟନ୍ତ ଅସ୍ୱାଭାବିକ ଓ ଅପ୍ରାକୃତିକ। ଏଥିପାଇଁ ପ୍ରାକୃତିକ କାରଣ ନୁହେଁ ବରଂ ମନୁଷ୍ୟକୃତ କାରଣ ହିଁ ଦାୟୀ। ଗୁରୁତ୍ୱର ବିଷୟ, ବିଶ୍ୱ ପରିବେଶରେ ବିଗତ କିଛି ବର୍ଷ ଭିତରେ ଦେଖାଯାଇଥିବା ପରିବର୍ତ୍ତନ ଭିତରୁ ବିଶ୍ୱର ହାରାହାରି ତାପମାତ୍ରାରେ ବୃଦ୍ଧି ବା ବିଶ୍ୱ ଉତ୍ପାଦକରଣକୁ ସବୁଠାରୁ ଅଧିକ ଗୁରୁତ୍ୱପୂର୍ଣ୍ଣ ବୋଲି ଧରାଯାଉଛି। ଅଙ୍ଗାରକାମ୍ଳ ଓ ମିଥେନ୍ ଆଦି ପ୍ରାକୃତିକ ସବୁଜ କୋଠରି ଗ୍ୟାସ୍ ଏବଂ କ୍ଲୋରୋଫ୍ଲୋରୋକାର୍ବନ୍ସ ଆଦି ମଣିଷକୃତ ସବୁଜ କୋଠରି ଗ୍ୟାସ୍‌ର ପରିମାଣରେ ବୃଦ୍ଧି ହେଉଛି ବିଶ୍ୱତାପନର କାରଣ। ସବୁଜ କୋଠରି ଗ୍ୟାସ୍‌ର ପ୍ରଭାବ କିଛି ନୁଆ କଥା ନୁହେଁ। ଆମ ପୃଥିବୀକୁ ଉତ୍ତପିତ ଉତ୍ତୁତା ଯୋଗାଇ ଏହାକୁ ଜୀବନ-ଅନୁକୂଳ କରି ରଖିବାରେ ଅଙ୍ଗାରକାମ୍ଳ ଆଦିର ଅବତାର ରହିଛି। ଏହି ପ୍ରାକୃତିକ ବ୍ୟବସ୍ଥା ନ ଥିଲେ ଆମ ପୃଥିବୀ ଏକ ଅତି ଶୀତଳ, ବିଶାଳ ଓ ନିର୍ଜୀବ ତଥା ନିଷ୍ପ୍ରାୟ ପିଣ୍ଡିଏ ପରି ପଡ଼ିହୋଇଥାନ୍ତା। ତେବେ ଉନ୍ନତବଗର କାରଣ ହେଉଛି ମଣିଷର ଉନ୍ନତନମୂଳକ କାର୍ଯ୍ୟ ଯୋଗୁଁ ସବୁଜ କୋଠରି ଗ୍ୟାସ୍‌ର ପରିମାଣରେ ଅହେତୁକ ବୃଦ୍ଧି ଘଟୁଛି, ଯାହା ବନ୍ଧୁଷ୍ଟ ବିଶ୍ୱତାପନର କାରଣ ହୋଇପଡ଼ିଛି। ବିଶ୍ୱ ଜଳବାୟୁରେ ପରିବର୍ତ୍ତନ, ସମୁଦ୍ର ପତନରେ ବୃଦ୍ଧି, ବିଭିନ୍ନ ପ୍ରାକୃତିକ ଦୁର୍ଘଟାଳ ଆଦି ସମସ୍ୟା ପଛରେ ରହିଛି ଏହି ବିଶ୍ୱ ଉତ୍ପାଦକରଣ ପ୍ରଭାବ। ଯୁଗାଭିତ୍ତୁ ଆରବ ଏମିରେଟ୍ସ ବା

ସଂଯୁକ୍ତ ଆରବ ରାଷ୍ଟ୍ରରେ ବୁଝାଉପାତ; ସାଉଦି ଆରବରେ ମୁସ୍ଲିମ ଧାରାରେ ବର୍ଷା; ଯୁରୋପରେ ଗ୍ରୀଷ୍ମ ପ୍ରବାହ; ଯୁକ୍ତରାଷ୍ଟ୍ର ଆମେରିକାରେ ପ୍ରଲମ୍ବିତ ଗ୍ରୀଷ୍ମ; ମୁମ୍ବାଇରେ ଅବିରାମ, ପ୍ରବଳ ଓ ଅଚିନ ବର୍ଷା ଏବଂ ଚକ୍ଚକିତ ବନ୍ୟା; ଏ ବର୍ଷ କେରଳରେ ହୋଇଥିବା ଅଭୂତପୂର୍ବ ବର୍ଷା ଓ ବନ୍ୟା ବିପ୍ଳବ; ସାଇବେରିଆ, ଡିକଟ, ନେପାଳ, ଆଫଗାନିସ୍ତାନ, ଭୁଟାନ ଓ ଭାରତରେ ଶୀତଋତୁରେ ଅତ୍ୟଧିକ ତାପମାତ୍ରା ଓ ବରଫ ଡଳିବା ଦ୍ୱାରା ହିମସ୍ତୋତର ଆୟତନ ହ୍ରାସ ପୁଥିବାର ବିଭିନ୍ନ ଅଞ୍ଚଳରେ ଥିବା 'ସମୁଦ୍ର ବୃଷ୍ଟିବନ' ଭାବେ ପରିଚିତ ସକ୍ରିୟ, ପ୍ରାଣବତ୍ତ ପ୍ରବାଳ ଦ୍ୱୀପର ଅବକ୍ଷୟ ଆଦି ଉଦ୍‌ବିଗ୍ନକୁ ବିଶ୍ୱ ଉତ୍ପାଦନଶକ୍ତିନିତ ଜଳବାୟୁ ପରିବର୍ତ୍ତନ କେତେକ ଅଗ୍ରାନ୍ତ ଉଦାହରଣ ଭାବେ ଗ୍ରହଣ କରାଯାଇଛି। ସେହିପରି ଆମ ରାଜ୍ୟରେ ୧୯୯୮ ମସିହାରେ ହୋଇଥିବା ଅଭୂତପୂର୍ବ ଗ୍ରୀଷ୍ମ ପ୍ରବାହ, ଯେଉଁଥିରେ ୨୦୦୦ରୁ ଅଧିକ ଲୋକଙ୍କର ମୃତ୍ୟୁ ଘଟିଥିଲା, ତାର ଏକ ଦୃଷ୍ଟାନ୍ତ। ୨୦୧୫ରେ ମଧ୍ୟ ଆମ ଦେଶରେ ଗ୍ରୀଷ୍ମ ପ୍ରବାହ ଯୋଗୁଁ ୨୫୦୦ରୁ ଅଧିକ ବ୍ୟକ୍ତି ପ୍ରାଣ ହରାଇଥିଲେ। ଆମ ରାଜ୍ୟରେ ୧୯୯୯ ମସିହାର ମହାବାତ୍ୟା ଏବଂ ତା' ପରେ ବିଭିନ୍ନ ସମୟରେ ଆମର ପୂର୍ବ ଉପକୂଳକୁ ଆକ୍ରାନ୍ତ କରିଥିବା ବିଭିନ୍ନ ବାତ୍ୟା, ମହାବାତ୍ୟା, ବନ୍ୟା ଓ ସୁଲମି ଆଦି ଏହାର ଉଦାହରଣ।

ଏହି ପୃଷ୍ଠଭୂମିରେ ୮ ଅକ୍ଟୋବର ୨୦୧୮ରେ କାଚିଫ୍‌ସର ଆକ୍ଷୟରକାରୀ ଜଳବାୟୁ ପରିବର୍ତ୍ତନ ଦିଶାଉଦ ଗୋଷ୍ଠୀ (ଇଣ୍ଡର-ଗଭର୍ଣ୍ଣମେଣ୍ଟ ଫ୍ୟାଲେଉ ଅନ୍ କ୍ଲାଇମେଟ୍ ରେଷ୍-ଆଇପିସିସି) ଚରଫରୁ ଉଦ୍‌ଘୋଷିତ ବିଶେଷ ସମାକ୍ଷା ରିପୋର୍ଟ ବେଶ ଗୁରୁତ୍ୱ ବହନ କରେ। ୧୯୮୮ରେ ପ୍ରତିଷ୍ଠିତ ଏହି ଫ୍ୟାଲେଉର ଦାୟିତ୍ୱ ହେଉଛି ଜଳବାୟୁ ପରିବର୍ତ୍ତନ ଉପରେ ବିଶ୍ୱକୁ ଏକ ବସ୍ତୁନିଷ୍ଠ ତଥା ବିଜ୍ଞାନଭିତ୍ତିକ ରିପୋର୍ଟ ଦେବା। ଅପୂର୍ବ ସଂଯୋଗର ବିଷୟ ଯେ ଠିକ୍ ସେହିପରି ହିଁ ସୁରୁତ୍ୱପ୍ରଦ ଏକାଡେମୀ ଅଫ୍ ସାଇନ୍ସସର ଚରଫରୁ ଅଧିକାଂଶରେ ନୋବେଲ ପୁରସ୍କାର(୨୦୧୮) ପାଇଁ ମନୋନୀତ ହୋଇଥିବା ଉଇଲିୟମ ନର୍ଚ୍ସିହାଉସ ଓ ପ'ଲ ରୋମର ପରିବେଶ ବିଜ୍ଞାନ, ସବୁଜ ଅଭିବୃଦ୍ଧି ଏବଂ ଅଧିକାଂଶ ଭିତରେ ଥିବା ସଂପର୍କ ଉପରେ ଗବେଷଣାତ୍ମକ କାର୍ଯ୍ୟ କରିଛନ୍ତି। ପ୍ରଫେସର ନର୍ଚ୍ସିହାଉସ ସବୁଜ କୋଠିର ଗ୍ୟାସ୍ ନିର୍ଗମନ ହ୍ରାସ ନିମନ୍ତେ ଅଙ୍ଗୀକାର ଚିକିତ୍ସା ପ୍ରବର୍ତ୍ତନ କରିବା ବିଷୟ ପ୍ରଥମେ କହିଥିଲେ। ବିଶ୍ୱ ଉତ୍ପାଦନଶକ୍ତି ଗୋଟିଏକୁ ହେଲେ ଉତ୍ତର୍ଜନ ହ୍ରାସ ଅପରିହାର୍ଯ୍ୟ। ସେ ବୃଷ୍ଟିରୁ ଉତ୍ତର୍ଜନ ହ୍ରାସ ପୂର୍ବକ

ବିଶ୍ୱତାପନ ନିୟନ୍ତ୍ରଣ ନିମନ୍ତେ ୨୦୧୫ ପ୍ୟାରିସ ଜଳବାୟୁ ସମ୍ମିଳନୀର ରାଜିନାମା ଏ କ୍ଷେତ୍ରରେ ଏକ ମାଇଲ ଖୁଣ୍ଟ ଭାବେ ବିବେଚିତ। ପ୍ୟାରିସ ରାଜିନାମା ଅନୁଯାୟୀ ତାପମାତ୍ରା ବୃଦ୍ଧିକୁ ୨.୦୦ ସେଲସିୟସ୍, ଏପରିକି ୧.୫୦ ସେଲସିୟସ୍ ଭିତରେ ସୀମିତ ରଖିବା ପାଇଁ ସ୍ଥିର କରାଯାଇଥିଲା। ବିଶ୍ୱ ଉତ୍ତାପ ବଢ଼ିଲେ ଏହାର ପ୍ରଭାବ କ'ଣ ହେବ ତା' ଉପରେ ୨୦୧୮ ମସିହାରେ ଏକ ରିପୋର୍ଟ ଦେବା ପାଇଁ ଆଇପିସିସିକୁ ପ୍ୟାରିସ ଜଳବାୟୁ ସମ୍ମିଳନୀ ଚରଫରୁ ଅନୁରୋଧ କରାଯାଇଥିଲା। ପୂର୍ବରୁ ୨୦୧୪ ମସିହାରେ ଆଇପିସିସିର ପଞ୍ଚମ ଆକଳନ ରିପୋର୍ଟ ପ୍ରକାଶ ପାଇଥିଲା।

ଆଇପିସିସିର ଏହି ଅକଳନ ଅନୁଯାୟୀ ଏବର ସବୁଜ କୋଠିର ଉତ୍ତର୍ଜନ ପରିମାଣ ବିଗତ ୮,୦୦,୦୦୦ ବର୍ଷ ମଧ୍ୟରେ ସର୍ବାଧିକ। ବର୍ଷିଷ୍ଟ ଉତ୍ତର୍ଜନ ସହ ତାଳ ବେଲ ବିଶ୍ୱର ତାପମାତ୍ରା ଅଧିକ ତୀବ୍ର ହେଉଛି ଏବଂ ଜଳବାୟୁରେ ଅବଚ୍ଛିତ ପରିବର୍ତ୍ତନମାନ ଦେଖାଦେଉଛି। ତିନି ଦଶନ୍ଧିର ବିଶ୍ୱତାପନ ତୁଳନା କଲେ ଜଣାଯାଏ ଯେ ପ୍ରତ୍ୟେକ ଦଶନ୍ଧିର ତାପମାତ୍ରା ବୃଦ୍ଧି ତା'ର ପୂର୍ବ ଦଶନ୍ଧି ତାରୁ ଅଧିକ ତୀବ୍ର ଥିଲା। ସେହିପରି ସମୁଦ୍ରପତନ କ୍ରମାଗତ ଭାବେ ବଢ଼ିବା ସହ ଗ୍ରୀଷ୍ମ ପ୍ରବାହ ମଧ୍ୟ ଅଧିକରୁ ଅଧିକ ତୀବ୍ର ହେଉଛି। ବାରମ୍ବାର ଭୀଷଣ ବୃଷ୍ଟିପାତର ଆଶଙ୍କା ବଢ଼ୁଛି। ଏ ସବୁ ପାଇଁ ମଣିଷ ହିଁ ଦାୟୀ। ମଣିଷର କାର୍ଯ୍ୟକଳାପ ଏହି ଧାରାରେ ଭଲିଲେ ୨୦୯୯ ମସିହା ସୁଦ୍ଧା ବିଶ୍ୱ ତାପମାତ୍ରା ୩.୭୦ ସେ. ରୁ ୪.୮୦ ସେ.କୁ ବଢ଼ିଯାଇପାରେ। ଏହି ରିପୋର୍ଟରେ ଆହୁରି ବର୍ଣ୍ଣାଯାଇଛି ଯେ ସମୁଦ୍ର ଜଳର ତାପମାତ୍ରା ମଧ୍ୟ ବଢ଼ୁଛି ଯାହା ଫଳରେ ଏହା ଅଧିକ ପ୍ରସାରିତ ହେଉଛି। ଏହା ସମୁଦ୍ର ପତନ ବୃଦ୍ଧିର ଅନ୍ୟତମ କାରଣ। ଏଥିଯୋଗୁଁ ଝଟୋଟୋଫାନ ଓ ବାତ୍ୟାର ସଂଖ୍ୟା ବଢ଼ୁଛି ଏବଂ ଏସବୁ ଅଧିକ ତୀବ୍ର ହେଉଛି। ଜଳବାୟୁ ପରିବର୍ତ୍ତନ ଜୀବ ଜୀବନର ସବୁ ଦିଗକୁ ପ୍ରଭାବିତ କରୁଛି। ତା ଛଡ଼ା ମଣିଷ ତୁଳନାରେ ଅନ୍ୟ ପ୍ରାଣୀ ଏବଂ ଉଦ୍ଭିଦ ଅଧିକ ପ୍ରଭାବିତ ହେଉଛନ୍ତି। ବିଶ୍ୱ ତାପମାତ୍ରା ଅନିୟନ୍ତ୍ରିତ ଭାବେ ବଢ଼ିଲେ ବହୁ ଉଦ୍ଭିଦ ଓ ପ୍ରାଣୀ ବିଲୁପ୍ତ ହୋଇଯିବାର ଆଶଙ୍କା ରହିଛି। ବିଶ୍ୱତାପନକୁ ରୋକିବା ପାଇଁ ମୁଖ୍ୟତଃ ଜୀବଶୁ ଉତ୍ତରର ଦ୍ୟବହାରକୁ ପର୍ଯ୍ୟାୟ କ୍ରମେ କମ କରି ୨୧୦୦ ମସିହା ସୁଦ୍ଧା ଏହାକୁ ସଂପୂର୍ଣ୍ଣ ବନ୍ଦ କରିବା ଆବଶ୍ୟକ। ତା ସହ ୨୦୫୦ ମସିହା ସୁଦ୍ଧା ଧାରଣାକ୍ଷମ ଅଙ୍ଗୀକାରକରଣ ଶକ୍ତି ଗଣ୍ଠ (ଯଥା, ସୌର ଶକ୍ତି ଆଦି) ଉପରେ ଅଧିକ ନିର୍ଭର କରିବା ଅପରିହାର୍ଯ୍ୟ ହୋଇପଡ଼ିଛି। ଏହା ଦ୍ୱାରା ୨୧୦୦ ମସିହା ବେଳକୁ 'ଶୂନ୍ୟ ଉତ୍ତର୍ଜନ' ଲକ୍ଷ୍ୟ ହାସଲ କରିହେବ।

ଆଇପିସିସିର ସଦ୍ୟ ପ୍ରକାଶିତ ସମୀକ୍ଷା ଅନୁଯାୟୀ ଚାପମାତ୍ରାରେ ୧.୫୦ ସେ. ଦୃଢ଼ି ଘଟିଲେ ଏହାର ବିଷମତ୍ତ ପ୍ରଭାବ ସାରା ବିଶ୍ୱ ଉପରେ ବିଶେଷତଃ ଭାରତ, ଚୀନ ଓ ପାକିସ୍ତାନ ଉପରେ ପଡ଼ିବ। ଏଥିରେ ବେତାବତୀ ଦିଆଯାଇଛି ଯେ ଯଦି ସାଂପ୍ରତିକ ହାରରେ ସବୁଜ କୋଠରି ଗ୍ୟାସ ଉତ୍ପାଦନ ଚାଲେ, ତା' ହେଲେ ୨୦୩୦ରୁ ୨୦୫୨ ଭିତରେ ହିଁ ଆମେ ଏହି ୧.୫୦ ସେ. ସୀମା ଅତିକ୍ରମ କରିଯିବା। ତେବେ ଏହି ଚାପମାତ୍ରା ଦୃଢ଼ିକୁ ସୀମିତ ରଖିବାକୁ ହେଲେ ୨୦୩୦ ମସିହା ପୂର୍ବରୁ ଅଙ୍ଗାରକାମ୍ଳ ଉତ୍ପାଦନକୁ ୨୦୦୦ ମସିହା ପୂର୍ବରୁ ତୁଳନାରେ ୪୫% କମାଇବାକୁ ହେବ ଏବଂ ୨୦୫୦ ମସିହା ବେଳକୁ ଉତ୍ପାଦନକୁ ପୂରା କମାଇଦେଇ ଶୂନ୍ୟ ପ୍ରଭାବ ଆଣିବାକୁ ପଡ଼ିବ। ଏପର୍ଯ୍ୟନ୍ତ ଚାପମାତ୍ରା ଦୃଢ଼ିର ଧାରାକୁ ଦେଖିଲେ ଏହା ସହଜ ମନେ ହେଉନାହିଁ। କାରଣ ଏହି ହାର କ୍ରମଶଃ ଅଧିକ ହେଉଛି। ୧୯୦୬ରୁ ୨୦୦୫ ମସିହା ଭିତରେ ଚାପମାତ୍ରା ୦.୬୪୦ ସେ. ବଢ଼ିଥିଲା। ଏହି ୧୦୦ ବର୍ଷ ଭିତରେ ପ୍ରତି ଦଶ ବର୍ଷରେ ଚାପମାତ୍ରା ଯେଉଁ ହାରରେ ବଢ଼ିଥିଲା, ୧୯୫୬ରୁ ୨୦୦୫ - ଏହି ୫୦ ବର୍ଷ ଭିତରେ ଏହି ହାର ଦ୍ୱିଗୁଣିତ ହୋଇଯାଇଛି।

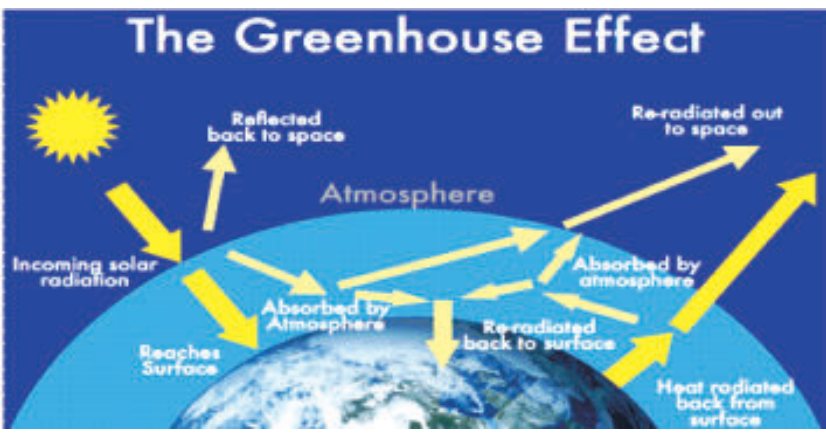
ଏହି ସମୀକ୍ଷାରେ ଆହୁରି ଦର୍ଶାଯାଇଛି ଯେ ଗତ ୧୫୦ ବର୍ଷ ଭିତରେ ବେନୁଇ, ମୁମ୍ବାଇ, ଦିଲ୍ଲୀ ଓ କଲିକତାର ହାରାହାରି ଚାପମାତ୍ରା ସାଧାରଣତଃ ୦.୬୦ ସେ., ୦.୬୦ ସେ., ୧.୦୦ ସେ. ଓ ୧.୨୦ ସେ. ବଢ଼ିଛି। ଚାପମାତ୍ରାର ବର୍ଦ୍ଧିଷ୍ଣୁ ଧାରା ଜାରି ରହିଲେ ଏହାର ଉତ୍ପାଦନ ପ୍ରଭାବ ଭାରତ ଉପରେ ଅଧିକ ପଡ଼ିବ ବୋଲି ସତର୍କବାଣୀ ଶୁଣାଇ ଦିଆଯାଇଛି। ଦେଶରେ ଅତି ତୀବ୍ର ଗ୍ରୀଷ୍ମପ୍ରବାହ ଦେଖା ଦେବାର ଆଶଙ୍କା ରହିଛି, ଯାହା ଧନକାରକ ହାରି ଘଟାଇବ। ବିଶେଷତଃ ଗରିବ ଲୋକେ ଅତି ମାତ୍ରାରେ କ୍ଷତିଗ୍ରସ୍ତ ହେବେ।

ଆସନ୍ତା ଭିସେମ୍ବର ମାସରେ ପୋଲାଣ୍ଡର କାଟୋଭିସ୍ତାଠାରେ ଜାତିସଂଘର ପରବର୍ତ୍ତୀ ଜଳବାୟୁ ସମ୍ମିଳନୀ ଅନୁଷ୍ଠିତ ହେବାକୁ ଯାଉଛି। ଏଥିରେ ଉପରୋକ୍ତ ସମୀକ୍ଷା ରିପୋର୍ଟ ଉପରେ ବିଶେଷ ଆଲୋଚନା ହେବ। ତେବେ ପ୍ରତ୍ୟେକ ବ୍ୟକ୍ତି, ଗାୟ, ବେଶ ଓ ସମଗ୍ର ବିଶ୍ୱସ୍ତରରେ ବିଶ୍ୱ ଚାପମାତ୍ରାକୁ ରୋକିବା ଅପରିହାର୍ଯ୍ୟ। ନବେତ ମଣିଷ ସମେତ ସମଗ୍ର ଜୀବମଣ୍ଡଳ ପାଇଁ ବିପଦ ମାଡ଼ିଆସିବ।

୭୩, କୋଅପରେଟିଭ କଲୋନି, ଭୁବନେଶ୍ୱର
ମୋ - ୮୨୮୦୨୩୯୯୫୭

Reproduced from : Sambad 18.10.2018

(Prof. Amulya Kumar Panda, Former Principal, Ravenshaw College Cuttack is a senior academician of Odisha, and Patron of Orissa Environmental Society)



July 5, 2018; Univ of New South Wales; Future global warming may eventually be twice as warm as projected by climate models... (<https://www.sciencedaily.com>)

3. Prasanna Kumar Dash Memorial Lecture

- 2017 Sri Saroj Kumar Pattnaik, Former Addl PCCF (Wildlife) and Chief Wildlife Warden, Odisha: 'Wildlife Scenario in Odisha'
- 2016 Er. Nanda Kumar Mohapatra, Former Chief Engineer-Irrigation, Government of Odisha
- 2015 Shri Priyanath Padhi, Former Principal Chief Conservator of Forests, Odisha
- 2014 Prof. (Dr) Omkar Nath Mohanty, Director, Technology and Academic Initiative, RSB Metaltech, RSB Group
- 2013 Dr Trilochan Mohapatra, Director, Central Rice Research Institute, Cuttack
- 2012 Dr Bijay Ketan Patnaik, Former Principal Chief Conservator of Forests and Chief Wildlife Warden, UP

4. Awards Instituted by OES

(A.) Lifetime Achievement Award

- 2017 Dr Udaya Narayan Dev, Ornithologist, Odisha
- 2016 Prof. Lalit Narayan Patnaik, Former Chairman, State Pollution Control Board, Odisha
- 2015 Prof. Satyananda Acharya, Former Vice Chancellor, Utkal University
- 2014 Prof. Rebati Charan Das, Former Vice Chancellor, Berhampur University
- 2013 Dr Chitta Ranjan Mohapatra, Former Principal Chief Conservator of Forests (WL) and Chief Wildlife Warden, Odisha
- 2012 Prof. Madhab Chandra Dash, Former Vice-Chancellor, Sambalpur University

(B.) Environmentalist of the Year Award

(Smt. Parbati Mishra Memorial Award)- presented on World Environment Day

- 2018 Mr. Sudarshan Das, Environmental Activist
- 2017 Prof. Gopala Krushna Panda, Former Professor of Geography, Utkal University
- 2016 Dr Sudhakar Kar, Former Sr. Research Officer, Forest Dept (Wildlife Wing), Govt. of Odisha
- 2015 Dr Lala Aswini Kumar Singh, Former Sr. Research Officer, Forest Department (Wildlife Wing), Govt. of Odisha
- 2014 Dr Chandra Sekhar Kar, Former Sr. Research Officer, Forest Department (Wildlife Wing), Govt. of Odisha. (Posthumous award)
- 2013 Dr Bibhudhendra Pratap Das, President, Odisha Krushak Maha Sangha
- 2012 Dr Sudarsan Sasmal, Former Principal Scientist, Central Rice Res. Inst., Cuttack
- 2011 Mr. Prafulla Kumar Dhal, Director, Biswa Research and Innovation Centre
- 2010 Mr. Biswajit Mohanty, Wildlife Society of Orissa

(C.) Dr. B.C.Panda Award

Environment and Science Communication Award

- 2017 Dr. Ramesh Chandra Parida, Former Professor of Chemistry, OUAT
- 2016 Dr Jayakrushna Panigrahi, Past Convener, ISCA Bhubaneswar Chapter
- 2015 Dr Chitta Ranjan Mishra, Former GGM, NALCO
- 2015 Dr Bijay Ketan Patnaik, Former PCCF (Wildlife), Odisha

5. Felicitations to Senior Life Members

On the occasion of the 37th Foundation Day celebrated on 04 November 2018 Orissa Environmental Society felicitates the following Senior Life Members in appreciation of their persistent support to the society's progress.

1. **Dr. Seba Mohapatra**
Former Director, Health Services, Government of Odisha
2. **Mr. Bhagirathi Behera**
Former Director, Environment, Government of Odisha
3. **Prof. Sadasiba Biswal**
Former Reader of Physics and Principal
4. **Er. K. Gandhi Choudhury**
Former Supt. Engineer(Elec.)
5. **Mr. Jagabandhu Sarangi**
Former Director of Handicraft and Cottage Industries

On the occasion of the 36th Foundation Day on 29th October 2017 Orissa Environmental Society felicitated the following Senior Life Members in appreciation of their persistent support to the society's progress.

1. **(Er.) Sri Somanath Mishra**, Former Secretary (Works), Govt. of Odisha
2. **Sri S. N. Bohidar**, IFS (Retd.)
3. **Dr Rabindra Nath Padhi**, Dy.DG (Retd.), GSI
4. **Sri Ramesh Chandra Pani**, Former Chairman & MD, Central PSU
5. **Sri Sarat Chandro Patnaik**,
Former District Panchayat Officer

6. 'FELLOWS' of OES (2018)

The following Life Members of Orissa Environmental Society are nominated as Fellow in appreciation of their outstanding contribution and persistent support to the field of Environment and Natural Resources Management, and the certificate of Honour as Fellow are presented on the occasion of the Foundation Day of the Society observed on 04 November 2018

01. Prof. B Sitaram Patro

Former Dean, CET,
Biju Patnaik University of Technology

02. Prof. Sailabala Padhi

Former Professor of Botany
Berhampur University

03. Dr. Budurddin Mohammad Faruque

Former Director,
Geological Survey of India

04. Dr. Lala Aswini Kumar Singh

Former Sr. Research Officer (Wildlife)
Forest & Environment Dept., Govt. of Odisha

05. Dr. Chitta Ranjan Mishra

Former DGM, Nalco
Bhubaneswar



7. Patrons of OES

2015. **Tamotia (Dr) Shailendra Kumar**,
Hon. Dean- cum- Director General
and Vice Chairman, Bharatiya Vidya Bhavan,
Bhubaneswar Kendra, Flat No. D/801, Gymkhana Palm
Heights, Near SUM Hospital, Shampur, Po- Ghatikia,
Bhubaneswar-751003
09937011356, Email: sk_tamotia@yahoo.co.in
2015. **Patnaik (Dr) Lalit Narayan**
Former Chairman, OSPCB,
116, Mechatech House, Kalyan Nagar, Cuttack - 753 013
9437000973, Email: lnpatnaik116@gmail.com
2015. **Patro (Dr) Sundara Narayana**
Former Reader in Botany and Principal,
MIG-106, Phase-1, Khandagiri Enclave,
Housing Board Colony, Khandagiri, Bhubaneswar-751030
09437190420; Email: snpatro11@rediffmail.com
2015. **Ray (Prof.) Debi Prasad**
Former Vice-Chancellor, OUAT,
HIG -105,(K-5), Kalinga Vihar, Patrapara,
Bhubaneswar-19
Phone: 09881721435; 08087815770,
Email: dpray1949@gmail.com
2015. **Panigrahi (Dr) Jaya Krushna**,
Associate Professor in Zoology,
41-A, Prachi Enclave, Chandrasekharapur,
Bhubaneswar-751016
Phone: 09437076100; Email:jk.panigrahi@gmail.com
2016. **Sundaray (Dr) Jitendra Kumar**, Head,
Division of Fishgenetics & Biotechnology, CIFA
Kausalyaganga, Bhubaneswar- 751002

C/o. Purna Chandra Sundaray,
At.Po. Aiginia, Bhubaneswar-751019
Phone: 09437166872; Email: sundarayj@yahoo.com,

2016. Patnayak (Dr) Bipra Charan

Former Director, Central Sheep & Wool Research Institute
(ICAR), S/30, Maitree Vihar, Bhubaneswar-751023
09937000824, Email: bpatnayak@yahoo.co.uk

2016. Panda (Prof.) Amulya Kumar

Former Principal, Ravenshaw College,
73, Cooperative Colony, (Near Chandrasekharpur)
PO.: KIIT, Bhubaneswar-751024
09937440390, Email: amulyapanda39@gmail.com

2018. Das (Dr.) Ashutosh

Vice-Chancellor & Director,
Centre for Research & Development,
Centre for Environmental Engg.,
PRIST University, Thanjavur- 613403
[744, Sriram Nagar, Pillaiyarpatti, PO- Vallam,
Thanjavur- 613403]
Phone: 09894122821
Email: director_cee@prist.ac.in; acadas@gmail.com

2018. Singh (Dr.) Lala Aswini Kumar

Former Senior Research Officer (Wildlife)
Govt. of Odisha; Former O-i-C,
Central Crocodile Breeding and Management Training
Institute, Hyderabad, Govt. of India
1830, Mahatab Road, Old Town, Bhubaneswar-751002

2018. Jena (Er.) Prakash Chandra

President, Ever Green Forum
At: Raisar, PO: Narada, Via: Teyndakura
Dist: Kendrapara, PIN: 754134



8. Obituary



(Er.) Sri Somanath Mishra

(Demise on 07 January 2018)

Former Secretary (Works), Govt. of Odisha, Er. Mishra was a Senior Life Member of OES. He was 85 years old and was not keeping well. On the occasion of the 36th Foundation Day on 29th October 2017 OES had announced felicitations for Er. Mishra. It was in appreciation of his persistent support to the society's progress.



CA B. Chandrasekhar Subudhi

(Demise on 2nd April 2018)

CA B. Chandrasekhar Subudhi was the Life Member and also the Chartered Accountant of OES. He expired due to cardiac arrest on 2nd April 2018. He was only sixty-two years.



9. Activities of OES: 2017-18

(Upto October 2018)

29.10.2017:

36th OES Foundation Day

The Orissa Environmental Society (OES) discussed various environmental issues being faced by the world and its contribution at its 36th foundation day held on Sunday, the 29th October 2018. Forests and Environment Minister Bijayshree Routray attending as chief guest said a State achieves true development when utilisation of natural resources and prioritisation of environment development happen simultaneously. Former Ambassador Sri Abasar Beuria talked about Odisha's natural resources and possibilities of development. Former Addl. PCCF (Wildlife) Sri **Saroj Kumar Patnaik** presented a talk titled 'Wildlife Scenario in Odisha' under '**Prasanna Kumar Das Memorial Lecture**' on this occasion. **Dr Uday Narayan Deb** was conferred **Lifetime Achievement Award** and **Prof Ramesh Chandra Parida** was given **Dr Bishnu Charan Panda Award** for Environment and Science Communication. Besides, 15 OES members were conferred with OES-Fellowship for the first time.

25-26 November 2017:

19th Odisha Bigyan 'O' Paribesh Congress

The Bigyan 'O' Paribesh Congress was previously known as the Odisha Bigyan Congress. The Focal Theme of this year's congress was "**Science & Technology for Environmental Security**". The Venue was KIIT University, Bhubaneswar, and the organizers were the KIIT University & Orissa Environmental Society. There were more than 500 participants. Dr Jaya Krushna Panigrahi- the Secretary (EMD) of OES functioned as

the Convenor and Prof. Biswa Bandita Kar functioned as the Organising Secretary of OBPC. S. Prafulla Samal, Minister, Social Security & Empowerment of Persons with Disabilities, Women & Child Development, & MSME graced the programme as the Chief Guest; Dr. Sachikanta Kar, Director, CTTC, Bhubaneswar and Prof. Hrushikesh Mohanty, Vice Chancellor, KIIT University attended as the Guests of Honour; Dr. Himanshu Pathak, Director, NRRI, Cuttack, the Chief Speaker addressed the delegates.

Background: The genesis of Odisha Bigyan Congress was in the year 1997 aimed to endow the scientific community of the State with an apt platform for deliberating on the advances in science and technology in diverse frontiers. Since then it is being organized as an annual event in reputed universities/institutions of the State. The Congress is pursuing the objective for bringing to a common forum the scientists, academics, engineers, technologists and nature-lovers of the State as well as from other parts of the country for sharing their experiences and innovations. On the occasion of the Congress, a national seminar is organized on a theme of current significance. Some noted scientists and academics of the State are felicitated during the Congress for their lifetime contributions, while young researchers are awarded prizes for best oral and poster presentations. A little amendment was made to the title of the Congress from its 18th session held in 2016. It is now and for future the “**Odisha Bigyan ‘O’ Paribesh Congress**” focusing attention on the environmental challenges confronting the mankind at the present juncture. ‘Lifetime Achievement Awards 2017’ were presented for sustained lifetime contributions in the field of science and technology to Prof. Damodar Acharya, former Vice Chancellor of Biju Patnaik University of Technology; Prof. Dhruv Raj Nayak, former Professor Zoology; Prof. Choudhury R. Praharaaj, Nuclear Physicist; and Dr Subrata Kumar Acharya, Pro-Chancellor, KIIT University.

30th November 2017 at Nuapada

Bahuda River Basin Stakeholders Consultation Workshop

The Bahuda River originates at Luba from the Singharai Hills (above 1500 meters ht) of Mahendragiri hill complex on the Eastern Ghats in Gajapati District of Odisha State. The Old Students Association (OSA), Government High School, Nuapada in association with Orissa Environmental Society organised the Bahuda River Basin Stakeholders Consultation Workshop on 30th November 2017 at Nuapada to make an assessment of the present status of the river. The workshop was sponsored by the Odisha Environment Congress 2017 being held under the auspices of the Human Development Foundation. It was attended by more than 70 participants representing farmers, social service organisations, welfare societies, local citizens, political leaders. The Executive Engineer, Chikiti Irrigation Division Er. Dillip Kumar Das, SDO Er. Jagannath Panda, Assistant Engineer Er. Dasarathi Sethi, and the Junior Engineer Sri Biswajiban Mohapatra attended the workshop as representatives of Water Resources Department, Government of Odisha. Nuapada Village was chosen as the venue for consultation workshop as it is the biggest village along the river basin and located on the edge of the river.

Mr. E. Tejeswar Rao, Secretary of OSA chaired the workshop and welcomed the guests and participants. Dr. Sundara Narayana Patro, President of OES and senior member of OSA introduced the guests and resource persons. Mr. Bijoy Pradhan of Ekta Parishad and member of River Basin Consultation Core Committee presented a brief account of the aims and objectives of Odisha Environment Congress (OEC) and the theme of 8th OEC as well as the River Basin Stakeholders Consultation Workshop. The Executive Engineer, Chikiti Division Er. Dillip Kumar Das presented a brief note on the present status of the Bahuda River. Mr. Brundaban Pradhan, ex-Sarpanch, as the Guest of Honour, addressed on the issues regarding distribution of river water for the purpose of irrigation

and cultivation. Dr. S. N. Patro also made a power-point presentation on **‘Water: Conservation and Management for Sustainable Future’** with special reference to Bahuda River. Batala Krishna Murty (Nuapada Village-representative of local M.L.A. and Minister Smt. Usha Devi), Bontu Ramanarayana Subudhi (Nuapada Village), Agadi Kalia (Brahaman Nuapada Village), Murali Pradhan (Dhanyarasi Village), Korada Keshab Rao (Nuapada Village), Bipin Padhi (Mundapota Village), Duryadhan Behera (Dekhali Village), Brundaban Pradhan (Sundarada Village), Bibekananda Patnaik (Dobhara Village), and a few others also spoke. It was followed by floor discussion. Mr. Ch. Simanchal Patro, Working President of OSA proposed vote of thanks.

Workshops of this kind need to be repeated at different places along the entire river basin for promotion of river water conservation and management was one of the recommendation.

03.12.2017:

Environmental Appreciation in Himalayan Expedition

Susanta Kumar Das, Former Faculty, Wildlife & Adventure Tourism, Regional College of Management presented a talk on “Environmental Appreciation in our Himalayan Expeditions” and discussed about Himalayan Expeditions- as a form of Adventure Sport, Himalayan Expeditions for differently able Odiya youths, and Environmental Concerns during Himalayan Expeditions. Sri Das also screened two short films on their ‘Mission Zanskar’ to the frozen lake in Leh-Ladakh region and ‘Mission Roop Kund’ to Gharwal Himalayas in Uttarakhand. Dr L. A. K. Singh, while summing up at the end appreciated the social touch given by Mr Das in selecting ‘specially enabled participants’ for the adventure. He also deplored how pollution has been carried up the Himalayas where the holy Ganges originates. The Himalayas need greater care. While on trekking to Himalayas, the trekkers must only bring back memories and photographs, not any souvenir

plugged out from nature. At the end Sri Susant Kumar Das and two of his colleagues, Ms. Arpita Mohapatra and Sri Amrutendu Baral were presented mementoes to mark the occasion.

07/01/2018: A popular talk on “Application of Biotechnology for Meeting Environmental Challenges” was delivered by Dr. Mrutyunjay Suar, Professor and Director, School of Biotechnology, KIIT University, Bhubaneswar.

26/01/2018: Flag hoisting and observation of Republic Day followed by discussions on current issues in the Republic of India.

04/02/2018: A popular talk on “Environmental Perspectives of Crop Protection in India: Theory and Reality” was given by Dr. Rajasekhara Rao Korada, Principal Scientist-Entomology Division of Crop Protection, ICAR-National Rice Research Institute, Cuttack, Odisha.

10/03/2018: The subject “Pisciculture for Augmenting India’s Food and Nutrition Security” was discussed in a very popular style by Dr Jitendra Kumar Sundaray, Director of ICAR-Central Institute of Freshwater Aquaculture, Bhubaneswar.

23/03/2018: Environment Awareness Campaign with the theme “Save Water Save life” was organised at Maingaon village, Titlagarh in collaboration with Ever Green Forum and Bolangir Forest Division. Sri Samir Kumar Satpathy, DFO, Bolangir attended as Chief Guest, and Er. Prakash Ch. Jena, Jt. Secretary of OES presided the meeting.

07/04/2018: World Health Day was observed by Members of OES with Chief Guest Dr. Shantanu Kumar Kar, MD, Director, IMS & SUM Hospitals and former Director, RMRC, Bhubaneswar; and Chief Speaker Dr. Nisith Mohanty, DM, Senior Nephrologist, Apollo Hospitals, Bhubaneswar. The event was organized at Regional Science Centre, Bhubaneswar with

their collaboration. The theme of the year, “Universal Health Coverage (UHC): Everyone, Everywhere” was discussed at length along with participation of school students in a quiz competition.

06/05/2018: “Go Green; Plastic is Obscene” was the subject for popular discussion by Dr. Asutosh Debata, Director, Centre for Environmental Studies, Forest & Environment Department, Govt. of Odisha, Bhubaneswar. As expected, the talk attracted a lot of educative discussions.

05/06/2018: World Environment Day-2018

Theme Discussion: Beat Plastic Pollution

While Dr S. N. Patro- President, OES presided the process, the Chief Guest was Dr. Sandeep Tripathy, PCCF (Wildlife) & Chief Wildlife Warden, Odisha, and the Chief Speaker was Prof. Nachiketa Das, Visiting Professor, Hiroshima Kokusai Gakuin University, Japan. The Chief Guest released two books ‘Paribesh Panchamruta’ and ‘Climate Change and World Peace’ written by former Chief Wildlife Warden, Dr Bijoy Ketan Pattnaik. The Environmentalist of the Year Award was presented to Mr. Sudarshan Das for having made significant contribution in campaigning for the safety of our environment. The Anchalika Vikas Parishad of Gunthabandham, Ganjam was felicitated for their significant contribution towards Wildlife Conservation.

07 July-2018: Vana Mahotsav was observed at the Centurion University, Jatani, Bhubaneswar. The Vice Chancellor of Centurion University, Prof. Haribandhu Panda presided over the briefing meeting held for the students and faculty. Dr S. K. Biswal, the Dean introduced the guests and other faculty. Prof. K. B. Satpathy gave a presentation on Medicinal Plants in the University campus. Dr B. K. Pattnaik and Dr Lala A. K. Singh talked about the concept and other related aspects of Vana Mahostav, emphasizing on the event for 2018, hosted by India. The following other members participated. Dr. Chitta Ranjan

Mishra, Dr. Rekha Das, Er. Prakash Jena, Mr. Rama Chandra Patra, Mr. Debendra Satpathy, Mr. Sarat Chandro Pattanaik, Mr. Muktipada Panda, Er. Umesh Chandra Mohanty, Mr. Prakash Chandra Mishra, Dr. Sunil Chandra Pradhan, Prof. Suryamani Behera and Dr. Nimai Charan Mishra

29/07/2018: Discussions relating to Vana Mahostav and Global Tiger Day (July 29, 2018) were Organised by Orissa Environmental Society, Ever Green Forum and the 'all-women' self-help organisation of Satakhi in K-4 Kalinga Nagar, Bhubaneswar. Cultural programmes were organised by members of Satakhi. The slogan 'Plant One, Protect One' was discussed at length.

Er. Prakash Ch. Jena, the Jt. Secretary, OES & President, Ever Green Forum introduced and welcomed the guests. Dr. J.K.Panigrahi, Secretary, OES talked on Vana Mahostav, and Dr. L.A.K.Singh, Vice President, OES discussed briefs on tiger biology, the objectives of observing World Tiger Day and the duties of city dwellers. Dr. Debabrata Swain, IFS, PCCF, Odisha, Chief Guest, talked on various aspects of tree plantation and wildlife conservation. The processes were presided by Dr. S.N.Patro, President, OES, and Vote of Thanks was given by Smt. Sabita Prusty, President, Satakhi.

10/08/2018: A popular talk on "**Energy and Environment**" was given by Er Mayadhar Swain.

15/08/2018: Independence Day was observed by flag hosting in the hands of President S. N. Patro. It was followed by discussion on various current issues in the country.

26/08/2018: Rakshi Bandhan

In India, the festival of 'Rakshi Bandhan' is celebrated on the full moon day in the month of Shravan every year. This year the date is 26th August 2018. Every sister waits to tie the sacred thread, called 'Rakshi' on her brother's wrist on this auspicious day. The festival reinforces and reaffirms the bond between a brother and sister. In these days of modern luxury-intensive life style the 'Nature' is under stress due to environmental

degradation. Now the very survival of humanity is under threat. 'Tree' symbolizes 'Nature'. The 'Rakshi Bandhan' festival was organised at the newly constructed holy 'Yog Mandap' in the premises of the Jayadev Batika, Khandagiri (near 2ndGate) to tie 'Rakshi' on each other's wrist and also on the 'Tree', on the occasion. Jayadev Walkers Club, Bharatiya Yog Sansthan Khandagiri Yog Zilla and Prajapati Brahma Kumari's Iswariya Viswa Vidyalaya Khandagiri branch collaborated with cooperation of Jayadev Vatika.

02/09/2018: Dr Dillip Kumar Ray, Jt. Director, Odisha Livelihood Mission, PR & AMP; DW Department, Govt. of Odisha, Bhubaneswar gave a very educative, interesting and popular talk on **"Green Transport: Prospects in Odisha"**.

07.10.2018: The monthly meeting was held to observe the Wildlife Week with a discussion on the topic "Big Cats - Predators under Threat". Dr. Tapan Kumar Chand, Chairman-cum-Managing Director, NALCO graced the occasion as Chief Guest, and Dr. Debabrata Swain, IFS, Principal Chief Conservator of Forests & HoFF, Odisha addressed as the Chief Speaker. The Guests of Honour were Dr. H. S. Upadhyay, IFS, PCCF & Director, Nandankanan, and Sj. P.K.Mohan, IFS, Addl. PCCF (Retd.). The meeting was organised in collaboration with the Save Elephant Trust, Odisha.



10. OES Publication List

01. Environment and Natural Resources Management	1983
02. Mass Mobilization Campaign on Wildlife (Black Buck) Conservation	1984
03. Environmental Conservation	1984
04. Conservation of Similipal in its Wilderness	1985
05. Environment and Indira Gandhi (Odia)	1986
06. Chilika: the Pride of our Wetland Heritage	1986
07. Environment and Sustainable Development	1990
08. My Home (Cost Reduction Techniques and Low Cost Materials for Rural Housing)	1990
09. Public Hearing on Environment 1991 and Development Strategies-Orissa Report	1991
10. Mahendragiri: The Pride of Eastern Ghats-1991	1991
11. Environment Conservation Movements in Orissa	1991
12. Noise Pollution	1992
13. Save Environment: Save Yourself	1992
14. Eastern Ghats in Orissa: Environment, Resources and Development	1994
15. Spatial Dimension of Geography	1995
16. Useful Plants for Diabetes	1997
17. Similipal: A Natural Habitat of Unique Biodiversity	1998
18. Auto- Vehicular Pollution (Odia)	1998
19. Biodiversity Conservation: Problem and Prospects	1998

20. Keep Our Water Resources Clean (Odia)	1999
21. Kathina Barjyabastu Parichalana (Odia)	2000
22. Manaba Sebare Udbhida (Odia)	2001
23. Sahaniya Bikash (Odia)	2002
24. Jala o Jibana (Odia)	2003
25. Jibana Paain Jala (Odia)	2004
26. Kathina Barjyabastu (Odia)	2005
27. Kathina Barjyabastu: Samasya ebam Nirakaran (Odia)	2006
28. Kathina Barjyabastu: Eka Samikhya (Odia)	2007
29. Souvenir: Silver Jubilee Commemoration Volume	2007
30. Jaiba Bibidhata: Eka Samikhya (Odia)	2008
31. Biswa Tapana Ebam Jalabayu Paribartan (Odia)	2009
32. Jalabayu Paribartan: Eka Samikhya (Odia)	2010
33. Mahendragiri (English)	2010
34. Jaiba Bibidhata (Odia)	2011
35. Nirantara Jiban Dharan Paain Aranya (Odia)	2012
36. Manaba Sebare Jaiba Bibidhata (Odia)	2013
37. Orissa Environmental Society- A Profile	2013
38. Jaiba Bibidhata (Odia)	2014
39. Jayadev Vatika (English)	2015
40. Orissa Environmental Society- Annual Report with compilation of lectures on Science and Environment	2016
41. Lectures on Environment and Science Annual Report	2017

Besides the above publications, the Society has brought out a good number of souvenirs, proceedings and research reports.



Some Books Published by OES members in 2018

Prof. Madhab Chandra Dash:

The National and State Animals of India and their Conservation Status, 156 pages, Gyan Books Pvt. Ltd., New Delhi, ISBN No. 9789386397416

Prof. Madhab Chandra Dash:

Reading in Ecology and Environmental Science, 319 pages, Book Code: 1111012715182

Prof. Krishna Chandra Sahu:

Heavy Metal Pollution with Case Studies from India, 368 pages, LAP LAMBERT Academic Publishing, Riga, Latvia, ISBN: 978-613-7-43434-5

Dr Sudhakar Kar and Dr Bijay Ketan Patnaik:

Chilika: Our Rich Heritage, 200 pages, Published by: State Project Management Unit, Integrated Coastal Zone Management Society of Odisha, Bhubaneswar.

Dr Lala Aswini Kumar Singh:

Gharial is a Fish-eating Crocodile- Its Ecology, Behaviour and Conservation, 268+ pages with 29 figures, 82 images, 2 maps, LAP LAMBERT Academic Publishing, Riga, Latvia, ISBN: 978-613-8-38791-6



11. List of Life Members (From 2016)

A11	Acharya (Prof.) Prasant Kumar Former Prof. Sanskrit, 4, Khandagiri Vihar, Khandagiri, Bhubaneswar-751030; Email: prasantchry@gmail.com,	602 (2016)	09853194572
A12	Acharya (Mr.) Gopeswar, Administrative Officer, Hi-Tech Medical College & Hospitality, BBSR Plot No. 582/E/1, Narayan Mishra Lane, Mahatab Road, Cuttack- 753012; Email:	632 (2017)	9090952337
B32	Behera (Mr.) Harish Chandra, Retd. EIC-cum-Spl. Secretary, Deptt. of Water Resources. "Banyosoda" Plot No. 195/208, Khandagiri Vihar, Kolathia, Po- Aiginia, Dist.- Khurdha-751019; E: harishchandra.behera@037gmail.com	596 (2016)	09437056384
B34	Bhanja (Dr.) Prafulla Kumar, Senior Scientist & Secretary, Odisha Bigyan Academy, S & T Deptt. Govt of Odisha, D-11/4, Rental Colony, IRC Village, Bhubaneswar- 751015; Email: prafullakumarbhanja@gmail.com	618 (2017)	08895326001 09853334997
B35	Biswal (Dr.) Debendra Nath, Team Leader, Odisha Community Tank, MGT, Project, Deptt. of Water Resources Plot No. 1234/2251, Santoshi Nagar, Bomikhal, Bhubaneswar-751010	586 (2015)	

B36	Behera (Dr.) Manoranjan, Associate Professor in Chemistry, Silicon Institute of Technology, Silicon Hills, Patia, Bhubaneswar-24 At/Po: Mandal, Via- Kalampur, Dist.- Kalahandi, Email: mano.silicon@gmail.com	652 (2017)	09438134371
B37	Behera (Mr.) Pandaba, IFS, Former Addl. PCCF VIIM- 57, Sailashri Vihar, Bhubaneswar Email: pandaba57@gmail.com	656 (2018)	08658034356
C12	Choudhury(Mr.) Prashant, Manager, ABB Ltd. M- 09, Padmalaya, Versa Villa, Shree Vihar, Patia, Chandrasekharpur, Bhubaneswar-751031; Emai: prashantwildies@gmail.com	610 (2016)	09937223422
C13	Choudhury (Mr.) Ramesh Chandra, Director, Raajdhani Engineering College, Near Mancheswar Rly. Station, Bhubaneswar,Odisha-751017; Email: rameshchoudhury11@gmail.com	634 (2017)	09437424011
D61	Er. Chaudhury Ananga Das, Retd. Sr. G.M. (Elec.) OPTCH. N-4/62, IRC Village, Bhubaneswar-15 Email: -	604 (2016)	0647-2555487 08658014048
D62	Das (Dr.) Kali Sankar, M.B.H, Homoeopathy Doctor, Homoeopathy International, Main Road, Jeypore- 764001 Dist: Koraput, Odisha, India; Email: dr_ksdas@rediffmail.com	619 (2017)	06854-232808 09437472434

D63	Dhala (Sri) Prasanna Kumar, Teacher Plot No. 316/5853, Niladri Vihar, Chandrasekharapur, Bhubaneswar-21 RS: At- Bhogada, Po- Dhanchangada, Via- Kantilo, Dist.- Nayagarh-752078 Email: pk.dhal09@gmail.com	638 (2017)	08280711176
D64	Das (Dr.) Ashutosh Vice-Chancellor & Director, Centre for Research & Development, Centre for Environmental Engg. , PRIST University Thanjavur- 613403, Tamilnadu, India 744, Sriram Nagar, Pillaiyarpatti, Po- Vallam, Thanjavur- 03, Tamilnadu Email: director_cee@prist.ac.in acadas@gmail.com	657 (2018)	09894122821
F2	Fatesingh (Mr.) Himansu Sekhar Teacher, At- Baligadia, Po.- Jankia, Dist.- Khordha, Odisha- 752020; Email: himansu1972@gmail.com	633 (2017)	08908289411
G5	Gupta (Mr.) Ram Narayan, Sr. Scientist (Retd.) C.G.W.B, Min. of Water Resources G.O.I, House No. MP-II-24, H.B.Colony, Khandagiri, Bhubaneswar-751030; Email: rngupta2006@gmail.com	601 (2016)	09437479291
G6	Ganesh, M Chartered Accountant 418, Prachi Vihar, Near Palasuni Hata, Bhubaneswar- 751025; Email: mganesh7@yahoo.com	627 (2017)	09437091233

G7	Giri (Dr.Mrs.) Gitisudha, Associate Professor, Silicon Institute of Technology, Silicon Hills, Patia, Bhubaneswar-24 Res: N-4/F-27, IRC Village, Bhubaneswar- 751915 Email: ggiri@silicon.ac.in	651 (2017)	09937416058
H3	Hota (Mr.) Prashant Kumar, Executive Vice-President, Jindal Steel & Power, Near Rotary Eye Hospital, Bhubaneswr-751024; Email: prashanthota@gmail.com	609 (2016)	09777443999
H4	Hota (Mr.) Tapan Kumar Rain Water Harvesting Consultant, (Certified Govt. of Odisha), At/Po- Chiplima, Dist.: Sambalpur-25 Email: tapankumarhota@gmail.com	617 (2017)	09583558755
J10	Jammula (Mr.) Murali, N-6/456, IRC Village, Near Hotel CROWN, Bhubaneswar-751015; Email: murali@ppamktg.com	626 (2017)	09437030840
K19	Kejriwal (Ms.) Swati, Partner, M/S O.M. Kejriwal & Co. 66, Lord's Galaxy, Bhakta Madhu Nagar, Talabania, Jagamara, Bhubaneswar-751003 Email: swati@omandco.com	631 (2017)	0674- 2397227 2397890
K20	Khuntia (Dr.) Bandana Lecturer in Zoology, Institute of Higher Sec. Education,	662 (2017)	09437271724

	ITER, SOA University, C/o- Atanu Sabyasachi Nayak, 112, Styra Nagar, Near Khelaghar park, Bhubaneswar-751007 Email: bandanakhuntia38@gmail.com		
M 114	Mohanty (Mr.) Jitasatru, IFS (Retd.) Former Conservator of Forest, Odisha Forest Department, Plot No.: C/61, Sec-08, CDA, Cuttack-753014; Email: jitasatrumohanty@gmail.com	605 (2016)	09437080233
M 115	Mohapatra (Dr.) Pavitra Mohan, Senior Breeder, Centre for Pulses Research, Berhampur, Po- Krupasindhupur, Via- Nimakhanti, Dist.- Ganjam-761001 Plot No.- 2115/15/1, Rath Road, Bhubaneswar- 751002; Email: pavitramohan@rediffmail.com	621 (2017)	09437485663
M 116	Mishra (Dr.) Suryakanta Choudhury Professor and Head, Depatt. of Zoology, OUAT, Bhubaneswar.; 45 VIP Area, Flat-301, Ananda Villa, Nayapalli, Bhubaneswar-751015; Email: cskmishra@yahoo.com,	630 (2017)	09861073501
M 117	Mishra (Sri) Sarat Chandra, Krishna Vihar, Khandagiri, Kolathia, Bhubaneswar- 751019 Email: debani11@gmail.com, debani@IIIT-bh.ac.in	639 (2017)	08763763656

M 118	Misro (Dr.) Ram Chamdro Prof. of History, Plot no. B2/41, Lingaraj Vihar, Pokhariput, Bhubaneswar-751020	641 (2017)	09437193073
M 119	Mukherjee (Dr.) Suman Assistant Proferssor (W.B.E.S.), 30/3, Middle Road, Santoshpur Kolkata, West Bengal-700075 Email: biosmukherjee@gmail.com	642 (2017)	09830359087
M 120	Mishra (MR.) Prakash Chandra Chief Conservator of Forest & Addl. P.D.(Retd.) A/4, Brindavan Enclave, Khandagiri, Bhubaneswar-751030 Email: pcmforest1999@gmail.com	644 (2017)	09437193175
M 121	Mahapatra (Dr.) Sujata Reader in Botany, Ramadevi Women's University, Bhubaneswar A/17, Surya Nagar, Bhubaneswar-003 Email: sujatamahapatra62@gmail.com	646 (2017)	09437616831
M 122	Mishra (Mr.) Siba Prasad, Scientist Plot No.-1242/2201, Sishupalgarh, Bhubaneswar-751002 Email: sibahort@gmail.com	654 (2018)	09437135939
M 123	Mahato (Ms.) Anupama Research Scholar, C/o- Dr. Subhasish Mahato, House No. 2B, Vaishali Nagar, Srikant Verma Marg, Bilashpur, Chhatishgarh- 495001 Email: anupama.mahato4@gmail.com	655 (2018)	09862821156

M 124	Mishra (Mr.) Sudhanshu Sekhar, IRTS Chief Safety Officer, East Cost Railway, F- 112, Falcon Residency, Near KIIT, Patia, Bhubaneswar-751024 C-74, BDA Colony, Palashpalli, Near Air port, Bhubaneswar-751020 Email: ssmishra995@gmail.com	658 (2018)	09938622897
M 125	Mohanty (Er.) Gyana Ranjan, Engineer in Chief (Water Resources) Retd. Qrs. No.- 4R/2, Delta Colony, Unit-8, Bhubaneswar- 751012, Email: gyanawrd@gmail.com	659 (2018)	09437281999
M 126	Mishra (Dr.) Swopna, Director cum Principal, Talent India Public School, Plot No. 726/2880, E/5, Seshadri Nagar, Lingipur, Bhubaneswar- 751002 Email: swopnamishra68@gmail.com	660 (2018)	08895275646
N15	Nayak (Mrs.) Maya, Professor, Plot No. 3299, Sriram Nagar, Old Town, Bhubaneswar 751002 Email: mayanayak3299@yahoo.com	598 (2016)	
N16	Nayak (Mrs.) Niva, Associate Professor in Chemistry, C/o- N.C.Nayak, Plot No. 14-A, Brahmeswar Bag, Tankapani Road, Po- Badagada Brit Colony, Bhubaneswar- 751018; Email: nivanayak72@gmail.com, nnayak_n@yahoo.co.in	599 (2016)	09437403679

N17	Nayak (Mr.) Gaurang, Former Secretary, State Social Welfare Board, MIG-139, Kalinga Vihar, Patrapada, Bhubaneswar-751019 Email: madhusmita17@gmail.com	645 (2017)	09437653177
N18	Nayak (Dr.) Siba Sankar, Associate Professor of Chemistry, Silicon Institute of Technology, Silicon Hills, Patia, Bhubaneswar-751024. C/o: Snehashree, Kajidiha, Po: Madhupatna, Cuttack-10 Email: snayak_2009@yahoo.com	650 (2017)	
P131	Panda (Mr.) Mukti Pada, Retd. Govt. Servant, RP-77, Pandab Nagar, Tankapani Road, Bhubaneswar-751018; Email: muktipadapanda@yahoo.com	595 (2016)	09776001947
P132	Prasad (Mr.) Gulab, Scientist 'D' CGWB (SER), Bhubaneswar MIG- 20, Phase-II, Khandagiri H.B. Colony, Khandagiri, Bhubaneswar-751030; Email: gpd_cgwb@yahoo.co.in	603 (2016)	09437480754
P133	Pathak (Dr.) A. K., IFS, Chief Conservator of Forest, Kendu Leaves, Balangir, Plot No. - 101, Biswanath Villa, Vivekanda Marg, Old Town, Bhubaneswar-; Email: ak.pathak@rediffmail.com,	607 (2016)	09438659962

P134	Parija (Mrs.) Jayanteebala Lecturer in Botany, Salipur (A) College, Salipur, At: College Road, Salipur, Cuttack- 02 Email: jayanteebala@gmail.com	611 (2016)	
P135	Panda(Dr.) Prasant Kumar Scientist (Agronomy), CDR (OUAT), Berhampur, Po- Krupasindhupur, Via- Nimakhand, Dist.- Ganjam- 761001, Odisha; Email: pkpanda_69@yahoo.com	622 (2017)	09437414202
P136	Patra (Mr.) Prasanna Kumar, Secretary, Jupiter +2 Sc. College, 2, Gopabandhu Nagar, Unit- 8, Bhubaneswar- 751012 Email: prasannakumarpatra@yahoo.co.in	624 (2017)	09437051905
P137	Patro (Mr.) C. Jawaharlal, Plot No.- 524, Swiss Villa, Sahid Nagar, Bhubaneswar; Email: c.jawaharlalpatro@yahoo.com	625 (2017)	09861007579
P138	Panda (Dr.) Sarad Chandra Secretary, Raajdhani Engineering College, Near Mancheswar Rly. Station, Bhubaneswar, Odisha-751017; Email: saradchandrapanda@gmail.com	636 (2017)	09437077210
P139	Pradhan (Dr.) Malay Kumar, Deputy Director of Factories and Boilers (SAFETY), Unit-3, Kharavela Nagar, Bhubaneswar Qrs. No. VR-40, Unit-6, Bhubaneswar Email: malay.pradhan@yahoo.com	637 (2017)	0674- 2390363 09439210915

P140	Pradhan (Dr.) Sunil Chandra, Lect. In Zoology, V.N.(Auto) College, Jajpur Road. Plot No. 486/2175 A, Kanan Vihar, Phase-II, Patia, Bhubaneswar-751031 Email: sunilch_pradhan@yahoo.com	640 (2017)	09437305097
P141	Pattanaik (Dr.) Ellarani, Associate Professor in Chemistry, Khalikote University, Berhampur, C/o: Prof. Ashok K. Mohanty, At- Ayodhya Nagar, 2nd Lane, Po- Engineering School, Berhampur, Ganja 760010 Email: ellapattanaik@gmail.com	647 (2017)	09437594555
P142	Puhan Dr. Puspasree, Assistant Professor, N-1/125, IRC Village, Bhubaneswar-15 Email: puspapuhan@gmail.com	648 (2017)	09437630717
P143	Prusty (Mr.) Raghunath, Former Chief Manager- Allahabad Bank Flat No. -103, Tower-10, Vipul Gardens, Ghatikia, Bhubaneswar Email: rnprusty00782@gmail.com	649 (2017)	07537004449
P144	Padhiary (Mr.) Aditya Kiran Farm Manager, KVK, Sambalpur, OUAT C/o- Rabindra Padhiary, Plot No.- F/563, CDA-7, Cuttack Email: aditya.ugl@gmail.com	653 (2018)	09437425706
R36	Rath (Dr.) Shiba Prasad, Former Vice-Chancellor, 258, Kanan Vihar, Phase -II, Patia, Bhubaneswar-751031;	608 (2016)	08895926002

R37	Rath (Dr.) Arun Kumar Lecturer in Botany Nayagarh (Auto) College, 985/15, Sambit Villa, Ghatikia, BBSR-03 Email: arunk_rath@yahoo.co.in	643 (2017)	09437103429
R38	Rao (Mr.) Korada Rajasekhara, Principal Scientist, Division of Crop Protection, National Rice Research Institute, Cuttack. HIG-3/125, Lane No. 19, Satya Sai Enc., Kolathia, Khandagiri, Bhubaneswar Email: rajasekhararao.korada@gmail.com	663 (2018)	08917223043
S68	Senapati (Dr.) Manas Ranjan, Prof. & HoD Chemistry, Trident Academy of Technology, 60/61, Laxmivihar, Sachibalaya Marg, Bhubaneswar 751005; Email: dr-senapti@yahoo.com	597 (2016)	09437237797
S69	Swain (Mr.) Manoj Kumar, OAS-I Special Officer, The Odisha Mining Corporation Ltd. OMC House, Bhubaneswar-751001; Email: manojkumarswainoas@gmail.com	606 (2016)	09437254639
S70	Swain (Dr.) Gouranga Charan, Retd. Asst. Professor, B/L-54, V.S.S. Nagar, Bhubaneswar-07 Email: emerging.scince08@gmail.com	612 (2016)	0674-2581918 09438077329
S71	Sahu (Mrs.) Kuntala Kumari, Reader in Botany, Atal Behari College, Basudevpur, C/o: Rajkishore Sahoo, At: Kundibag (Ichhapur), Po: Bhadrak Bypass, Bhadrak;	613 (2016)	09437176978

S72	Sahu (Prof.) Krishna Chandra, Professor (Retd.), F-302, Powai Park Co-op. Society, Hiranandani Gardens, Powai, Mumbai- 400076; Email: sahukc_kc@yahoo.com	614 (2016)	022, 25704983 09769398235
S73	Sahoo (Mr.) Krupasindhu President, FUSCAO, A/42, Nilakantha Nagar, Bhubaneswar-751012; Email: krupasindhuvss@gmail.com	615 (2016)	09437001251
S74	Saha (Mr.) Sidharth, Vice- Chairman, Sambalpur Municipality At- Nayapada, PO/Dist- Sambalpur Email: sidharthsaha@gmail.com	616 (2017)	09937200000
S75	Satpathy (Er.) Subas Chandra, Former Engineer-in-Chief, HIG-1/19, Sri Satyasai Enclave, Lane-13, Khandagiri, Bhubaneswar- 751030; Email: subas_satapathy@yahoo.co.in	620 (2017)	0674-2384568 09861096579
S76	Sahu Prof. (Dr.) Arun Chandra, Professor and Head (Retd.) GM Autonomous College, Sambalpur, Anwesana, 52/II, Bhagabat Sandhan, GGP, Bhubaneswar- 751025; Email: sahuac52@gmail.com,	623 (2017)	09437133387
S77	Subudhi (Mr.) Chandra Sekhar Chartered Accountant, 18/60, Gayatri Vihar, Baramunda, Bhubaneswar-751003; Email: bcsubudhi@gmail.com	628 (2017)	07894433663

S78	Subudhi (Mr.) B. Sarbeswar, Professional (CA) Duplex-10, Manorama Enclave, Rasulgarh, Bhubaneswar-751010; Email: subudhias@gmail.com	629 (2017)	09437022977
S79	Sarangi (Dr.) Bimal, Principal, Raajdhani Engineering College, Near Mancheswar Rly. Station, Bhubaneswar, Odisha-751017 At/Po. Panikoili, Jajpur-755043; Email: bimal_binit@yahoo.com	635 (2017)	0674-240179 09437123892
S80	Satapathy (Dr.) Hrudaya Ranjan, Former Reader in English, Plot No. 726/2880, E/5, Seshadri Nagar, Lingipur, Bhubaneswar- 751002 Email: satapathyhr@gmail.com	661 (2018)	09861124202

12. Executive Committee of OES Including Office Bearers

- 01 Dr Sundara Narayana Patro** 09437190420
President
MIG-106, Phase-I,
Khandagiri Enclave, Khandagiri,
Bhubaneswar-751030
Email:snpatro11@rediffmail.com;
- 02 Dr Budruddin Mohammad Faruque** 09938661814
Vice President (EMD) 0671-2417583
Former Director, GSI, Zahirland,
Tinikonia Bagicha,
Cuttack-753001
Email:bmfaruque@gmail.com;
- 03 Dr Lala Aswini Kumar Singh** 07377727949
Vice President (EAP)
Former Sr. Research Officer (Wildlife), 09861092928
Member, IUCN-Conservation Breeding Specialist Group,
1830- Mahatab Road, Friends Colony, Old Town,
Bhubaneswar-751002
Email: laksinghindia@gmail.com,
laksingh2005@yahoo.co.in
- 04 Dr Jaya Krushna Panigrahi** 09437076100
Secretary (EMD) 0674-2741542
Reader in Zoology,
41-A, Prachi Enclave,
Chandrasekharapur,
Bhubaneswar-751016
Email:jk.panigrahi@gmail.com;
- 05 Dr Rekha Das,** 09938454233
Secretary (EAP) 0674-2551011
Reader in Zoology
130, VIP Colony, Ekamra Vihar,
IRC Village, Bhubaneswar-751015
E-mail:rekhadas1957@rediffmail.com;

- 06 **Dr B. Seetarama Patro** 09437309977
Treasurer 09556342407
Former Dean & Prof. 0674-2354330
Mechanical Eng. BPUT,
L-1, Housing Board Colony, Baramunda, Bhubaneswar - 3
Email: bspatro@gmail.com;
- 07 **Dr Ladukesh Prasad Mishra** 09861238619
Joint Secretary (EMD) 09437138228
Lecturer in Botany, 0674-2550969
22,VIP Area, IRC Village, Bhubaneswar - 751015
Email: lpmishra_2006@yahoo.co.in
- 08 **Er. Prakash Jena** 09437572053
Joint Secretary (EAP) 09937623053
President, Ever Green Forum,
At: Raisar, Po: Narada, Via-Teyndakura,
Dist: Kendrapara, PIN-754134
Email: prakashjena81@gmail.com
- 09 **Dr Veerendra Pratap Upadhyaya** 0674-2302417
Member, Director (S), 09650039945
Ministry of Environment & Forests, 09437129945
Eastern Regional Office,
A/3, Chandrasekharapur, Bhubaneswar- 751023
Email: vpupadhyay@gmail.com
- 10 **Dr Sailabala Padhi,** 09937095353
Member 09937188514
Former Prof. of Botany, Brahmapur University,
Gajapati Nagar, Lane-1, Brahmapur (Ganjam) - 760007
Email: sailabalapadhi@gmail.com;
- 11 **Dr Sudhakar Kar** 09438054614
Member, Former Senior Research Officer,
Odisha Forest Deptt., Member: IUCN/SSC
Crocodile Specialist Group.
"Subhadra Nibas", Durgamadhab Nagar, (Lane-1),
Near Central Ayurvedic Research Centre and Hospital,
Sampur, Po- Ghatikia, Khandagiri, Bhubaneswar- 751003,
Email: kar.sudhakar@gmail.com;

- 12 **Dr Prativa Nanda** 09437226645
Member
Former Reader in Botany,
Flat No. 208, Chandralok Apartment,
Professorpara, Cuttack- 753 003
E-mail: nanda_pkn99@yahoo.com
- 13 **Mr. Guru Charan Das**
Member
Director, Geological Survey of India (Retd.)
Journalist Colony, Madhusudan Nagar,
Tulsiapur, Cuttack-753008
Email: 31.7gurudas@gmail.com; 09437109321
- 14 **Mr. Sarat Chandro Patnaik** Member 09437497722
Former District Panchayat Officer, 0674-2557722
N-3/450, IRC Village,
Bhubaneswar-751015
Email: amsaratcpatnaik@gmail.com
- 15 **Er. K. Gandhi Choudhury** Member 0674-2554776
Former Supt. Engineer (Elc.), 09861072281 09438019382
N-3/290, IRC Village, Bhubaneswar-751015
E-mail: kgchoudhury@rediffmail.com;
- 16 **Mr. Rama Chandra Patra**, OSS (Retd.), 09337872220
Administrative Officer 0674-2558648
N-4 / 60, IRC Village, Bhubaneswar - 751015
Email: rcpatrairc@gmail.com
- 17 **Dr Ramesh Chandra Mishra** 0647-2741419
Co-opted Member 09861086811
Sr. Scientist, National Genetic Resources, ICAR,
Plot No. 467/22, Shree Vihar, Po. Patia,
Bhubaneswar- 751031
Email: rcmisranbpgr@gmail.com

13. Advisors

Advisors to President

Prof. Satyananda Acharya, Principal Adviser

Former Vice Chancellor, Utkal University and Past President, OES

Prof. Amulya Kumar Panda, Adviser

Former Principal, Ravenshaw College

Prof. Debi Prasad Ray, Adviser

Former Vice Chancellor, OUAT

Advisory Body of OES

Prof. Madhab Chandra Dash, Chairman

Former Vice Chancellor, Sambalpur Univeristy

Dr Bijay Ketan Patnaik, IFS (Retd.) Member

Former PCCF (WL) & Chief Wildlife Warden, Odisha

Er. Binod Chandra Padhi, Member

Former Engineer-in-Chief, Odisha

Dr Sachidananda Tripathy, Member

Former Professor of Geography, Utkal Univ.

Dr Bipra Charan Patnayak, Member

Former Director, ICAR

Academic Advisory Committee

Dr Naba Kishore Mahalik, Chairman

Former Professor of Geology, Utkal University

Dr Sarat Chandra Mishra, Member

Former Chief Engineer

Mr. Gandharba Behera, Member

Former Dy. Director, ISRO

Financial Advisory Committee

Mr. Santosh Kumar Tamotia, Chairman

Former CMD, NALCO

Dr Surendra Kumar Sarangi, Member

M.D., GEOMIN

Dr Chitta Ranjan Mishra, Member

Former General Manager, NALCO

14. OES Membership Application Form



Orissa Environmental Society

(Registered under Societies Registration Act 1860,

Regd. No. PBN 100/19 of 1982-83

And Foreign Contribution (Regulation) Act 1996,

Regd. No. 104830132 of 2003)

ND-4, VIP Area, IRC Village, Bhubaneswar-751015, Odisha, India

Telephone: 91-674-2557423

Email:oesbbsr@rediffmail.com,oesbbsr@gmail.com

www.orissaenvironment.com

APPLICATION FORM FOR MEMBERSHIP

To

The Secretary, Orissa Environmental Society,

ND-4, VIP Area, IRCVillage,

Bhubaneswar (Orissa, India) – 751015

Dear Sir,

I wish to be enrolled as an Annual Member*/ Life Member of the Orissa Environmental Society.

(In case of individuals)

We wish to enroll our Organization/Institution/Department as an Institutional Member of the Orissa Environmental Society.

(In case of Organization/Institution/Department)

Enclosed herewith, please find the bank draft/*cheque/cash for an amount of Rs. _____

(Rupees _____) only towards individual- annual / life membership subscription;

Institutional Membership subscription (Strike words not applicable).

Details of Individual

Name in full (block capital letters) _____

Designation _____

Present Address (with pin code) _____

Telephone _____, Fax _____,

e-mail _____

Permanent Address (with pin code) _____

Telephone _____, Fax _____,

e-mail _____

Date of birth _____

Academic qualification _____

(Attach copy of the last educational qualification certificate)

Brief note on the activities (attach separate sheet)

Details of Institution / Organisation / Department

Name of the Organization _____

(Attach copy of the registration certificate in case of Non-Government Organization/ Trust/ Company)

Address (with pin code) _____

Telephone _____, Fax _____,

e-mail _____

Contact person _____

Brief note on activities (attach separate sheet)

Signature with date _____

Kindly read objectives, membership fees, instruction, etc. overleaf
**Send an additional amount of Rs. 70/- (Rupees seventy) only in case of outstation cheques towards collection charges.*



Orissa Environmental Society

ND-4, VIP Area, IRC Village, Bhubaneswar-751015,
Odisha, India

Email: oesbbsr@rediffmail.com, oesbbsr@gmail.com

Website: www.orissaenvironment.com

The quality of life on the Earth is fast deteriorating consequent upon resource depletion and environmental degradation. This poses a threat to the very existence of the mankind and all other forms of life. The challenge before us now is the reversal of this situation through enrichment of the environment and conservation of the natural resources for a sustainable future. The World Conservation Strategy defines sustainable development as the kind of development that meets the needs of the present without compromising the ability of the future generation to meet their own needs. In other words, it means improving the quality of human life while living within the carrying capacity of the supporting ecosystem. Realising this, the Orissa Environmental Society (OES) was founded in 1982 to promote education and awareness on the fast deteriorating quality of human environment and the need for conservation of the Nature.

Objectives

- Promote knowledge, understanding and appreciation of nature, and the principles and practices of conservation of natural resources among the common mass.
- Establish contact with regional, national, and international organizations, the Department of Environment and other such departments/agencies of the State as well as the Union Government so far as these contacts are beneficial to the Society or its objectives.
- Advise the government and non-government agencies on the environmental matters in the public interest.
- Conduct and encourage activities like tree plantation, nursing, habitat conservation, education and awareness programmes- padayatra, mass mobilization campaign, workshop, seminar, conference, training, popular lecture, exhibition, competitions, study, survey, research, publication of proceedings, books, brochures, bulletins,

extension materials etc. towards protection, regeneration and conservation of environment and natural resources.

- Frame curricula and co-curricula, and organize courses on environmental sciences at all levels of education.
- Work regardless of race, religion and political belief.
- Adopt any other means that might be advantageous to the Society's objectives.

DETAILS OF SUBSCRIPTIONS

Member	Individual	Institution
Life	Rs.2,000	Rs.25,000
Annual*	Rs.200	-

Payment should be made in shape of bank draft in the name of Orissa Environmental Society to be drawn on any nationalized bank in Bhubaneswar. *In case of out station cheque an additional amount of Rs. 70/- (Rupees Seventy) only should be paid towards collection charges.

*The annual subscription year- 1st April to 31st March

FOR OFFICE USE ONLY

Money Receipt No. _____, dated _____,

Membership No. _____ Bank Draft/Cheque No. _____,

dated _____ Name and address of the bank on which

to be drawn _____ Name and

address of the draft/cheque issuing bank _____

15. OES Fellow- Guidelines

In the bylaws of Orissa Environmental Society there is a provision of 'Fellow' (under article IV (b)- Category of Members). The Society is going to award the certificate of honour as 'Fellow' to the Life Members from the current year.

Interested members are requested to furnish the relevant information as per the format (Annexure -1). Enclosed please find the guidelines suggested by the OES Fellow Nomination Committee.

Guidelines for selection

1. The total strength of OES-Fellows in any year will remain at a maximum of 20% of the number of existing OES Life Members. The calculation will be based on the strength of Life Membership by 25 October each year, which is the Foundation Day of OES.
2. In the first year (2016 as base year), 5% of the total Life Members will be nominated as the Founder Fellows of OES. All eight Patrons of OES, as on 20 Oct, 2016, may be included in the list of "Founder Fellows" as all of them have made significant contributions towards environment. In the starting year, up to 30 (thirty) "Founder Fellows" may be nominated by the Executive Committee of OES.
3. In subsequent years 5 (five) Fellows may be selected out of about 10 (ten) identified or invited nominations.
4. It is not necessary to award the honour of 'Fellow of OES' every year, if suitable nominations do not come forth..
5. Individuals or organisations nominated for consideration should have done noticeable field work and made significant contributions to the fields of science and technology, and environment.
6. Normally, the nominee should have been a Life Member of OES for 5 (five) years

7. Life Members who are Patrons of OES and have demonstrated significant contributions towards environmental protection shall be considered for nomination, even if they have not been Life Members for five years.
8. Life Members who have been felicitated with 'Lifetime Achievement Award' by OES will ordinarily be considered for award of the honour as 'Fellow of OES'.
9. Persons who are not Life Members yet but have very significant contributions in the field towards environment protection/ conservation / research may be nominated for consideration for award of the honour as 'Honorary Fellow of OES'.
10. Biographical profiles will be requested from nominees and considered for final selection.
11. Financial mechanism to meet the expenses- the nominees will be appealed for paying a 'goodwill subscription' of at least Rs.2000/- (Rupees two thousand) only for promoting environment protection. The amount donated to Orissa Environmental Society qualify for deduction U/S 80G (5) of the IT Act 1961.
12. Draft Application Format for record of the Society has suggested in Annexure-I.
13. An Undertaking/ Oath as in Annexure-II will be taken by the OES-Fellow



Annexure-I

OES Fellow Guideline

Orissa Environmental Society

(Resume of Prof./ Dr. _____ ‘Fellow’ of OES)

(1.) Name of the applicant:

(2.) Present address and occupation:

(3.) Date of birth:

(4.) OES Life Membership No. with year:

(5.) Academic qualification:

(6.) Significant contribution in the field of science, technology and environment:

(Mention within maximum ten lines only):

(7.) Awards, Felicitations, Honours, etc. received:

(8.) Contribution to the activities of Orissa Environmental Society to achieve its objectives, and welfare of the society in general.

The information furnished is true to the best of my knowledge

Signature with date

(Full Name:.....)

Annexure-II

OES Fellow Guideline

Undertaking

“I _____
the undersigned, do hereby subscribe to the obligation that I will make endeavour to promote the interest and welfare of the Orissa Environmental Society for the furtherance of its objects, and observe its rules and regulations so long as I shall continue to be a Fellow thereof”.

Signature with date

(Full Name:.....)

16. OES Patron- Guidelines

There is a provision of ‘Patron’ in the Rules and Byelaws of Orissa Environmental Society (Article IV, b) under the category of members. As per the provision, an eminent person of repute and merit is nominated as ‘Patron’ of Orissa Environmental Society for distinguished contributions to the cause of protection, conservation and promotion of natural resources and environment.

Any Life Member eligible to become a ‘Patron’ of Orissa Environmental Society, may submit an application in the enclosed format. The application, basing on the merit, will be considered for the award of the ‘Certificate of Honour’ as ‘Patron’.

Any Life Member to be chosen as ‘Patron’ will be requested to contribute an amount not less than Rs. 10,000/- (Rupees ten thousand) only to the Corpus Fund of the Society. Donations made to Orissa Environmental Society shall qualify for deduction U/s 80G (5)(vi) of the IT Act 1961.

Application Form for Award of the Certificate of Honour as ‘Patron’

1. Name of the applicant:
2. Present address and occupation:
3. Date of birth:
4. OES Life Membership No. with year
5. Academic Qualification:
6. Significant contribution in the field of environment, natural resources, science & technology: (Mention within maximum ten lines only):
7. Awards, Felicitations, Honours, etc. received:
(Supporting documents may be attached)
8. Contribution to the activities of Orissa Environmental Society to achieve its objectives.

Signature with date

(Full Name:.....)

Undertaking

“I_____ the undersigned, do hereby subscribe to the obligation that I will make endeavour to promote the interest and welfare of the Orissa Environmental Society for the furtherance of its objects, and observe its rules and regulations so long as I shall continue to be a Fellow thereof”.

Signature with date

(Full Name:.....)