

**LECTURES
ON
ENVIRONMENT AND SCIENCE**

ANNUAL REPORT - 2019



**ORISSA ENVIRONMENTAL SOCIETY
2019**

LECTURES ON
ENVIRONMENT AND SCIENCE
(ANNUAL REPORT - 2019)



ORISSA ENVIRONMENTAL SOCIETY

ND-4, VIP Area, IRC Village
Bhubaneswar-751015, Odisha, India
Telephone: 0674-2557423
Email: oesbbsr@gmail.com,
Website: orissaenvironment.com

Lectures on Environment and Science (Annual Report - 2019)

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

Publisher : **Orissa Environmental Society**
ND-4, VIP Area, IRC Village,
Bhubaneswar – 751015
Phone: 0674-2557423

Printed at : AD GRAPHIX, Bhubaneswar
Tel.: 7077388860

Cover design : Sarat Kumar Swain (Biranchi)

Date of Publication : October 25, 2019

© Publisher

Citation Example:

Kar, S.(2019). Bhitarkanika Mangrove Ecosystem: A Hotspot of Biodiversity. Pages 5-14. In: Patro, S. N., Lala A. K. Singh and J. K. Panigrahi (Compilers). Lectures on Environment and Science, Annual Report –2019. Orissa Environmental Society, Bhubaneswar vi+102 pages

The views and contents of the write-ups are entirely those of the concerned authors.

FOREWORD



Orissa Environmental Society (OES) 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. The fact that the Society stands on its own for the last 37 years without any external grants to meet its regular establishment cost, distinguishes itself from other similar organizations.

Among many of the successful programmes of the Society are the environment conservation activities in the Angul-Talcher industrial belt, and biodiversity conservation activities in Similipal, Mahendragiri, Chilika, and other natural habitats in Odisha. 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 14 villages in Angul district was implemented in 2000-2001 under

Orissa Environment Programme (Indo-Norwegian Cooperation). The Central Pollution Control Board has identified Angul- Talcher 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.

From 2018 a new program - "Clean & Green Campaign" is launched by the Society to promote tree plantation, reduce use of plastic and polythene, conserve water, environmental sanitation and cleanliness. The nation has launched the "Swachha Bharat Aiviyan", a 5-year program to end on 2nd Oct'19, the 150th birth anniversary of Mahatma Gandhi. The Clean and Green campaign has covered forty-eight schools, colleges, educational institutions and villages spreading the awareness amongst 6000 participants. During the year 2018-19, more than 1100 saplings were planted.

Countries across the globe have adopted a historic International Climate Agreement at the UN Framework Convention on Climate Change Conference (UNFCCC) of the Parties (COP₂₁) in Paris in December 2015. One of the India's Nationally Determined

Contributions (NDC) is to create an additional carbon sink of 2.5 to 3 billion tons of CO₂ equivalent through additional forest and tree cover by 2030. In appreciation of India's NDC the OES has volunteered to undertake the project of tree plantation and awareness.

Holding of monthly meetings on current issues of environment and science is our regular programme. So far 114 guest lectures have been successfully organized. The other most important regular program of the Society is holding of an annual meet of scientists and nature lovers namely 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. Large number of 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 fourth year in 2019. 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.

Sundara Narayana Patro,
President, OES

CONTENTS

1. Lectures on Environment and Science

- | | | |
|---|--------------------|----|
| ❖ Prasanna Ku. Dash Memorial Lecture:
Conservation of Tiger in Human Dominated Landscape | Debabrata Swain | 01 |
| ❖ Bhitarkanika Mangrove Ecosystem:
A Hotspot of Biodiversity | Sudhakar Kar | 05 |
| ❖ Water Issues in India: Present and Future | Pramod Kumar Panda | 15 |
| ❖ World Health Day-2019: Universal Health Coverage:
Everyone Everywhere | OES-highlight | 23 |
| ❖ Pugmark Tracking- the Traditional Science for
Tiger Population Studies | | 30 |
| ❖ Scope of Renovation and Rejuvenation of
Water Bodies of Bhubaneswar for Water Security | Binayak Rath | 38 |

2. Activities of OES: 2018-19

- | | | |
|---|--|-----|
| ❖ 20th Odisha Bigyan 'O' ParibeshCongress | | 44 |
| ❖ 'Clean and Green' Campaign: Voice of Action | | 45 |
| ❖ 37th Foundation Day and other Activities | | 58 |
| 3. Activities by OES Members | | 63 |
| 4. Prasanna Kumar Dash Memorial Lectures | | 69 |
| 5. Awards Instituted by OES | | 70 |
| 6. Felicitations to Senior Life Members | | 72 |
| 7. Fellows of OES | | 74 |
| 8. Patrons of OES | | 77 |
| 9. Obituary | | 80 |
| 10. OES Publications | | 81 |
| 11. List of Life Members (from 2018) | | 83 |
| 12. Executive Committee of OES including Office Bearers | | 90 |
| 13. Advisory Body | | 93 |
| 14. OES Membership Application Form | | 94 |
| 15. OES Fellow- Guidelines | | 98 |
| 16. OES Patron- Guidelines | | 101 |



1. Lectures on Environment and Science

8th Prasanna Kumar Dash Memorial Lecture, 2018

Conservation of Tiger in Human Dominated Landscape

Debabrata Swain

(Lecture delivered on: 04.11.2018)

Summary

Briefly speaking about Prasanna Kumar Dash and his contribution, particularly conservation of Similipal and creation of Similipal Biosphere Reserve, the following issues were dealt in the lecture:

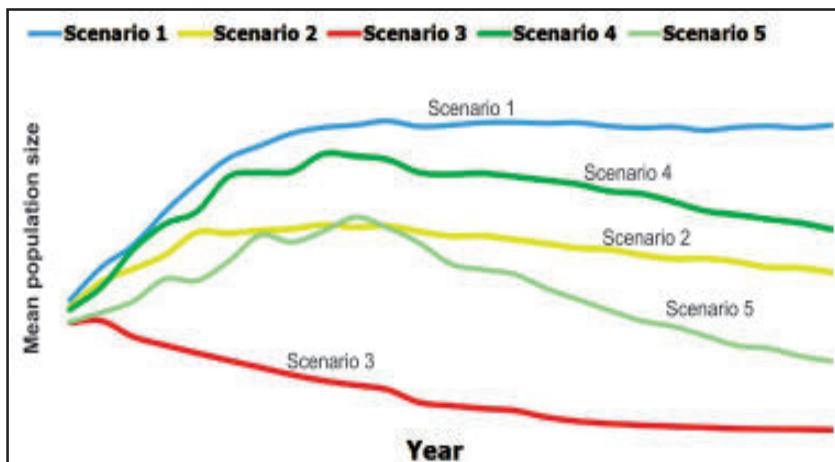
Similipal Biosphere Reserve: Government of India declared Similipal as a biosphere reserve in 1994. SBR came into UNESCO World Network in 2009, with a total area of 5569 sq.km, having Core: 1194.75 sq.km; Buffer: 1555.25 sq.km and Transitional Area: 2819 sq.km. 1340 species of plants, 96 species of orchids, 55 species of mammals, 385 species of birds, 60 species of reptiles, 21 species of amphibians and 164 species of butterflies have been identified in the Similipal Biosphere.

Biosphere Reserve Concept: The concept is to promote management, research, and education in ecosystem conservation including sustainable use of natural resources. The Biosphere Reserves are IUCN management category V protected areas. There are 18 biosphere reserves in India. Globally 686 biosphere reserves are in 122 countries, including 20 transboundary sites. BRs are having core, buffer and transitional zones.

Mahendragiri Hill Complexes: This is a part of the Eastern Ghats, having the 2nd highest peak in Odisha; associated with Pandavas and Parshuram in mythology. There are interesting archaeological remains and it is a biodiversity hotspot.

Tigers in Similipal: There is existence of melanistic tigers. Issues around tiger conservation are habitat protection, people's participation, tourism/ecotourism, connectivity, and the absence of bamboos.

Population Viability Analysis (PVA): It is normally examined in different scenarios. SCENARIO 1: Base model, with only demography and does not include catastrophe, inbreeding, harvest (in this case, poaching) and supplement; SCENARIO 2: Natural process model, with demography and includes catastrophe and inbreeding; SCENARIO 3: Harvest model, with demography and include catastrophe, inbreeding and one poaching per year; SCENARIO 4: Supplement model, with demography and include catastrophe, inbreeding, no poaching and supplement of 2 tigers every three year for three consecutive time scale; SCENARIO 5: Supplement and harvest model, with demography and include catastrophe, inbreeding, supplement of 2 tigers every three years for three consecutive time scale, and 1 poaching per year. The National Tiger Conservation Authority (NTCA) have initiated approaches in these directions.



Forest Cover of Odisha: Odisha is the 4th in the country, for significant increase in forest cover. There is an increase of 885 sq.km forest cover in 2017 with respect to 2015. Odisha is having 12109 sq.km of bamboo bearing areas and is placed fourth in the country.

YEAR	Forest Cover (in sq. km)	YEAR	Forest Cover (in sq.km)
1997	46,941	2009	48,855
1999	47,033	2011	48,903
2001	48,838	2013	50,347
2003	48,366	2015	50,460
2005	48,374	2017	51,345

Ecotourism in Odisha: Odisha is being projected as the ecotourism hub of India. MoUs have been signed between forest and tourism department. Thirty-six (36) nature camps have been developed, and development of nine camps are under progress. Online bookings are made for entry and stay. So far there are livelihood supports for 229 Eco Development Committees (EDC)/ Van Surakshya Samitees (VSS) members and over 23 thousand tourists have stayed in the facilities.



Dr Debabrata Swain, PhD

Former, Principal Chief Conservator of Forests,
Government of Odisha

Presently, Hon'ble Member, Lokayukta, Odisha

Mob: +91-9438877077

Email: dswain2008@gmail.com

Born on 28 February 1959, Dr Debabrata Swain is an MSc in Chemistry (1979) and Bachelor of Law (1992) from Utkal University. In 2001 he was awarded the PhD degree from Utkal University for his work on 'Elephants of Odisha: Their Conservation & Management'. He was a Post-doctoral Fellow at Harvard Institution, USA in 2009, and a Fulbright Fellow, Smithsonian Institution, USA in 2005. Dr. Swain joined Indian Forest Service in 1984, along with the 1986-Post Graduate Diploma in Forestry from IGNOU, Dehradun.

Dr. Swain has received a number of national and international scholarships and fellowships while pursuing his academic interest. He received the Charles Bullard Fellowship in Forestry from Harvard University, USA in 2008-09; the International Tropical Timber Organization (ITTO) Fellowship in 2009; Fulbright Indo-American Environmental Leadership Program Fellowship in 2005; Indo-US Science and Technology Forum Fellowship in 2005; Smithsonian Institution/MAB Program Fellowship in 2005; Fellowship, Zoological Society of India in 2001; President of India Medal (for the best essay on Wildlife), Dehradun, 1984; and the State Govt. Scholarship, Dept. of Education, Govt. of Odisha, 1973-1975. Dr. Swain has published the book 'Asian Elephants: Past, Present and Future', and 51 scientific and popular articles in national and international journals. Dr Swain was honoured with the Man of the Year 2013 award from the organization 'HONEST (House of Nature, Environment and Society Trust) for contribution in the field of forest, wildlife and environment. He served as the Director, Similipal Biosphere and Tiger Reserve during 2002-2007; Special Secretary, Forest & Environment, Govt of Odisha, January to October 2014; Inspector General, National Tiger Conservation Authority, Central Region, Nagpur (2014-2017); Secretary and Executive Head, National Tiger Conservation Authority, Ministry of Environment, Forest and Climate Change, New Delhi from February 2017-April 2018. From April 2018 - February 2019 Dr Swain served as the Principal Chief Conservator of Forests and Head of Forest Force, Odisha. From April 2019, Dr Debabrata Swain is the Hon'ble Member, Lokayukta, Odisha.



Bhitarkanika Mangrove Ecosystem: A Hotspot of Biodiversity

Sudhakar Kar

(Presented on 04.08.2019)

Bhitarkanika is a deltaic area in Kendrapara district of Odisha formed by the alluvial deposits of river Brahmani and Baitarani and is a Wildlife Sanctuary (672.0 sq.km) as per provisions of the Wildlife (Protection) Act, 1972. The core area of Bhitarkanika Wildlife Sanctuary was notified as a National Park (145.0 sq.km) during 1998. It is also recognized as a Ramsar site, i.e. Wetland of International Importance, since 2002.

Bhitarkanika ecosystem is a hotspot of rich biological diversity. With 71 species of mangroves and mangrove associates, the area supports the largest population of country's estuarine crocodiles, *Crocodylus porosus*, numbered at 1742 as per Jan. 2019 census. It supports the largest Indian Lizard (*Varanus salvator*), python (*Python molurus*), King cobra (*Ophiophagus hannah*), varieties of resident and long-distance migratory birds (271 species) and a number of rare and endangered mammalian species including aquatic mammals such as Irrawaddy dolphins (*Orcaella brevirostris*), Bottle nose dolphins (*Tursiops truncatus*) etc.

The Gahirmatha sea beach (now a marine sanctuary), bordering the Bhitarkanika sanctuary attracts over half a million of Olive Ridley sea turtles (*Lepidochelys olivacea*) for mass nesting / egg laying (World's largest rookery) during the winter months (January to April).

Bhitarkanika is endowed with a very complex and dynamic ecosystem and is highly fragile in nature. The essential factors for maintenance of such ecosystem is regular influx of fresh water from adjoining land and tidal inflow from the sea. Any change in the regime of either factor is likely to effect a corresponding change in the mangrove ecosystem.

This ecosystem supports a range of interconnected food webs within it to maintain the balance of nature. This ecosystem is complex and is intricately mixed with each other. The livelihood patterns of the villagers surrounding Bhitarkanika directly or indirectly influences the very existence and survival of the flora and fauna in this ecosystem. The State Forest and Environment Department have taken several measures for conservation and management of this unique ecosystem and its rich biodiversity, with the support of the Ministry of Environment & Forests, Govt. of India.

Biodiversity Resources

Bhitarkanika supports one of the largest mangrove ecosystems after Sundarbans, Gujarat and Andhra Pradesh in the Indian mainland. The floral diversity (71 species of mangroves and associates) of Bhitarkanika is known to be largest in India and second largest after Papua New Guinea in the world. Considering the genetic diversity of the wetland and its importance, the Mangrove Steering Committee of Govt. of India have established its National Mangrove Genetic Resource Conservation Centre in one of the islands of this wetland i.e. Kalibhanjadia island.

Endemism in Bhitarkanika is not fully explored. Yet, it is expected to be there particularly in sectors like mangrove flora and benthic fauna, soil fauna as well as aquatic flora and fauna. Among the three species of Sundari trees (*Heritiera sp.*) available in the area, *Heritiera kanikensis* or Kanika Sundari is endemic to Bhitarkanika.

Bhitarkanika is endowed with a variety of habitats and microhabitats to shelter wide ranging aquatic, terrestrial and avifauna. The animals and birds associated with the mangrove and wetland can be broadly categorized into two groups namely invertebrate and vertebrate. Vertebrate fauna includes a variety of fishes, amphibians, birds, reptiles and mammals. This ecosystem harbours the largest number of Estuarine Crocodile population in the Indian sub-continent. Other reptilian fauna includes Monitor Lizard, Indian Python, King Cobra and varieties of other snake species. It

also harbours a number of endangered animals like Fishing Cat, Leopard Cat, Irrawaddy Dolphins and varieties of local and long-distance migratory birds.

In comparison to the national status, the composition of vertebrate fauna of Bhitarkanika site represents 8.0 % mammals, 17.70 % birds, 9.40 % reptiles and 2.5 % amphibians.

Ecosystem functions

Mangrove areas support a range of interconnected food webs, which directly sustain the fisheries. Algae and detritus sustain shrimps and prawns, which provide a food source for species such as Bhekta (*Lates sp.*), Cat fishes etc. Fish and prawns spend most of their adult life at sea and return to the mangrove areas and vice versa to spawn. Mud skippers, a typical fish reside around and in the mangroves. These fishes are able to survive short periods of aerial exposure, skip around on the water and mud and build chimney like burrows.

Economic value

Bhitarkanika mangrove wetland is one of the most productive ecosystems. It adds to the coastal fishery production. The rivers and creeks in the wetland are a major source of variety of indigenous fish. The sheltered waters of mangroves provide nursery ground for commercially harvested prawns and shrimps. Several fish species come to the estuary for breeding. Fishing is the mainstay of the villagers those who do not have any landed property. In addition, the local people depend on the mangrove vegetation for collection of honey, wax and medicinal plants. Around 50 quintals of honey are available per year in Bhitarkanika forests.

Special features

The resilient mangroves serve as the protective functions to a greater extent. It protects the hinterland against cyclonic storms during cyclones, super

cyclones, tidal surges and other natural catastrophes acting as an effective shelterbelt. In the unprecedented super cyclone of October 1999, the mangroves have withstood the onslaught of cyclonic wind and saved the life and property of millions of people.



Bhitarkanika river with luxuriant mangrove vegetation

Mangrove wetlands perform a variety of productive as well as protective functions. This mangrove wetland is a repository of biological diversity in terms of flora and fauna.



Rhizophora, one of the dominant mangrove species



One of the largest males (about 20 feet) Estuarine crocodile
(Photo courtesy: K. L. Purohit)



Female partial white (Sankhua) crocodile "Gori" in captivity at Dangamal in Bhitarkanika National Park



Mass nesting (Arribada) of Olive Ridley Sea turtles

The Estuarine crocodile "rear and rehabilitation" operation is a success story in Bhitarkanika and the crocodile population in the Bhitarkanika river system has been gradually built up. The captive reared young crocodiles have been released in the creeks and estuaries and above 3000 crocodiles have been released in phases since 1977. Some of the released crocodiles have bred successfully in the wild and above 103 clutches of eggs have been located, which is over 17 times in comparison to 1975-76. Bhitarkanika holds the largest living crocodile (above 20' length) throughout its distributional ranges in the world. Besides, this habitat provides shelter to small population (15 no.) of partial white crocodiles (local name 'Sankhua') which is noteworthy.

Bhitarkanika's famous Gahirmatha coast finds a prominent place in the turtle map of the world because of the distinction of having one of world's largest nesting and breeding congregation of Olive Ridley Sea turtles. Mangrove wetlands including mudflats provide ideal feeding, perching and nesting facilities to a variety of resident and migratory water birds.

Ecosystem value/ significance

Mangroves have been considered as "land builders". It is believed that the roots of mangroves secrete a substance, which modifies the coarse particles into fine ones and help in soil formation. Network of mangrove roots provide firm anchorage to the banks of tidal rivers, creeks and also the coastline. It effectively arrests riverbank and coastal erosion and ultimately helps in controlling flood damages. It also exercises a moderating influence on the cyclonic wind and storm surges. In the past, severe cyclones and tidal surges of the coastal Kendrapara district; particularly in the Rajnagar area, is known to have been effectively controlled due to the presence of thick mangrove vegetation in the zone of Bhitarkanika and the adjoining Mahanadi deltaic area.

Socio-cultural value

The wetland has a good number of ancient monuments like palace of ex-zamindar in Kanika, Shiva temple inside Bhitarkanika forest block, Jagannath temple at Righagarh, Keradagarh, Pentha and Panchubarahi goddess temple at Satabhaya (now shifted to Bagapatia near Gupti) and others such small temples which are culturally significant to the inhabitants.

Ecotourism potentiality

Bhitarkanika is paradise for nature lovers, conservationists, and biologists and has been identified as tourist destinations. However, the ecotourism or wilderness tourism potentiality is yet to be fully explored.

Major threats

- Illegal fishing,
- Aquaculture,

- Encroachment of forest land,
- Illicit collection of wood,
- Grazing of cattle,
- Hunting of wildlife, etc.

Conservation measures

A massive awareness programme has been undertaken to prevent poachers to enter in the Protected Area (PA) for poaching of animals. The efforts are supplemented with the establishment of anti-poaching camps at strategic points. To encourage eco-tourism, training camps for eco-guides and boat-man associations are being organised. Habitat development inside the sanctuary is being done with funds received from Ministry of Environment, Forests and Climate Change, Govt. of India (MoEF&CC). These measures include raising up of plantations, digging and renovation of creeks and digging of ponds.

Management strategy

The State Forest and Environment Department have taken several measures for conservation and management of this unique ecosystem and its rich biodiversity, with the support of the Ministry of E &F, Govt. of India. These measures include:

- ❖ Protection of threatened mangrove forests
- ❖ Protection of estuarine crocodiles and sea turtles
- ❖ Protection of migratory water birds and other wildlife species prone to poaching for meat
- ❖ Restoration of the feeding and roosting habitat of water birds
- ❖ Creation of awareness about the values and functions of mangroves and wetland
- ❖ Strengthening research and development activities
- ❖ Community participation

- ❖ Capacity building
- ❖ Institutional strengthening
- ❖ Promotion of eco-tourism in peripheral areas of the National Park/ Sanctuary.

Conclusion

A long-term multidisciplinary study on the value and resource of Bhitarkanika area along with formulation of broad-based management plans are the key parameters to preserve and sustain this unique ecosystem and the proposed World Heritage Site.

Acknowledgments

I am thankful to the Principal Chief Conservator of Forests (Wildlife) and Chief Wildlife Wardens, Odisha for encouragement and support.

Further Readings

Behura, B. K. (1999). Bhitarkanika- The Wonderland of Odisha. Nature and Wildlife Conservation Society of Odisha. Bhubaneswar. pp.1-63.

Bustard, H.R. (1976). World's Largest Sea Turtle Rookery. Tiger paper. 3(3) :25.

Dash, M.C. and Kar, C. S. (1989). The Turtle Paradise Gahirmatha. An Ecological Analysis and Conservation Strategy. M/s Interprint Publishers, New Delhi.

Daniel, J.C. and Hussain, S.A. (1975). A record (?) saltwater crocodile, *Crocodylus porosus* (based on their study in Bhitarkanika during 1973). J. Bombay Nat. Hist. Soc., 71 (2). 309-312.

Das, G. P. (1951). Forest Rules and Regulations of Kanika Raj (Published by the Dewan of Kanika Raj). pp: 1-14.

Kar, S.K. and Bustard, H.R. (1982). Occurrence of partial albinos in a wild population of Saltwater crocodile (*Crocodylus porosus* Schneider) in Bhitarkanika Wildlife Sanctuary, Odisha, India. Brit. J. Herpetol. 6:220-221.

Kar, S.K. and Bustard, H.R. (1991). Status of Saltwater Crocodiles, *Crocodylus porosus* Schneider in Bhitarkanika Wildlife Sanctuary, Odisha, J.Bombay Nat. Hist. Soc. 86(2):141-150.

Kar, S.K. and Patnaik, S.K. (1999). Status, Conservation and Future of Saltwater Crocodile in Odisha. Envis (Wildlife and Protected areas). Wildlife Institute of India, Dehradun. June, 1999. 2(1): 24-28.

Kar, S.K. (1984). Conservation Future of the Saltwater Crocodile (*Crocodylus porosus* Schneider) in India. Crocodiles. Proc. of the 6th Working Meeting of the Crocodile Specialist Group of the IUCN/SSC. Victoria Fall, Zimbabwe and St. Lucia Estuary, South Africa. 19-30 Sept.1982. pp.29-32.

Kar, S.K. (1991). Checklist of birds in Bhitarkanika Wildlife Sanctuary, Odisha, India. Newsletter for Bird Watchers. 31(11&12): 3-6.

Mohanty, S.C.; Kar, C.S.; Kar, S.K. and Singh, L.A.K. (2004). Wild Odisha-2004. Wildlife Organisation, Forest Department, Govt. of Odisha, Bhubaneswar. pp. 1-81.

Mohanty, S.C; Singh L.A.K; Kar S.K.; Kar, C.S.; and M.V. Nair (2006). Nesting Animals of Odisha-2006. Wildlife Organisation, Forest Department, Govt. of Odisha, Bhubaneswar. pp.1-60.

Singh, L.A.K; Kar, S.K; Kar, C.S; Nair, M.V; Mishra, S.K; and Mohanty, S.C. (2007). Wildlands of Odisha-2007. Wildlife Organisation, Forest Department, Govt. of Odisha, Bhubaneswar. pp. 1-68.

Singh, L. A. K. (2017). Forty Years' Saga of Mangrove and Biodiversity Conservation Launched from Crocodile Conservation. Pages 22-23. In: Behera, Ajay Kumar (Ed.) Rajabhumi- Smaranika-2017. Sagarabela Mahotsav Sanskritika Parishada, Rajnagar, 128pp in Odia language.



Dr. Sudhakar Kar, MSc, PhD

Former Senior Research Officer, Forest and Environment Department, Government of Odisha and Member: IUCN/SSC Crocodile Specialist Group.
Durgamadhab Nagar, Lane-1, Sampur, Bhubaneswar
Email: kar.sudhakar@gmail.com
Mob: 8895393040, 9438054614

Dr Sudhakar Kar, born to parents Late Subhadra and Madhabananda Kar in the village Dhanamandal of Aul P.S. in undivided Cuttack district (now Kendrapara), did his Post Graduation in Zoology from the Utkal University in 1973. After a short assignment in Orissa University of Agriculture and Technology, Bhubaneswar, in mid-1975, Dr Kar joined as a Researcher in the project for Crocodile Conservation of Odisha State Forest Department / Government of India / FAO / UNDP. His studies on the "Ecology and Biology of Estuarine Crocodiles in Bhitarkanika Mangrove Ecosystem/ National Park" led to Ph. D degree from the Utkal University in 1983. Successful rearing of crocodiles at Dangamal and their conservation in Bhitarkanika Sanctuary / National Park are linked with Dr Kar's work. He has also been associated with work on Gharials at Nandankanan Biological Park, Olive Ridley sea turtles at Gahirmatha coast, the water birds and Irrawaddy dolphins in Chilika lagoon, and the Blackbuck in Balipadar-Bhetnoi areas of Ganjam district. Dr Kar has guided three PhD students and is the author or co-author of a number of books and booklets on wildlife. He is trained in Zoo and Animal Management from the Wild Life Institute of India, Dehradun and the National Extension College, Cambridge, UK, and visited Australia, Papua New Guinea, Philippines, Thailand, Malaysia and Singapore in 1982 to study on captive and wild crocodilians. He is a Member of the IUCN/SSC Crocodile Specialist Group and had participated in its 7th Working Meeting at Caracas city of Venezuela in 1984. After retirement as Senior Scientist of the Forest and Environment, Govt. of Odisha, Dr. Kar is providing guidance to Odisha Forest Department as a technical expert on census of crocodilians in Bhitarkanika, and the water birds in Chilika lagoon.



Water issues in India: Present and Future

Pramod Kumar Panda

(Presented on 01.09.2019)

Since time immemorial India has established unique place in the world for its civilization, culture and science. It is also endowed with diverse human resources, animal population, climate, soil, plants, food habits, varied dresses, religious believes and languages. Presently 17 percent of world's human population, 15 percent of world's livestock and 7 percent of the global fisheries live in this beautiful country with meager global share of 2.4 percent land, 4.0 percent water, 1.0 percent forests and 0.5 percent pasture (Panda, 2012). Hence, tremendous pressure is being exerted upon our natural resources for their transformation to meet our needs. Out of these natural resources, water plays a vital role for the development of all the sectors. Agricultural development is more dependent on water resource management as India experiences differential rainfall i.e. very high rainfall of 11690 mm per annum in the north-east to very low rainfall of 100 mm per annum in the Jaisalmer district under Thar desert.

Earth is endowed with 30 percent of land and 70 percent of water in its surface. Out of this 70 percent water, 97.3 percent belong to saline and only 2.7 percent belong to freshwater category. We should be more concerned about this 2.7 percent fresh water. Out of this 2.7 percent fresh water, 77 percent are locked in glaciers and permanent snow, 11 percent occur at a depth below 800 m and cannot be put to any use by the present technology available with us (CGWB, 2007). Another 11 percent of water is available at a depth within 800m, which can be extracted and put to use, and only 1.0 percent is available as surface water in the lakes, reservoir and in river system. Though the global renewable water supply is 7000 m³/person/annum, the uneven distribution with respect to time and space are the areas of concern. In the western developed countries, a per capita per annum water supply of 2000m³ is considered to be ideal. As per international standard, if the per capita per annum water availability is less

than 1700m³, then it is called water stressed and when it is less than 1000 m³, it is called as water scarce (vision 2030, 2011).

India receives diverse rainfall ranging from as low as 100 mm to 11690 mm depending upon the location. Total precipitation including snowfall has been estimated to be 4000 BCM (Billion cubic meter), out of which, total runoff is estimated to be 1869 BCM. However, maximum utilizable water resources have been calculated to be 1123 BCM due to various constraints. Out of 1123 BCM, 690 BCM can be harvested from surface water and 423 BCM can be harvested from ground water resources (Vision 2050, 2013). The per capita per annum water availability in India has been reduced from 5177 m³ in 1951 to 1869 m³ in 2001 and is projected to reduce further to 1140m³ in 2050.

Table 1: Per capita per annum water availability in India


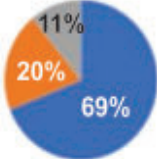

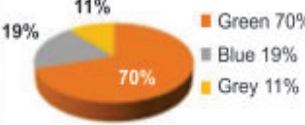






Sl.No.	Year	Population (million)	Per capita water availability (m ³)
1.	1951	361	5177
2.	1955	395	4732
3.	1991	846	2200
4.	2001	1027	1869
5.	2025 (P)	1341	1341
6.	2050 (P)	1640	1140

(Source: CGWB, 2007), (P)- Provisional



Fig.1 (left): Better water management in high rainfall areas of Sikkim

Fig.2 (right): Poor water management in low rainfall areas of Chambal (Madhya Pradesh)

	<p>Rice</p>  <ul style="list-style-type: none"> ■ Green 69% ■ Blue 20% ■ Grey 11% 	<p>To produce 1 Kg rice, 2500 litres of water is required</p>
	<p>Wheat</p>  <ul style="list-style-type: none"> ■ Green 70% ■ Blue 19% ■ Grey 11% 	<p>To produce 1 Kg wheat, 1600 litres of water is required</p>
	<p>Milk</p>  <ul style="list-style-type: none"> ■ Green 85% ■ Blue 7% ■ Grey 8% 	<p>To produce 1 litre Milk, 1000 litres of water is required</p>
	<p>Beef</p>  <ul style="list-style-type: none"> ■ Green 93% ■ Blue 4% ■ Grey 3% 	<p>To produce 1 Kg beef, 154000 litres of water is required</p>
	<p>Beer</p>  <ul style="list-style-type: none"> ■ Green 85% ■ Blue 6% ■ Grey 9% 	<p>To produce 1 litre of beer, 300 litres of water is required</p>

The combined water demand for various sectors of India has been worked out for the year 2050 and was found to be 1447 BCM. For agriculture sector only, we will be requiring 1074 BCM by 2050. Maximum utilizable water resources in our country is 1123 BCM. By the year of 2050, if we could be able to develop all the water resources, then there would be a huge shortage of 324 BCM water. Agriculture sector being the major consumer of water resources and by 2050, no government can allot 74 percent of its total water resources to agriculture sector only. Under this circumstance, our strategies should be (i) to produce more from less water by efficient use of utilizable water resources in irrigated areas, (ii) to enhance productivity of challenged ecosystems i.e. rainfed and water logged areas and (iii) to utilize a part of grey water for agriculture production in a sustainable manner. Maximum efforts should be put for generation of technology in the above direction. Simultaneously efforts should be continued to bring effective awareness among the people regarding the future implications of water through qualified water resource personnel.

Water footprints and virtual water trade

In recent years our country has started exporting various commodities to other countries. We need to understand the virtual water flow in this process and water footprints associated with that commodity. Net virtual water flow should be calculated by subtracting the gross water outflow from the gross water inflow. If it is positive, the country or the region is gaining water, but if it is negative the country or the region is losing water. We also have to understand critically which segment of water resources are being exploited in the process and whether that exploitation is sustainable or not in the long run. For this analysis let us know basic terminologies.

Grey water

Grey water is water from our bathroom sinks, showers, tubs, and washing machines. It is not the water that has come into contact with fecal matter, either from the toilet or from washing diapers.

Green water

The precipitation on land that does not run off or recharge the groundwater but is stored in the soil or temporarily stays on top of the soil or vegetation.

Blue water

Fresh surface and groundwater, in other words, the water in freshwater lakes, rivers and aquifers.

Black water

Black water is the water coming from the toilet.

Virtual-water content

The virtual-water content of a product is the freshwater 'embodied' in the product, not in real sense, but in virtual sense. It refers to the volume of water consumed and polluted for producing the product, measured over its full production chain. If a nation exports/imports such a product, it exports/imports water in virtual form. The 'virtual-water content of a product' is the same as 'the water footprint of a product', but the former refers to the water volume embodied in the product alone, while the latter term refers to that volume, but also to which sort of water is being used and to when and where that water is being used. The water footprint of a product is thus a multidimensional indicator, whereas virtual-water content refers to a volume alone.

Virtual-water flow

The virtual-water flow between two geographically delineated areas (for example, two nations) is the volume of virtual water that is being transferred from the one to another area as a result of product trade.

Virtual-water import

The virtual-water import into a geographically delineated area (for example, a nation or catchment area) is the volume of virtual water associated with the import of goods or services into the area. It is the total volume of freshwater used (in the export areas) to produce the products. Viewed from the perspective of the importing area, this water can be seen as an additional source of water that comes on top of the available water resources within the area itself.

Virtual-water export

The virtual-water export from a geographically delineated area (for example, a nation or catchment area) is the volume of virtual water associated with the export of goods or services from the area. It is the total volume of

freshwater consumed or polluted to produce the products for export (Hoekshtra and Hung, 2002).

The Water Footprint

The Water Foot print of a product is the volume of freshwater appropriated to produce the product, taking into account the volumes of water consumed and polluted in the different steps of the supply chain. The water footprint of an individual, community or business is defined as the total volume of freshwater that is used to produce the goods and services consumed by the individual or community or produced by the business. Water footprint of a product is calculated by adding all the footprints i.e. green water footprint, blue water footprint and grey water footprint.

Grey water footprint

The grey water footprint of a product is an indicator of freshwater pollution that can be associated with the production of a product over its full supply chain. It is defined as the volume of freshwater that is required to assimilate the load of pollutants based on natural background concentrations and existing ambient water quality standards. It is calculated as the volume of water that is required to dilute pollutants to such an extent that the quality of the water remains above agreed water quality standards.

Blue water footprint

Volume of surface and groundwater consumed as a result of the production of a good or service. Consumption refers to the volume of freshwater used and then evaporated or incorporated into a product. It also includes water abstracted from surface or groundwater in a catchment and returned to another catchment or the sea. It is the amount of water abstracted from groundwater or surface water that does not return to the catchment from which it was withdrawn.

Green water footprint

Volume of rainwater consumed during the production process. This is particularly relevant for agricultural and forestry products (products based on crops or wood), where it refers to the total rainwater evapotranspiration (from fields and plantations) plus the water incorporated into the harvested crop or wood (Hoekstra et al. 2011).

Policy implications for India

India is an agricultural country and we are exporting various agro-based products to other countries. If the exported commodities are produced from rainwater, then there would be no problem with respect to sustainability of water resources. However, those commodities which are produced during rabi or winter season, they invariably consume groundwater. As the groundwater recharge process is very slow, our extraction is surpassing the recharge, in many folds, depleting the groundwater level. In the entire north western India, entire central India and in some parts of peninsular India, annual groundwater depletion is taking place at an alarming rate. Depleting groundwater resources for our own consumption is fine, but for export, eliminating ground water from our soil is not at all a visionary step. Water footprint and virtual water trade would guide us which commodities from which place and to what extent we should export so that it wouldn't have negative impact on the sustainability of our groundwater resource.

References

Central Ground Water Board. 2007. Manual on artificial recharge to ground water, CGWB, MoWR, New Delhi

Hoekstra, A.Y., Chapagain, A.K., Aldaya, M.M. and Mekonnen, M.M. 2011. The water footprint assessment manual: Setting the global standard, Earthscan, London, UK.

Hoekshtra, A. Y. and Hung, P. Q. 2002. Virtual water trade: A quantification of virtual water flows between nations in relation to international crop trade. Value of water research report series No.11, P.O. BOX 3015 2601 DA DELFT, THE NETHERLANDS.

Panda, P. K. 2013. Natural resource conservation through watershed management in rainfed areas: role of pulses. In- Resource Conservation Technologies in Pulses by P. K. Ghosh, N. Kumar, M.S. Venkatesh, K.K. Hazra and N. Nadarajan, Scientific Publishers (India), Jodhpur - 342 001.

Vision 2030. 2011. Directorate of Water Management (ICAR), Bhubaneswar, Odisha-751023.

Vision 2050. 2013. Directorate of Water Management (ICAR), Bhubaneswar, Odisha-751023.



Dr. Pramod Kumar Panda

Principal Scientist (Agronomy),

Indian Institute of Water Management,

Government of India, Chandrasekharpur

(Opposite Rail Vihar), Bhubaneswar, Odisha-751023

Mob: 8763841108, 8917426440

Email: pandaicar@gmail.com

Dr. Pramod Kumar Panda has specialised in conservation agriculture, organic farming, watershed management, integrated farming and rainwater management; and has remained in charge of ICAR-IIS & WC Centre, Agra, and the Research Farm, ICAR-Indian Institute of Water Management, Bhubaneswar. He also rendered his services as Expert Member in the Drought Management Committee of Government of Rajasthan, and Expert Member to IPR and GI registration committee of Government of Odisha. Dr Panda has over 104 different publications in national and international journals. Dr Panda periodically appears in programmes of All India Radio and Doordarshan. Among several awards and medals that Dr Panda have received, are two BHU gold medals during Post-graduation; fellowships from ICAR during Post graduation and Ph.D.; the Vice Chancellor Award in OUAT; and other awards for best research and presentations.



World Health Day - 2019

Universal Health Coverage (UHC): Everyone, Everywhere

OES-Highlights: (Discussion on 07.04.2019)

Guests:

Dr. C. Mohan Rao

Assistant Professor, KIIMS, KIIT University, Bhubaneswar

Dr. Seba Mohapatra

MD, Former Director of Health, Govt. of Odisha



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). The theme has remained the same for the years 2018 and 2019. 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 observed 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.

World Health Day 2019-Theme: Universal Health Coverage: Everyone, Everywhere

(Based on the talk delivered by Dr. C. Mohan Rao)

Universal health coverage (UHC) is about ensuring all people and communities have access to quality health services where and when they need them, without suffering financial hardship. It includes the full spectrum of services needed throughout life, from health promotion to prevention, treatment, rehabilitation, and palliative care, and is the best based on a strong primary health care system.

Achieving UHC is one of the key targets of the 2030 Agenda for Sustainable Development, and it has been the focus of World Health Day in 2018 and 2019.

What we aim to achieve through the campaign?

- This campaign aims to help people better understand what universal health coverage means, what services and support should be available and where.
- Health workers will have an important role to play in the campaign; helping decision-makers for health to recognize what people need in terms of care, particularly at the primary care level.
- The campaign also presents an opportunity for ministers of health and other government decision makers to commit for taking action to address gaps in universal health coverage in their countries, as well as to highlight progress that has already been made.

Background on the goals

The Sustainable Development Goals (SDGs) were reaffirmed at the United Nations Conference on Sustainable Development in Rio de Janeiro in June 2012. The objective was to produce a set of universal goals that meet the urgent environmental, political and economic challenges facing our world.

The SDGs replace the Millennium Development Goals (MDGs), which started a global effort in 2000 to tackle the indignity of poverty. The MDGs

established measurable, universally-agreed objectives for tackling extreme poverty and hunger, preventing deadly diseases, and expanding primary education to all children, among other development priorities.

For 15 years, the MDGs drove progress in several important areas: reducing income-poverty, providing much needed access to water and sanitation, driving down child mortality and drastically improving maternal health. They also kick-started a global movement for free primary education, inspiring countries to invest in their future generations. Most significantly, the MDGs made huge strides in combating HIV/AIDS and other treatable diseases such as malaria and tuberculosis.

Key MDG achievements

- More than 1 billion people have been lifted out of extreme poverty (since 1990)
- Child mortality dropped by more than half (since 1990)
- The number of out of school children has dropped by more than half (since 1990)
- HIV/AIDS infections fell by almost 40 percent (since 2000)

The legacy and achievements of the MDGs provide us with valuable lessons and experience to begin work on the new goals. But for millions of people around the world the job remains unfinished. We need to go the last mile on ending hunger, achieving full gender equality, improving health services and getting every child into school beyond primary. The SDGs are also an urgent call to shift the world onto a more sustainable path.

The SDGs are a bold commitment to finish what we started, and tackle some of the more pressing challenges facing the world today. All 17 Goals interconnect, meaning success in one affect success for others. Dealing with the threat of climate change impacts how we manage our fragile natural resources, achieving gender equality or better health helps eradicate poverty, and fostering peace and inclusive societies will reduce inequalities and help economies prosper. In short, this is the greatest chance we have to improve life for future generations.

The SDGs are unique in that they cover issues that affect us all. They reaffirm our international commitment to end poverty, permanently, everywhere. They are ambitious in making sure no one is left behind. More importantly, they involve us all to build a more sustainable, safer, more prosperous planet for all humanity.

What are the Sustainable Development Goals?

The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by all United Nations Member States in 2015 as a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030.



The 17 SDGs are integrated that is, they recognize that action in one area will affect outcomes in others, and that development must balance social, economic and environmental sustainability.

Chronic obstructive airway disease is an aftermath of pollution of the environment, outdoor and indoor. Smoking is projected to be the third cause of worldwide mortality. Tuberculosis causes havoc to human suffering and economic loss (12 billion\$ annually). Since centuries India bears the burden around 25-30% of global incidence, mortality, and the burden of TB-drug resistance.

Through the pledge to 'Leave No One Behind', countries have committed to fast-track progress for those farthest behind the first. That is why the SDGs are designed to bring the world to several life-changing 'zeros', including zero poverty, hunger, tuberculosis, AIDS and discrimination against women and girls.

Everyone is needed to reach these ambitious targets. There is a need to bring down morbidity and mortality of common diseases, both communicable and non-communicable, that impact common people across many nations.



Dr. C. Mohan Rao

Assistant Professor

KIIMS, KIIT University. Bhubaneswar

Dr. C. Mohan Rao was born on 14 September 1955. Formerly he was the Joint Director (Medical & Health Services) & HOD, Post Graduate Dept. of Respiratory Medicine at Rourkela Steel Plant, Steel Authority of India, Rourkela. He has a track where he chaired and presented lectures in state and national level conferences, with programmes in television. Dr. Rao's publications in national and international journals are cited in text books on respiratory diseases. Dr. Rao nurtures hobbies like philanthropy, teaching the medical students and academic upgrading.



Dr. Seba Mohapatra

Former Director, Health Services, Govt. of Odisha,
N1, A/10, IRC Village, Bhubaneswar-751015
Mob: 9437035531,
E-mail: drsebamohapatra@yahoo.co.in

Dr. Seba Mohapatra was born in 1943 in Naradia village in Jagatsinghpur District of Odisha. After doing MBBS and MS (O and G) she served in various capacities at different places as a specialist medical officer and physician under the Department of Health and Family Welfare, Government of Odisha. She adorned the post of Chief District Medical Officer, and superannuated in 2003 as Director, Health Services. After superannuation she continues to render her services for the cause of common man, being associated with a number of social service organisations. Enjoying supervisory and consultant status Dr Mohapatra worked for the World Bank project, State Institute of Health and Family Welfare. She was also chief advisor to the White Ribbon Odisha for Safe Motherhood, and a faculty at the Asian Institute of Public Health, Odisha. She has attended, chaired and presented papers on her subject of expertise in various seminars and conferences, and been a regular discussant in the mass media on issues related to health. She is the recipient of WHO Fellowship, and a number of prestigious awards including the 'Subarna Jayanti Samman' by Odisha State Welfare Board, and 'Lifetime Achievement Award' by OBGY Society, Bhubaneswar. Dr Mohapatra also contributes popular articles to popular Odia dailies and magazines. She rendered an inspirational participation when OES launched its 'Clean and Green'; campaign in the campus of Capital Hospital, Bhubaneswar.

World Health Day Themes

2019: Universal Health Coverage: Everyone, Everywhere	
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

Pugmark Tracking: The Traditional Science for Tiger Population Studies (1972-2004)

(From the Discussion Room, dt. 04 August 2019)

The Pugmark Tracking, also called 'Cooperation Census' technique was developed over 47 years back by the Odia Forest Officer- Saroj Raj Choudhury and was refined with simplifications in many aspects by OES Patron Dr Lala Aswini Kumar Singh during the 1990s from his work in Odisha, particularly Similipal forests. The Annual Report-2019 puts in record some straight facts related to the subject for future reference, with expectation that any new method should produce equally focused results for guidance of tiger population managers.



Tiger track on road

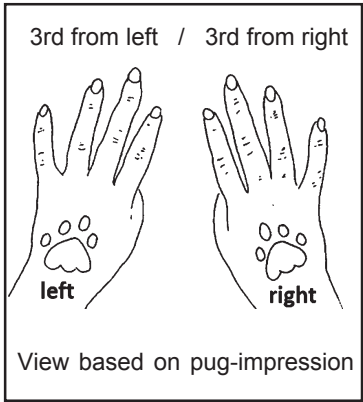
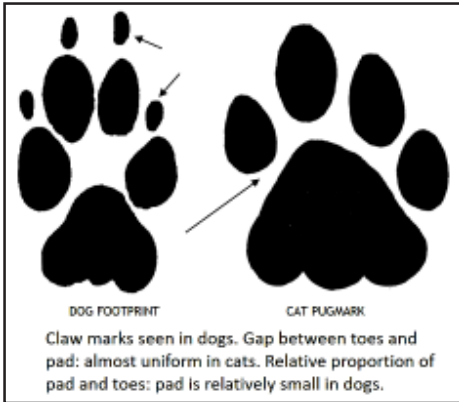


Transferring pugmark using 'Tiger Tracer'

- During the period 1972-2004 the traditional method was used with refinements;
- The technique requires 7 days for PIP-laying (Pug Impression Pad), and 6 days for data collection; analysis, done with data-collectors, takes 2-3 months for Odisha state. PIPs, each like a natural camera on ground- made of fine soil on ground, were used to get good interpretable impressions of the pugmarks. In Similipal alone, over 4500 PIPs were laid down and used during each census;
- Protocols use over 25 field-parameters to distinguish Tiger from

Leopard, male-female-cub, front-hind pugs, left-right pugs, and sometimes individuals to help analysis;

- It is called 'Cooperation Census' because the entire Forest Department and also the local people and non-officials participate in the process; the method is time-tested from 1970, much improved in 1990s; a lot of research were undertaken to standardise the technique; used in all tiger-range countries until 2004; all staff can understand, use, interpret and conclude; the traditional skill of people is used; it is economic;
- Actual composition of population is known with Male-Female-Cub and their spatial relationship over the terrain; cubs are linked to mother, and territory of female is identified with that of male territory; all locations (movement areas) shown on map; GPS readings were possible because of introduction of the hand-set equipment after 2002, but
- Contribution of the Cooperation Census (Pugmark Tracking) to National Scenario: the first nine Tiger Reserves (TR) were identified in 1973; the number of tiger reserves increased from 9 to 27 by 1990s and 41 by the year 2004; the area of TR increased from approx. 16339 sq.km in 1973 to 37269 sq.km in 1990s; all major tiger habitat types and populations were covered under TR-network;
- The habitat types are in the Himalayan High Altitude (Corbett), flat Terai Swamps (Dudhwa), hot humid Coastal Mangroves (Sundarbans), scorched and arid Scrubland (Sariska and Sawai Madhopur in Rajasthan), lush evergreen forests (TRs in south and north-east India), rolling hard grounds of Peninsular India, Sal-dominated hilly miscellaneous and semi-evergreen forests (Similipal);
- Contribution of Tiger Studies in Similipal to National Scenario: cautioned since 1990s about tiger gene pool degradation (evidenced from melanistic tiger), stagnation of tiger population, imminent reduction in tiger numbers, and the need for development of tiger corridors and their management at landscape level.



ବାସ ପାଦ ଚିହ୍ନ

FORM - D

ପତ୍ର ସଂ.ଏ*

ସୂଚିତ ଅଧ୍ୟାପକଙ୍କ ନାମ ଓ ପି.ଇ.ଆ.

ଉତ୍କଳ ଚଳେଦନରାଜ୍ୟ ଆକାଶବାନୀକାରୀଙ୍କ ନାମ ଓ ପି.ଇ.ଆ.

ପି.ଇ.ଇ.ଇ. ନାମ ଚାରିକା ସ୍ଥାନ

କେଉଁ ରାଜ୍ୟ ବା ନଦୀ ଧାର ପି. ଆଇ. ପି. ଏ*

କି ପ୍ରକାରର ନାମରେ ଚିତ୍ର ଲେଖାଯାଇଛି - ସୂଚିକାଙ୍କା/ ଚଳେଦନା/ ବାସି/ ବାସୁକା/

କେତେ ଚିତ୍ର ପାଇବୁ ଚିତ୍ର ଚିତ୍ରାଙ୍କିତ ହେବ

କେଉଁ ଚିତ୍ରକୁ ସାଧକି

ପଞ୍ଜୀକୃତ ନାମ (କେ.ନି.)	ପଞ୍ଜୀକୃତ ପାଦଚିତ୍ର (ସଂଖ୍ୟାରେ କର)			ଧାର ବା ଜାଗା ଇତି
	ଯଦି ଆପଣ-ପଞ୍ଜୀକୃତ ପାଦ ନିଖରେ ଦୂରତା ୩୦ ସେ.ମି. ବୁ ଜଣୁ ଆମ କେତେ ଦୂରତା ପାଖପାଖି ନିଖରେ ଦୂରତା ଲେଖନ୍ତୁ ।			
	ବାସକୁ ବାମ	ଫୁଲକକୁ ଫୁଲକ	ବାସକୁ ଫୁଲକ ବା ଫୁଲକକୁ ବାମ	

ପଞ୍ଜୀକୃତ - ବାମପାଦ ଚିତ୍ର ଚିତ୍ର (ବାମପାଦ ଉପରେ ଲେଖି ନିଖରେ ଲେଖ)

ପଞ୍ଜୀକୃତ ନାମ*

ପାଦଚିତ୍ର ପାଖରେ ଚିତ୍ର

କାମ ଚାହୁଁ କେତେ ଧରଣ

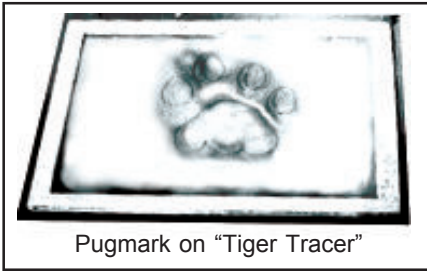
କାମ ଚାହୁଁ କେତେ ଧରଣ

କାମ ଚାହୁଁ କେତେ ଧରଣ

(ଉତ୍କଳ ଚଳେଦନରାଜ୍ୟ ଆକାଶବାନୀକାରୀଙ୍କ ପଞ୍ଜୀକୃତ)

ଚିତ୍ରାଙ୍କନ ନାମ.....

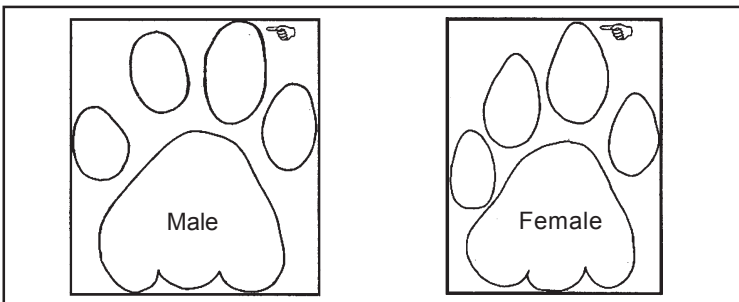
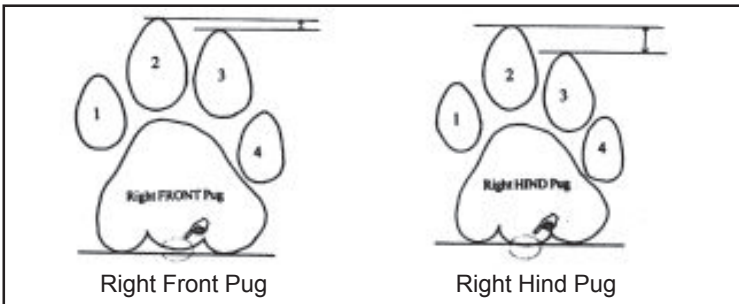
ପଞ୍ଜୀକୃତ



Pugmark on "Tiger Tracer"

For each plaster-cast an ID-number is given and it is mentioned on Form-D having the pugmark-tracing.

Reflecting on the skill of Census-Unit-Leader, sometimes a tracing is drawn from a better plaster cast. Tracings are used to segregate Leopard from Tiger, and the composed male-female-cub of each species.



Male hind pugmark fits to a square (PML~PMB <1cm); and female to a rectangle. Note: a biological square is not a mathematical square

Facsimile of Tiger Census Route Chart (not to scale)

SIMILIPAL TIGER RESERVE. Year: 1998 Range: UBK
 Tiger Census Unit No....., Name of Unit: BHANJABASA-I
 Unit Leader: SRI BAIJU CHARAN MAJHI, FG
 Assistants:.....
 Non-official Member.....

NAME OF THE ROUTE	DISTANCE IN KM.	NO. OF PIPS	CENSUS DATES
1. BH.BASA-PUTULIDIHA-MEGHASINI RD.- CHADHEICHUA-KUMBHAGHAI	8	15	05 + 08
2. BH.BASA-GUNDURIA-CHINGUDIA	11	20	06 + 09
3. BH.BASA-CHAMPACHUA- RANGAMATIA F.P.	12	18	07 + 10
	12	18	07 + 10

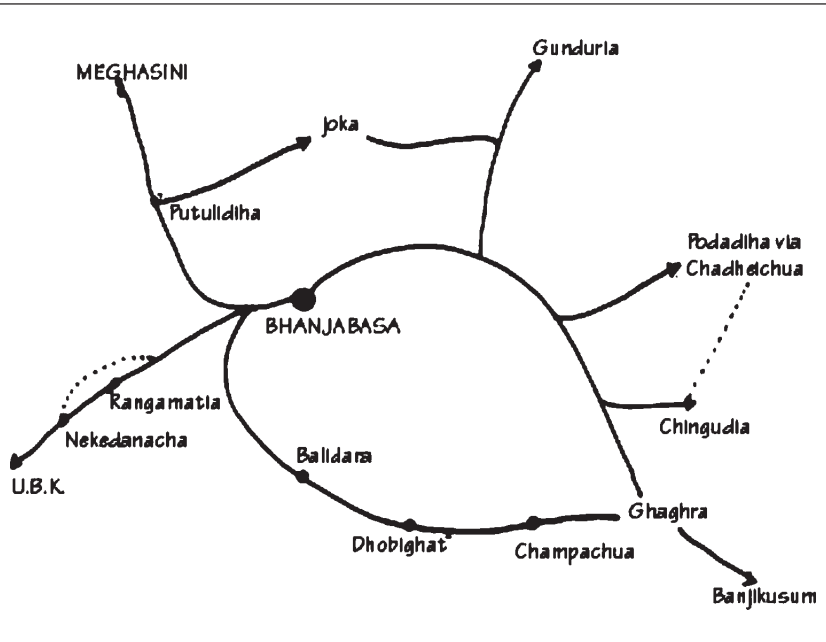


Table: Example of analysis report after each 'Pugmark Tracking' census showing identity, movement area and Tiger families (from Similipal).

SIM Sl. No.	Range Sl. No.	Unit L x B x S	Pug	MovementArea
Tiger				
M1	PTM1	B.M.Bari (Pithabata Range)	11.7 x 11.4 x 110	Kukudakhumpi-Sahubandha
M12	UTM1	Bhanjabasa	13.0 x 12.2 x 128	Bhanjabasa-Champachua-Balidara
M28	BTM1	(Kaptipada Range)	11.9 x 12.2 x 128	Balidara-Champachua-Kenduchua
F8	N TF1	Joranda	13.6 x 9.8	Joranda-Ring road-Guhal Pahad (TC14)
F10	N TF3	Khadkei	11.4 x 9.3 x 138	Daudidarha-Pandabandha- Sas.jharan (TC6, TC7)
F18	J TF4	Nuagaon / Devasthali	12.4 x 10.1	Nuagaon -(D.sthali-Golakund-S.mundi-Nuagaon-Bam.diha-Sarudala-) (TC25, TC26)
C6	CTC4		7.9 x 6.2 x 78	Baunsakhal-Purunapani (TF10)
C7	CTC5		7.5 x 6.4 x 76	Baunsakhal-Khadkei (TF10)
C14	NTC1	Joranda	8.8 x 9.0 x 95	Joranda-ring road-Guhalpahad (TF8)
C25	UTC9	Mahabirsala	8.0 x 7.8	Mahabirsala-Sarudala (TF18)
C26	UTC-10	Mahabirsala	7.9 x 8.5	Bachhurichara-Sarudala (TF18)
Key for symbols in first and last columns: C = Cub, F = Female, M = Male, T = Tiger				

Further Readings (Odisha authors only)

Choudhury, S. R. (1970). Let us count our tigers. *Cheetal* 14(2): 41-51.

Choudhury, S. R. (1971). The Tiger Tracer. *Cheetal* 13(1).

Choudhury, S. R. (1971). The Tiger Stride. *Cheetal*, 14 (2): 62-65.

Choudhury, S. R. (1972). Tiger census in India. Part I and II, *Cheetal* 15(1): 67-84.

Singh, L. A. K. (1995). Sex-Identification technique and sex ratio in Tiger: doubts and clarifications. *Indian Forester* 121(10): 885-894.



Singh, L.A.K. (1999). Tracking Tigers: Guidelines for estimating wild tiger populations using the 'Pugmark Technique'. WWF Tiger Conservation Programme, 39pp.



Singh, L.A.K. (1999). Tracking Tigers: A pocket book for forest guards. WWF Tiger Conservation Programme. 40pp

Singh, L. A. K. (1999). Born Black: The Melanistic Tiger in India. WWF-India, New Delhi. Viii+66pp.



Singh, L.A.K. (2000 a). Tracking Tigers: Guidelines for estimating wild tiger populations using the 'Pugmark Technique': Revised Edition. WWF Tiger Conservation Programme, 39pp.

Singh, L. A. K. (2000 b): Improved approach to tiger counting through pugmarks. Discussion based on power-point presentation at the Seminar:

"Wildlife in the wake of the third millennium" Venue: Indian Museum Auditorium, Calcutta (Kolkata) Date: 18 January 2000.

<https://independent.academia.edu/>

Singh, L. A. K. (2012): Supplement to Khan 2012 - Technological Enhancements Needed in Photo-trap Approach for Forthright Use by Tiger Population Managers. *Journal of Threatened Taxa*, April 2012. 4(4):2551-2552.



The method for pugmark tracking of large carnivores was invented by Saroj Raj Choudhury and practiced for the 1st All India Tiger Census in 1972. Sri Choudhury was the Senior Research Officer in Forest Research Institute, Dehra Dun at that time, and became the founder Field Director of Similipal Tiger Reserve. Sri Choudhury had adopted a tigress, Khairi from about 3 months age in 1974 till her 1981-euthanasia death following rabies-attack. After demise in 1982, Sri

Choudhury got honoured with Padmashree in 1983.



In 1999, the WWF-India recognized Dr. Lala Aswini Kumar Singh, (Senior) Research Officer in Similipal Tiger Reserve with WWF-medal and award for significant and innovative contributions in tiger conservation, and published his works on improved pugmark tracking and colour aberrations in tiger. Based on work in Similipal Dr. Singh and the concerned

Field Directors had cautioned since 1990s about tiger gene pool degradation, stagnation of tiger population, the imminent reduction in tiger numbers, and the need for development of tiger corridors and their management at landscape level. In 2010 Dr. Singh was honoured with the “Man of the Year (Wildlife Conservation) Award” from the organisation HONEST (House of Nature, Environment and Society Trust). In 2013, Dr Singh received the Odisha state honour, Biju Patnaik Award for Wildlife Conservation. On World Environmental Day 2015 Dr. Singh received the “Environmentalist of the Year Award” from Orissa Environmental Society. He has over 350 various publications on wildlife research and management.



Scope of Renovation and Rejuvenation of Water Bodies of Bhubaneswar for Water Security

Binayak Rath

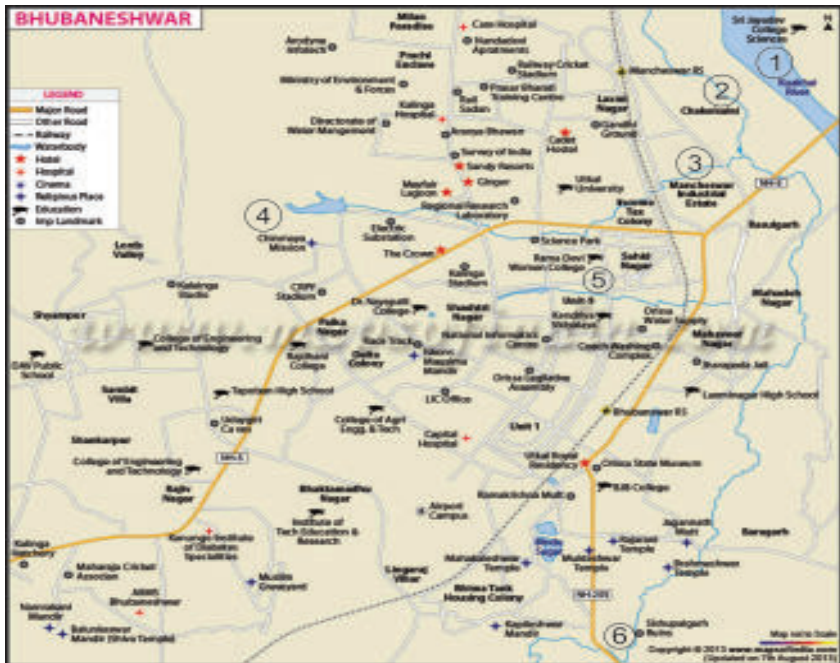
(Summary of invited article following his lecture presented on 06.11.2016)

Bhubaneswar, the capital city of Odisha, is endowed with a number of hills and ridges, a number of rivers around it, more than 21 natural streams flowing to the rivers, a number of natural springs, lakes and ponds, artesian wells/springs as well as canal network. It being a holy place known as Ekamrakhetra has also a number of Lord Shiva temples that were built mostly during the reigns of Soma/Keshari as well as the Ganga dynasty during 11th and 12th century. It is endowed with traditional water bodies like river, natural streams and ponds in their vicinity for use of the devotees coming from far off places. One such river in close vicinity of the heritage temples of the city is Gangawati/ Gandhabati / Gangua, circumventing the city with pure water carrying from the nearby hills.

Since the Ganga Kings had named Ekamkhetra as second Kashipith / Baranashi they had given the Gandhawati / Gangua the status of the Ganges. However, with rapid growth of population coupled with urbanisation, industrialisation & commercialisation, the pressure on land & water resources have gone up significantly. Added to it, the rise of private housing colonies and the associated encroachment of the river water courses, ponds and canal have aggravated the safe drinking water problems of the city.

Most of the natural streams existing in and around Bhubaneswar and more particularly, the historic and heritage river like the Gangawati / Gangua (Map-1) are either blocked due to various construction activities or the existing ones are highly polluted due to discharge of untreated urban liquid and solid wastes into those streams. We have noted that a few of the

springs and artesian well are the main source of water for a few ponds, e.g., Kedargauri pond, Nayapalli/ Bhoingar pond, Dumduma pond, Gadakan pond and Darutheng pond, which sustain water flows from them throughout the year. A few artesian wells and springs have formed lakes and wetlands.



Map-1: A portion of the Ganga and few other water bodies of Bhubaneswar.
 1. Kuakhai River- a branch of Mahanadi; 2. Gangua River- a tributary of Mahanadi system; 3. Vani Vihar Lake; 4. Bio-Tech Park Lake; 5. Nayapalli stream; 6. Sishupalgarh, erstwhile capital of emperor Khar Vel (1st BC)

The discharge of municipal liquid & solid wastes into the water bodies without treatment has been polluting the rivers & streams and the pollution load has crossed the threshold levels as specified by the Central Pollution Control Board (CPCB) / State Pollutions Control Board (SPCB). The pollution of river courses has adversely affected the downstream villages in terms of the loss of agricultural productivity, fishing potentials, aquatic life, safe water for bathing and drinking as well as for ecological life. Hence,

a time has come to critically examine the various issues associated with the water bodies of Bhubaneswar and the need for their rejuvenation and renovation.

Floods in the Gangua during Monsoon & Flow in Lean Seasons:

During the monsoon seasons, when there is excess rain in its catchment area, the river water overtops its boundary and causes flooding in the vicinity. The encroachment of the flood zone of the Gangua by human activities has further aggravated the problem. In the last two decades, a number of times the river has caused flooding and the severe among them are the floods of 1999, 2006, 2008, 2009 and 2013.



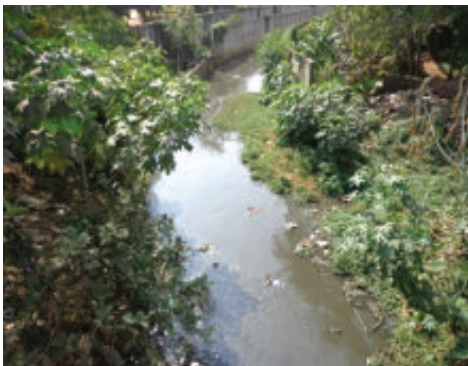
Photo: A



Photo: B

Photo: A - Gangua river in full spate

Photo B: Flood fury in Old Town area of Bhubaneswar where a man is trying to salvage his scooter



Untreated urban waste water directly discharged

Conservation of the Gangua

In the National Water Policy, 2012 vide section 8 it is envisaged that there should be a thrust on conservation of river, river corridors,



water bodies and associated infrastructure in a planned manner with community participation. The storage capacity of water bodies and water courses and associated wetland, the flood plains, ecological buffer areas required for recreational and social needs ought to be managed in an integrated manner to balance flooding, environment and social issues in a planned manner, particularly in the urban areas.

In tune with the above National Policy, it is suggested that attempts should be made to conserve the Gangua, its corridors and associated infrastructure by the Department of Water Resources with participation of all stakeholders.

The BDA/ Municipal authorities should construct decentralised

effluent treatment plants at different locations even in the simple form of oxidization ponds. In view of a good scope for revival and rejuvenation of these water bodies like the traditional streams, the BMC and BDA should set up treatment plants at intermittent points in a decentralised manner. Rejuvenation of these natural streams be included as a part of smart city planning exercise.

In course of our extensive field visits over a period of more than one year in 2018-19 to study the health of the Gangua and its streams, we have noted that the Daya west canal is still carrying fresh water from the Mahanadi system and it is extensively used by the villagers for various domestic uses, fishing as well as for farming up to Patia.

A Prominent Wetland of Bhubaneswar: Patia Dahal/ Patia Jheel

One of the prominent Wetlands of Bhubaneswar is the Patia Dahal which is formed by artesian spring effects and is located in village Sijuput and Nargoda of Tamando Panchayat covering an area of 6-7 acres. It is located between Tamando-Nargoda road on East-South and Gangapatna-Paikarapur road towards Madanpur on North-West side. The streams carrying the fresh water from Patia Jheel/ Dahal are Pahani nal flowing towards Madanpur.

To contain the climate change effects, we foresee a significant role of artesian wells and springs like Patia Dahal, which should be declared as a protective zone. Both in the core and in its buffer zone, no agricultural land be allowed to be converted into housing sites.



Prof. (Dr) Binayak Rath

Former Vice-Chancellor, Utkal University

Tel: 0674-2383175 (R) 09439013585(M)

Email: brath@niser.ac.in

Professor Binayak Rath is presently in IIT Bhubaneswar as Adjunct Faculty. The parent position of Professor Rath was in IIT, Kanpur, where his work on “Social Benefit-Cost Analysis” brought him the Ph.D. degree in 1980, and he had superannuated in June 2012 when he was Professor of Economics in the Department of HSS & EEMP. Prof. Rath also served as Professor in IIM-Lucknow and NISER-Bhubaneswar. As Vice Chancellor of Utkal University Professor Rath initiated a number of academic reforms, introduced innovations to rejuvenate the NSS activities in affiliated colleges and made improvements to make Vani Vihar a clean and green campus with the participation of all stakeholders. A few new teaching programmes were introduced on a PPP mode in the emerging areas of knowledge. Prof. Rath got his Honours and PG degrees in Economics from Utkal University, and joined Orissa Education Service and taught in Dhenkanal College (1971-1975) and Ravenshaw college (1980). For the last few years, he has been deeply involved in undertaking post-evaluation studies of a number of mining projects, particularly, in assessing their impact on the socio-economic environment including R&R aspects. Presently, he is working on environmental issues dealing with land and water management in rural and urban areas as well as in evaluation of the effectiveness of the women self-help groups and participatory irrigation management in typical regions of the country. Very often Prof. Rath is invited by academic and research institutions as well as industrial houses in India and abroad to address their special programmes. In this context or as member of Indian missions he visited many countries including Australia, Canada, England, Finland, Germany, Hongkong, Ireland, Nepal, Singapore, Spain, Sweden, Srilanka, Thailand, the Netherlands, the Peoples Republic of China, & the USA. Prof. Rath has authored more than 150 papers in national and international publications. Prof. Rath has published a book on “Employment Multiplier Linkages of the Steel Industry in India”, and authored more than twenty monographs, of which the important ones are “R&R in India: Approaches, Policies and RAP”, “Management of Water Resource Projects in India”, “Impact Evaluation Study of “BKVY and PP in KBK Districts”, and “Estimation of Chief Drivers of SDP of Uttar Pradesh”.



2. Activities of OES: 2018-19

(Up to October 2019)

20th Odisha Bigyan 'O' Paribesh Congress

November 17-18, 2018

The Congress was organized by Orissa Environmental Society, Bhubaneswar, and National Institute of Science Education & Research Bhubaneswar at NISER Bhubaneswar, Jatni. The focal theme of the Congress was 'Science for Society'.



The Inaugural Function was conducted in the presence of the Chief Guest Sj. Badri Narayan Patra, Minister, School & Mass Education, and Science & Technology; the Chief Speaker - Prof. Ishan Kumar Patro, Vice Chancellor, Ravenshaw University; the President - Prof. Sudhakar Panda, Director, NISER Bhubaneswar; Dr. Sundara Narayan Patro, President, Orissa Environmental Society; Dr. Jaya Krushna Panigrahi- Secretary OES and Convener of OBPC, and Dr. Debasmita P Alone, the Co-Convener. Prof. Sudarshan Nanda, Prof. Rabindranath Nayak, Prof. Mahendra Kumar Mahanti and Prof. Sudhakar Panda were felicitated on the occasion.

The Keynote Address on the Theme: 'Science for Society' was delivered by Prof. Ishan Kumar Patro, Vice Chancellor, Ravenshaw University, Cuttack. The Invited Lectures were delivered on (1) 'Advances in Neuro-Sciences and Future Promises' by Prof. Ashok Kumar Mahapatra, Former Director, AIIMS Bhubaneswar; (2) 'Conserving Tigers in a Human-dominated

Landscape of India by 'Dr. Debabrata Swain, Principal Chief Conservator of Forests, Odisha; (3) 'Understanding Universe: Two Biggest Discoveries of 21st Century' by Dr. Sanjay Kumar Swain, Assoc. Professor, NISER Bhubaneswar, and (4) 'On Science Education and Research' by Dr. Ajit Mohan Srivastava, Professor, Institute of Physics, Bhubaneswar. There were three Technical Sessions covering Biological, Physical and Technological Sciences; and a Panel Discussion on 'Science for Society' with Prof. Niranjana Barik, Former HoD of Physics, Utkal University on Chair, and as Members there were Dr. Pranay Kumar Swain, Reader-F & Dean-SA, NISER, Dr. Chitta Ranjan Mishra, Former GM (R&D), Nalco, and Dr. Rajeeb Swain, Scientist D, Institute of Life Sciences.

The Valedictory Function was conducted with Chief Guest - Prof. R V Rajakumar, Director, IIT Bhubaneswar, two Guests of Honour- Prof. Omkar Nath Mohanty, Former Vice Chancellor, BPUT and Dr. Debabrata Swain, PCCF, Odisha; the President - Prof. Sudhakar Panda, Director, NISER Bhubaneswar, and the presence of Dr. Abhaya Kumar Naik, Registrar, NISER Bhubaneswar, Dr. Jaya Krushna Panigrahi, Convener, and Dr. Debasmita P Alone, the Co-Convener.



Dr Jaya Krushna Panigrahi, Secretary OES recently retired as Head of the Dept. of Zoology & Environmental Science, Sri Jayadev College of Education & Technology, Naharkanta, Bhubaneswar. His doctoral research was on environmental impact assessment in Chilika Lake with regard to the fishery resources. He also worked as the Convener of Indian Science Congress Association: Bhubaneswar Chapter since its inception at Orissa Environmental Society. Dr Panigrahi has edited conference proceedings, books and journals. Regularly he participates in panel discussions organized by Odia TV channels.

Clean & Green Campaign: Voice of Action

Orissa Environmental Society is committed to spread awareness in the society for a clean and green environment. In our endeavour of creating such an environment in Bhubaneswar and its surrounding villages, the society is focusing its attention on the following aspects:



- **Municipal Solid Waste:** Cleaning of Municipal Garbage, plastics & other similar polluting debris
- **Tree Plantation:** Plantation of trees in selective areas with a higher survival rate
- **Water:** Conservation of water and protection of water bodies

It is felt that a structured approach followed by a sustained effort is very much essential in nurturing a culture of cleanliness with green surrounding. Therefore, in all our programmes we have drawn in public participation along with support from concerned authorities wherever possible.

A. Cleaning of Municipal Solid Waste

(Cleaning of plastics and other polluting debris)

As we all are aware of the catastrophic effect of plastic pollution, the team gave a thought to start its journey from a place or location which will have the potential to influence a large no of people. Hence, the team zeroed upon the places like: Heritage Locations, Public Hospitals, and Market Places etc.

A.1. Khandagiri & Udaygiri" Twin Hills

Our first endeavour was at "Khandagiri & Udaygiri" twin hills heritage place where on an average more than a thousand tourists visit daily apart from local people. The launching program was held on 26th March, 2019 by OES in collaboration with Archeological Survey of India, Bhubaneswar Circle and Bhubaneswar Municipal Corporation. The program was inaugurated by Mr. Samarth Verma, Commissioner, BMC in presence of Mr. Arun Mallick, the ASI Head of Bhubaneswar circle. Dr. S. N. Patro, OES President presided over the meeting and requested BMC & ASI machinery for their support and attention in creating a world class heritage place. The BMC Commissioner and ASI BBSR Circle head assured to extend all possible help in this regard. The local welfare organisations

namely Jayadev Walkers Club, Khandagiri Anchalika Bikash Parishad, Khandagiri Baristha Nagarika Sangha and Khandagiri Yoga Zilla of Bharatiya Yoga Sansthan were also associated with the program.

The program was successfully coordinated by Er. Manoranjan Mishra. Mr. Raghunath Prusty conducted the oath and Dr. Pradeep Kumar Rath proposed vote of thanks. Dr. Narayan Tripathy followed up with all the concerned institutions and stakeholders. As a sustained measure, the team had continued its campaign with relentless efforts in the twin hills area for one and half hours daily for next three weeks by way of physical cleaning, counselling the local vendors and persons, and distributing "Do's & Don'ts" leaflets.

A.2. Capital Hospital, Bhubaneswar

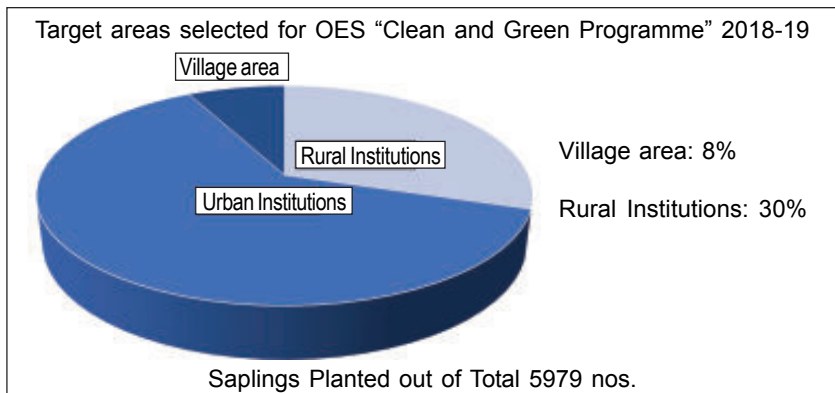
"Clean & Green" core team launched its second awareness campaign at Capital Hospital, Bhubaneswar on 21st Jun'19. The inauguration program was presided by OES President Dr. S.N.Patro. Mr. Surath Mallick, Additional Commissioner, BMC was the Chief Guest and inaugurated the launching program at Capital Hospital. Dr. Ashok Kumar Pattnaik, Director of the hospital also addressed the gathering.

The function was attended by Dr. Jaya Krushna Panigrahi, Secretary OES; other dignitaries like Prof. Manas Senapati- Trident Academy; Mrs. Arati Mohapatra- Social Activist; Mrs Swapna Behera- Poet of International repute; Mr. Pratap Mohapatra- Vice President- Plant Lovers Association; Mr. Ajay Pattnaik- Deputy Labour Commissioner; Mr. Shanti Bardhan of ICICI bank and many others. The eminent personalities from the hospital were Dr Manoranjan Sethi- Superintendent, Dr. Dhananjay Das- Dy Superintendent, Dr. Debashis Mishra- Blood Bank Superintendent, other



doctors and City Health officer of BMC, Dr. Basant Mishra and Deputy Municipal Commissioner Mr. Sumanta Mishra. Shop keepers and vendors also joined to clean the premises of the hospital. The meeting followed tree plantation by Mr. Surath Mallick, Dr S. N. Patro, Dr A. K. Pattnaik and others. The program was successfully coordinated by Er. Manoranjan Mishra. Mr. Raghunath Prusty conducted the oath and Dr. Pradeep Kumar Rath proposed vote of thanks. Dr. Narayan Tripathy followed up with all the concerned institutions and stakeholders.

After the inauguration, the "Clean and Green" core team continued their awareness programme on cleaning and counselling with further activities for two hours daily in the hospital premises. It continued regularly for more than a month and made the people conscious and responsible in transforming the hospital premises towards more 'clean and green' look.



B. Plantation

During the year, the core group members have carried out several awareness programs in various schools, institutions and organisations in different parts of Bhubaneswar, Cuttack and nearby districts. Focus was given on cleanliness of their respective campuses as well as their habitats, and the students were encouraged for growing fruit bearing as well as medicinal plants in their home gardens. The imminent challenges on water scarcity and air pollution were the central theme of the motivational deliberation. Special quiz competitions were also conducted amongst the students on environmental challenges and issues. Plantation of quite a good variety of saplings was also accomplished in these institutions. There

was overwhelming participation of students, teaching staff and eminent personalities of the society.

During this year OES has covered 48 institutions in various locations including rural areas of different districts and has spread environmental awareness amongst 6000 participants including the plantation of 1151 saplings.

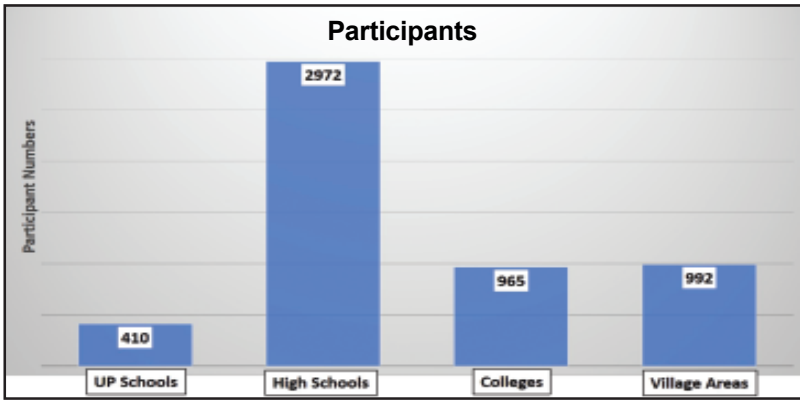


Table. Tree Plantation & Awareness Programs at a Glance

Date	Institution Details	No of participants	Saplings for plantation	Remarks
09.11.18	DAV School, Unit 8, Bhubaneswar	450	-	Awareness Program
01.12.19	Bharatiya Vidya Bhavan (MBA College)	65	-	Awareness Program
29.12.18	Indian institute of Tourism and Travel Management, Bhubaneswar	75	-	Awareness Program
27.02.19	Udayanath Charitable Trust, Nirgundi, Cuttack	45	-	Awareness Program
26.03.19	Clean & Green Campaign at Khandagiri & Udaygiri Twin Hills	150	-	Awareness Program
16.06.19	Bhagabati Pitha, Konark by "Arkashree"	350	-	Awareness Program

Date	Institution Details	No of participants	Saplings for plantation	Remarks
21.06.19	Capital Hospital, Bhubaneswar	85	5	Awareness & Plantation
01.07.19	Balarampur Village and "Ama Ashram", Jaipur	12	25	Plantation Program
02.07.19	Raghunathpur U.P. School by Block Development Committee	150	15	Awareness & Plantation
06.07.19	Trident Institute of Technology, Bhubaneswar	50	40	Awareness & Plantation
07.07.19	Satakshi Mahila Sangathan, Kalinga Vihar, Bhubaneswar in collaboration with Evergreen Forum	45	25	Awareness & Plantation
17.07.19	The Management Wing of Siksha 'O' Anusandhan University, Bhubaneswar	35	100	Plantation
17.07.19	The Institute of Agricultural Science of Siksha 'O' Anusandhan University, Bhubaneswar	45	100	Plantation
24.07.19	Ayatapur Nodal High School, Kandarpur, Cuttack	200	25	Awareness, Quiz & Plantation
6.07.19	Kamala Nehru Women's College, Bhubaneswar	50	25	Awareness & Plantation
28.07.19	Prachi Enclave Welfare Association, Patia, Bhubaneswar	25	10	Plantation
30.07.19	Gopal Smruti Government High School, Siddheswarpur, Cuttack	280	50	Awareness, Quiz & Plantation
04.08.19	Greening Odisha for sustainability and a trillion-dollar economy 2030 - Mission: one million fruit tree plantations at Durgadaspur Pipili. Organised by Sparsh Foundation of JK Paper Mills in collaboration with Orissa Environmental Society and other agencies	500	-	Awareness

Date	Institution Details	No of participants	Saplings for plantation	Remarks
07.08.19	"Srusti Academy of Management", Bhubaneswar	45	50	Awareness & Plantation
07.08.19	Udaynath Charitable Trust, Nirgundi 1. Darga Sahi UP school 2. Bilterun Urdu Project UP School 3. Alarpur Kendra Prathamik Vidyalaya 4. Sarkari Ucha Prathamika Vidyalaya 5. Sardola Up School	(185) 30 40 25 35 55	45	Awareness Plantation
11.08.19	Swarnapuri Residential Association, Patia, Bhubaneswar	65	30	Plantation
13.08.19	Dadhibamana UP School, Bamboori, Cuttack	75	15	Awareness, Quiz and Plantation
13.08.19	Chintamani Smruti Girls High School, Athanga, Cuttack	87	15	Awareness, Quiz and Plantation
15.08.19	Central Rice Research Institute, Bidyadharpur, Cuttack	350	12	Flag Hoisting, Awareness & Plantation
15.08.19	Dumduma Government UG High School, Bhubaneswar	255	27	Flag Hoisting, & Plantation
17.08.19	Ratnakar Vidya Mandir, Biribati, Cuttack	185	25	Awareness, Quiz & Plantation
17.08.19	'Ratnajodi Ratnabata Unnayan Trust' under Darada Gram Panchayat of Jagatsinghpur	55	12	- Do -
19.08.19	Dakshineswari P M High School & Bapuji Government U P School, Madhupur, Pipili	75	10	- Do -
28.08.19	28th August 2019 at DAV School, Ananta Vihar colony of Mahanadi Coal Field Ltd (MCL), Talcher	55	25	Awareness & Plantation

Date	Institution Details	No of participants	Saplings for plantation	Remarks
30.08.19	Dumduma Government UG High School, Bhubaneswar	70	-	Awareness and Quiz
03.09.19	Balarampur Nuagarh Village, Jajpur District	75	50	Awareness & Plantation
05.09.19	Kendriya Vidyalaya No - 2, Balasore	280	12	Awareness & Plantation
05.09.19	"Follow Up" Skill Development, Kuruda, Balasore	200	60	Awareness & Plantation
06.09.19	Saraswati SisuVidyamandir, Kandarpur Cuttack	180	6	Awareness, Quiz & Plantation
07.09.19	Nilachal Polytechnique, Sikharchandi, Bhubaneswar	45	31	Awareness & Plantation
10.09.19	Plant Management Team, RAMCO, Haridaspur (Near Chandikhol)	5	-	Introduction on OES
10.09.19	Sadhu Sundar High School, Nirgundi, Cuttack	380	12	Awareness & Plantation
11.09.19	Nahalapada High School, Pipili	210	20	Awareness, Quiz & Plantation
12.09.19	Gada Badaput High School, Kanas Block	85	6	Awareness & Plantation
12.09.19	Gada Sanaput High School, Kanas Block	180	18	Awareness & Plantation
23.09.19	Kandarpur College, Cuttack Sadar Block, Kandarpur	65	10	Awareness & Plantation
26.09.19	GIFT Engineering College, Bhubaneswar	85	30	Awareness & Plantation
27.09.19	GITA Engineering College, Bhubaneswar	75	210	Awareness & Plantation
	Grand Total (Nov'18 to Oct'19)	5979	1151	



9th Nov 2018: Students of DAV School, Unit 8, Bhubaneswar



6th July 2019: President, OES lighting the lamp at Trident Institute of Technology, Bhubaneswar



Mr. Raghunath Prusty addressing students at Gopal Smruti Government High School, Siddheswarpur, Cuttack on 30th July 2019



13.08.19: Oath-taking and then plantation programme by students, Dadhibaman U. P. School, Bamboori, Cuttack district and Chintamani Smruti Girls High School, Athanga, Cuttack district.



Dr Pradeep Kumar Rath at Central Rice Research Institute, Bidyadharpur, Cuttack on 15th August 2019



Plantation on 03.09.19 at Nuagarh Village, Balarampur in Jajpur District



05.09.19 at Kendriya Vidyalaya
No - 2, Ganeswarpur, Remuna,
Balasore District.





Dr Narayan Tripathy at Sadhu Sundara High School, Nirgundi, Cuttack on 10.09.19



Dr Kalyani Mohanty at Gada Sanaput High School, Kanas Block, Puri on 12.09.2019



Er. Manoranjan Mishra at GITA Engineering College, Bhubaneswar on 27.09.2019

C. Water Conservation

For quite some time, OES has been actively campaigning through its various programs about the importance of water conservation. The "Clean and Green" team is also conducting awareness programs on water crisis and importance of water conservation to the students during their plantation drive in various educational institutions. Besides this, during their visit to a village near Pipili, Dr. Rath and Dr. Mohanty of the team made an interactive campaign on the subject on the day of Holi festival.

Apart from the awareness program, the team has also made their nascent endeavor regarding rain water harvesting. As a pilot program, the team members Dr. Rath and Dr. Mohanty made a holistic and sustained effort at NALCO township in Bhubaneswar with technical assistance from Mr. Sushant Pattnaik, Executive Engineer, Odisha Ground Water division. At the time of submitting the report it has been intimated by the GM (HR & Administration) NALCO that administrative procedures have already been initiated and that NALCO is actively pursuing the pilot project.

The "Clean & Green Campaign" Core-Team



A highly motivated and committed core team, with inspirations and personal presence of the President, Dr. Sundara Narayan Patro, OES could spread the message of "Clean and Green" in widely separated areas. Many of the OES members, local volunteers, academicians, teachers, students and local people have participated in the programme with enthusiasm and result.



The OES 'Clean & Green Core Team': Top: Dr. S. N. Patro, President; from left to right: Dr. Pradeep Kumar Rath- "Prakruti Bandhu", Mr. Raghunath Prusty- "Prakruti Bandhu", Er. Manoranjan Mishra, Dr. Narayan Tripathy and Dr. Kalyani Mohanty

The 37th Foundation Day

The 37th Foundation Day was observed over a day-long programme on the 4th November 2018, with the following activities.

- ❖ **Dr. Debabrata Swain**, PCCF, Odisha, Chief Speaker delivered the Prasanna Kumar Dash Memorial Lecture.
- ❖ 'Lifetime Achievement Award' was presented to **Dr. Jafran Keshari Roy**, Former Jt. Director, NRRI.
- ❖ 'Dr. B.C Panda Award for Environment and Science Communication' was presented to **Dr. Surjyamani Behera**, Former Professor of Chemistry.

Sj. Suresh Chandra Mahapatra, Addl. Chief Secretary, Forest & Environment, Odisha honoured the programme as Chief Guest.



25.11.2018: One-Day Workshop- Cum-Exhibition on "Safe and Nutritious Foods"; was organized in collaboration of NIRMAN IGSSS (Indo Global Social Service Society). The Guest Speaker: Dr. Jayakrushna Panigrahi, Secretary, OES.

02.12.2018: 'Pollution Prevention- Our Responsibility'; Guest Speaker: Dr. Nihar Ranjan Sahoo, Chief Environmental Engineer, State Pollution Control Board, Odisha, Bhubaneswar.

29.12.2018: Motivational Awareness on Swachh Paryatan, Indian Institute of Tourism and Travel Management (IITTM), Khandagiri Anchalika Bikash Parishad (KABP), KBNS, Jayadev Walkers' Club (JWC); Guests: A. K. Patnaik, Ex- VC, Utkal University of Culture; Dr. S. K. Lenka, Director, IITTM; Dr. S. N. Patro, President, OES; Mr. Kora Padhi, Former Deputy Superintendent, Archaeology.

06.01.2019: Popular talk on 'Water Conservation in the Scenario of Climate Change'; Guest Speaker: Col. Sashi Dalvi (Retd.), (From Maharashtra), National Coordinator (Water Conservation - The Climate Reality Project, India.

03.02.2019: Popular talk: 'On the Wilderness of Pollution & Its Prevention'; Guest Speaker: Prof. Prasant Kumar Patnaik.

26.03.2019: 'Clean & Green Bhubaneswar' Campaign of OES was launched at Khandagiri-Udayagiri Twin Hills at Khandagiri, Bhubaneswar with the collaboration of Bhubaneswar Municipality Corporation (BMC), Archaeological Survey of India (ASI), Khandagiri Anchalika Bikash Parishad (KABP), Jayadev Walkers' Club (JWC), Khandagiri Barista Nagarika Sangha (KBNS), Bharatiya Yoga Sansthan Khandagiri Yoga Zilla (BYSKYZ), Cosmopolis Residents Welfare Association (CRWA). Guests: Commissioner, BMC; Superintending Archaeologist, ASI and other dignitaries.

07.04.2019: World Health Day was observed in collaboration with Regional Science Centre at the auditorium of RSC. Theme: 'Universal

Health Coverage: Everyone, Everywhere'; Chief Speaker: Dr. C. Mohan Rao, MD, Senior Faculty, KIIMS, Bhubaneswar; Chief Guest: Dr. Seba Mohapatra, MD, Former Director of Health, Govt. of Odisha

05.06.2019: World Environment Day, 2019 was organised at Hotel Suryansh in collaboration with SPARSH and J.K. Paper Mills. Chief Guest: Dr. Jugal Kishore Mohapatra (IAS, Retd.), Former Chief Secretary, Govt. of Odisha; Chief Speaker: Dr. Pramod K. Prusty, Chief Environmental Scientist, State Pollution Control Board, Odisha. Mr. Prafulla Dhal coordinated the entire programme.

The Orissa Environment Society was awarded with "Prakruti Mitra Award 2018-19" from Rayagada block of Gajapati district by Forest & Environment Department, Government of Odisha, for 'Environment Protection' and 'Nature Conservation'.

21.06.2019: 'Clean & Green Bhubaneswar' Campaign, second phase launching by OES at Capital Hospital, Bhubaneswar in collaboration with BMC, ICICI, Capital Hospital. Guest Speakers: Dr. Ashok Kumar Patnaik, Director, Capital Hospital, Bhubaneswar; Mr. Surath Kumar Mallick, Addl. Commissioner, BMC

06.07.2019: 70th Van Mahotsav; Theme 'Trees for Saving the World from Environmental Challenges' at Trident Academy of Technology in collaboration with the Academy. Chief Guest- Bijay Kumar Nayak, Former Justice, Odisha High Court and Member, Lokayukt, Odisha; Guest of Honour- Dr. Debabrata Swain, Former PCCF, Odisha & Member, Lokayukt, Odisha.

04.08.2019: Popular talk on 'Bhitarkanika Mangrove Ecosystem: A Hotspot of Biodiversity'; Guest Speaker: Dr. Sudhakar Kar, Senior Wildlife Scientist, Formerly in Forest & Environment Department, Govt. of Odisha, Bhubaneswar. During discussion, Dr. L.A.K. Singh briefed about pug mark tracking.

04.08.2019: Collaborative launching of "Mission: One Million Fruit Tree Plantations" at Durgadaspur Pipili. Organised by Sparsh Foundation of JK Paper Mills in collaboration with Orissa Environmental Society and other agencies.



04 August 2019: Greening Odisha for Sustainability and a Trillion-Dollar Economy by 2030, and "Mission: One Million Fruit Tree Plantations" at Durgadaspur Pipili.

01.09.2019: Popular talk on 'Water Issues in India: Present and Future'; Guest Speaker: Dr Pramod Kumar Panda, Principal Scientist (Agronomy), Indian Institute of Water Management, Government of India

02.10.2019: The Wildlife Week was observed in the campus of the Orissa Environmental Society in collaboration with the Save Elephant Foundation Trust. Dr. Debabrata Swain, IFS, Member of Lokayukta & Former PCCF, Odisha presided the function. The topic: 'Life Below Water: for People & Planet' was discussed by the Chief Guest: Shri Shashi Paul, IFS, Addl. PCCF (Wildlife), Forest & Environment Department, Govt. of Odisha.

In the beginning, while welcoming the guests, Dr L. A. K. Singh, Vice President-OES discussed about the conceptualization of Wildlife



Week from 1952 by the IBWL (Indian Board for Wildlife) coinciding the birthday of Mahatma Gandhi- the symbol of 'Ahimsa'. The topic identified for discussion on this day is the outcome of theme identified for the World Wildlife Day that was observed on 03 March 2019, which is the date that coincided signing of CITES (Convention on Trade in Endangered Species of Fauna and Flora).

At the end of the talk by Chief Guest, the Secretary-OES Dr. J. K. Panigrahi gave a brief addition about the life under oceanic water, the threat to them from pollution, etc. Dr. Prakash Chandra Jena, Jt. Secretary-OES gave vote of thanks. The programme also witnessed an introduction to a series of books on wildlife published recently by Prof. M. C. Dash. The President of the programme and the OES-members felicitated Er. Amaresh Naresh Samanta, Founder, Baba Balunkeswar -Gramya Bikash Parishad & Shri Soumya Ranjan Biswal, Olly Campaigner, Odisha Paryavaran Sangrakshan Abhiyan, Astarang.



3. Activities by OES Members

(Publications and Awards received in 2018-19)

Members of Orissa Environmental Society are known for their interest and contributions to the civic society, the academic arena, the social media, electronic media and print media. From time to time they are also honoured in various forums for their work and achievements. We are proud to have brought them under the aegis of OES. As an attempt to develop a database for future reference, OES-members have provided information on their recent publications and the recognitions they have received. In the following we have briefed such information alphabetically and wish it to continue to grow in coming years.

BEHERA, MS. SWAPNA (OES LM-689/2019)

Ms. Behera has retired from Kendriya Vidyalaya and pursues her literary interest. She mentions about her two recent books: "Amma is singing" (containing poems on Indian aroma), and "A bucket of water on bicycle" (children's literature on environment). The year 2018-19 has been a year of recognitions reaching Ms. Behera from various parts of the country and world, for her literary contributions.

BISOI, MR. SIDHANTA SEKHAR (OES LM-690/2019)

Mr. Bisoi, researcher from Regional Institute of Education (RIE), Bhubaneswar authored the book "Green Education: Plants for Fun & Games" with M. K. Satapathy, published by New India Publishing Agency (NIPA), New Delhi. Mr. Bisoi received the 'Young Scientist Award' from Vdgood Professional Association, a non-Government company in Chennai. He also got awarded for the 'Best Oral Presentation' at the National Seminar organised at Centurion University, Bhubaneswar in association with National Medicinal Plant Board.

DASH, PROF. M. C. (OES LM-386/2007)

Prof. M. C. Dash, former Vice Chancellor, Sambalpur University, received

the 2019 OTV Citizen Award for his eminent personality in Education. His recent Books: (1.) *The National and State Animals of India & Their Conservation Status*, Gyan Books, New Delhi (2018), ~150 pages; (2.) *Readings in Ecology & Environmental Science*, Gyan Books, New Delhi, (2018), ~410 pages; (3.) *The National and State Birds of India & Their Conservation Status*, Readers Paradise (Friends Publishers), New Delhi (2019), 132p; (4.) *The Greater & Lesser Apes and Human Evolution*, Readers Paradise (Friends Publishers), New Delhi (2019), ~114 pages. Recent Life Time Achievement Awards: (1.) Narasingh Choudhury Life Time Achievement Award (2018) for outstanding contribution in Life Science Research, by Govt. N. C. College, Jajpur; (2.) Bharat Ratna Gold Medal Award by Global Economic Progress & Research Association, New Delhi & Chennai; Award for Excellent Contribution in Ecology & Conservation (2018).

JENA, DR PRAKASH CHANDRA (OES Patron, LM-560/2013)

Dr Jena got awarded the PhD degree from Sikshya O Anusandhan University, Bhubaneswar for his work titled "Exploring Ensemble Learning Strategies for Classification and Regression on Heterogeneous Datasets". He also received the Rajya Puraskar 2019 from Hon'ble Governor, Odisha, Man of the Year Award 2019 and Utkalmani Gopabandhu Memorial Youth Award 2019 for his outstanding contributions to Plantation, Wildlife & Nature Conservation.

MISHRA, PROF. (MS.) DEBAHUTI (OES LM-665/2018)

Professor (Ms.) Mishra from Dept. of Comp. Sc./ Engg., ITER, SOA University has integrated Biotechnology, Information Technology and Artificial Intelligence. With her coresearchers, Prof. Mishra has published a large number of book chapters and research papers in 2018-19. The book "Integration and Visualization of Gene Selection and Gene Regulatory Networks for Cancer Genome", 1st Edition, Elsevier Publication, eBook ISBN: 9780128163573, Paperback ISBN: 9780128163566 (2018)" is authored with Shruti Mishra and Sandeep Satpathy.

MISHRA, SRI PRAKASH CHANDRA, IFS (Retired) (OES LM-644/2017)

Sri Mishra has published a book in Odia titled, "Paribesha Surakshya", Prachi Prakashan, Bhubaneswar 751007. Sri Mishra has discussed environment in the context of health, drinking water, fauna, elephant corridor, insecticides, garbage, exotic weeds and plants, forest fire, rain water-harvest, etc.

MISRA, DR. SARAT CHANDRA (OES Patron, LM-143/1990)

Dr. Mishra, Former Chief Engineer is honoured with the Odisha Technocrat Award 2019 on Engineers Day organised by EVER GREEN FORUM. He is Former Chief Engineer, Civil, Govt. of Odisha.

NANDA, DR. (Mrs.) PRATIVA KUMARI (OES LM-366/2005)

Dr (Mrs.) Nanda, Former Reader in Botany, received the "Life Time Achievement Award 2019" at New Delhi from Indian Institute of Oriental Heritage for her scholastic order and patronage of Oriental Learning linked with modern perspectives. Dr Nanda has also been honoured in the year 2018 by the popular Who's Who and Biography developer Rifacimento International.

PADHY, DR. SACHIDANANDA (OES LM-124/1990)

Dr. Sachidananda Padhy from Vedic Science Research Centre, Berhampur own the "Sanskriti Sammaan" from the Institute of Odishaan Culture, Bhubaneswar. His recent books include:(1.) Global Eco-Architecture: Paradigm from the Bhagavad Gita, LAP - LAMBERT Academic Publishing, Mauritius, 214pages, ISBN: 978-613-9-45449-5; (2.) Vaidika Amruta Dhaaraa, Odia, Publisher: Odisha State Bureau of Textbook preparation and production, Bhubaneswar; Sponsored by CSTT, New Delhi, 2019. ISBN: 978-81-8005-420-4. Other Publications by Dr. Padhy covers (1.) Ethno-ecological Introspection of the Bhagavad Gita: Scientific Implementation of the Work-Culture for Sustenance of Biodiversity, 2018; (2.) Angiosperm phyto-diversity of Chilika Lagoon, 2018; (3.) Over-religious activity, a threat to biodiversity and ethical restrictions against animal cruelty to protect

the environment, 2018; (4.) Over-religious activity, a threat to biodiversity: dishonest behavior to bulls, 2018; (5.) Diversity of the Divine Plant Soma, 2019.

PALITA, PROF. SHARAT KUMAR (OES LM-500/2010)

Working as Acting Vice Chancellor, Central University, Koraput, Prof. Palita is developing a dedicated study team for knowledge base on the Eastern Ghat region and accessing the traditional processes in medicines. Recently, along with the books "Resource Conservation in Eastern Region" and "Water Resource Management: Problems and Prospects", he has published two book chapters of eminence and thirteen research and conference publications covering biodiversity elements. The book chapters are: Biodiversity and Traditional Knowledge for Conservation in Eastern Region; (In: ISBN 978-93-5551-052-7); and Water Management, Climate Change and Biodiversity (In: ISBN9788131609903) published in 2019. Seven of the research papers are about Chiropteran diversity (bats)

PANDA, PROF. AMULYA KUMAR (OES Patron, LM-433/2008)

Prof. Panda, Former Principal, Ravenshaw College, has continued his incessant academic contributions, and added the Books: (1.) Uttapta Pruthivi Abhishapta Manisha. 2nd edition of the book on "Global Warming and Climate Change". The Book Point, Acharya Vihar, Bhubaneswar. Trust Samman 2019 awarded; (2.) Anuchinta Bichitra. A collection of articles on Science, Environment, Education and Society. The Book Point, Acharya Vihar, Bhubaneswar.

PATNAIK, DR. BIJAY KETAN (OES LM-084)

Dr. Patnaik, former Principal Chief Conservator of Forests (Wildlife), is also a recognised and prolific writer and poet. His recent books in Odia are: "Aama Baadi Bagichara Aushadhiya Brukshya-lata o Gulma" published by State Medicinal Plants Board, Odisha, and "Paribesha Panchamruta", Apurba Bhubaneswar. His poem "Atankita Gajaraja" has attracted the attention of environmentalists. Its English version [<http://positivevibes.today/article/newsview/218>] is "The Tusker-King Feels Endangered".

PATRO, DR. B. SEETARAMA (OES Patron, LM-286/1995)

Dr. Patro is honoured as the "Elder Engineer of the State" for his lifelong and dedicated contribution to the Engineering Profession. The recognition came from the Institution of Engineers (India) on the 52nd Engineers' Day (15 September 2019). He is Former Dean & Professor in Mechanical Engineering, Biju Patnaik Institute of Technology.

PRUSTY, SRI RAGHUNATH (OES LM-649/2017)

Forest and Environment Department, Government of Odisha have honoured Sri Raghunath Prusty with 'Prakruti Bandhu Puraskar-2019' in recognition of his contributions for nature conservation and environmental protections.

RAO, DR MOHAN (OES LM-670/2018)

Dr Rao, Senior Faculty, KIIMS, Bhubaneswar has published his research on "Clinical and Microbiological profile of Health Care associated pneumonia in Chronic renal disease." [www.medresearch.in] (authored with his other colleagues).

SINGH, DR LALA ASWINI KUMAR (OES Patron, LM-146/1990)

Dr Singh, former Senior Research Officer (Wildlife), has guided and published the Book: "Elephant Movement and its Impacts: Conservation Management in Odisha, India: Case Study", LAP Lambert Academic Publishing, Riga, Mauritius; ISBN: 978-613-9-97302-6; Released on: 05 July 2019, +405 pages. 104 Tables, 69 Figures, 41 Photographs (grayscale) (authored with Dr Nimain Charan Palei and Professor Hemanta Kumar Sahu). Dr Singh is a reviewer and subject editor for papers related to wildlife and biodiversity management accepted for the international monthly, 'Journal of Threatened Taxa'. Dr Singh also writes in his blog.

SUNDARAY, DR J. K. (OES Patron, LM-563/2013)

Dr Sundaray has been recognized as the Fellow of Society of Fisheries and Life Science, Mangalore. He was adjudged as the best Poster Awardee

at the 6th International Conference in Fisheries and Aquaculture, held at Bangkok in August 2019. In the private sector, Dr Sundaray was presented with the 'Jeeva Surakha NEH Award-2018' by Jeeva Surakha, Assam. As a very active researcher, in 2018-19 he has published 13 papers related to fisheries science. Apart from book chapters, concept papers and reviews, Dr Sundaray has rendered editorial services for the book: "Research trends in Fisheries and Aquatic Science- Volume -2, as Chief Editor (ISBN:978-93-5335-225-7)", and published the book "Application of computational tools and techniques in fisheries science, LAP Lamberts Academic Publishing, Mauritius. ISBN: 978-613-9-89926-5 (authored with Parameswari Behera).

SWAIN, SRI ANUP KUMAR (OES LM-580/2014)

Sri Swain, Assistant Professor in Chemical Engineering at IGIT, Sarang, Parjang, Dhenkanal has published a review on Industrial Wastewater Treatment by Aerobic Inverse Fluidized Bed Biofilm Reactors (AIFBBRs) with other three other co-workers, <https://doi.org/10.1016/j.jwpe.2018.02.017>.

SWAIN, DR GOURANGA CHARAN (OES LM-612/2016)

Former Assistant Professor of Biotechnology and Faculty of Science at PG Department of Botany, Utkal University is known for regularly editing and publishing periodical issues of 'Emerging Science'. During 2018-19 Dr. Swain has published several popular science articles including those on plant hormones in cancer therapy, neurodegenerative diseases and antioxidants.



4. Prasanna Kumar Dash Memorial Lectures

Delivered on OES Foundation Days

- 2019 **Dr. Pramod Chandra Mishra**, President, Odisha Bigyan Academy:
“Fluorosis: Source, Excursion, Impact, control and Management.
- 2018 **Dr. Debabrata Swain**, IFS, Principal Chief Conservator of Forests,
Odisha: 'Conservation of Biodiversity Habitats in Odisha'
- 2017 **Shri 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: 'Water Resources: Engine for Improvement
of Quality of Life and Economic Development'
- 2015 **Shri Priyanath Padhi**, Former Principal Chief Conservator of
Forests, Odisha: 'Conservation of Environment and the Poor- a
Social Dimension'
- 2014 **Prof. (Dr.) Omkar Nath Mohanty**, Director, Technology and
Academic Initiative, RSB Metaltech, RSB Group: 'Utilisation of
Effluents from Integrated Steel Plants- some examples'
- 2013 **Dr. Trilochan Mohapatra**, Director, Central Rice Research Institute,
Cuttack: 'Environmentally Sustainable Food Security'
- 2012 **Shri Bijay Kumar Patnaik**, Former Principal Chief Conservator of
Forests and Chief Wildlife Warden, UP; 'Conserving National
Biodiversity Habitats'.



5. Awards Instituted by OES

(A.) Lifetime Achievement Award

Presented on OES Foundation Day

- 2019 **Dr. Sundara Narayana Patro**, Founder Secretary and Present President, Orissa Environment Society
- 2018 **Dr. Jafran Keshari Roy**, Former Jt. Director, NRRI, Cuttack
- 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

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

- 2019 **Dr. Ramesh Chandra Mishra**, Sr. Scientist, ICAR
- 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 Dept. (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.) B. C. Panda Award

For Environment and Science Communication- presented on OES Foundation Day

- 2019 **Dr. Nikhilanand Panigrahy**, Former Director, Odisha Text Book Bureau
- 2018 **Dr. Suryamani Behera**, Former Professor of Chemistry
- 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 DGM, NALCO
- 2015 **Dr. Bijay Ketan Patnaik**, Former PCCF (Wildlife), Odisha



6. Felicitations to Senior Life Members

Orissa Environmental Society is felicitating Senior Life Members in appreciation of their persistent support to the Society's progress.

Felicitations on the occasion of the 37th Foundation Day, 03 November 2019

1. **Mr. Muktipada Panda** (OES- LM 595/2016)
Former Chief Engineer, Electrical
2. **Er. Umesh Chandra Mohanty** (OES- LM 444/2008)
Former Assistant Engineer, Electrical
2. **Er. Subash Chandra Satapathy** (OES- LM 620/2017)
Former Engineer-in-Chief, Water Resources
4. **Mr. Debendranath Satpathy** (OES- LM 549/2013)
Former Superintendent of Police
5. **Mr. Rama Chandra Patra** (OES- LM 356/2004)
Former Under Secretary, Odisha Secretariat Service

Felicitations on the occasion of the 37th Foundation Day, 04 November 2018

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

**Felicitation on the occasion of the 36th Foundation Day,
29 October 2017**

1. **Er. Somanath Mishra,**
Former Secretary (Works), Govt. of Odisha
2. **Sri Satya Narayana 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



7. Fellows of OES

Life Members of Orissa Environmental Society are nominated as OES-Fellows in appreciation of their outstanding contribution and persistent support to the field of Environment and Natural Resources Management. The certificate of Honour as Fellow is presented on the occasion of the Foundation Day of the Society.

Fellows nominated to be honoured on the occasion of the 38th Foundation Day, 2019

1. **Prof. (Dr) Aruna Kumari Mishra** (OES- LM 093)
Former Professor of Botany, Utkal University
2. **Prof. Binayak Rath** (OES- LM 553/2013)
Former Vice Chancellor, Utkal University
3. **Dr. Prakash Chandra Mishra** (OES- LM 644)
President, Odisha Bigyan Academy
4. **Dr. Debabrata Swain** (OES- LM 487/2010)
Former Principal Chief Conservator of Forests, & Head of Forest Force, Odisha

Fellows honoured on the occasion of the 37th Foundation Day, 04 November 2018

1. **Prof. B Sitaram Patro**
Former Dean, CET, Biju Patnaik University of Technology
2. **Prof. Sailabala Padhi**
Former Professor of Botany, Berhampur University
3. **Dr. Budurddin Mohammad Faruque**
Former Director, Geological Survey of India
4. **Dr. Lala Aswini Kumar Singh**
Former Sr. Research Officer (Wildlife) Forest & Environment Dept., Govt. of Odisha

5. **Dr. Chitta Ranjan Mishra**

Former DGM, NALCO

The certificate of Honour as Fellow were presented on the occasion of the 36th Foundation Day of the Society, 2017. The programme started from 2017.

1. **Prof. Satyananda Acharya**

Former Vice Chancellor, Utkal University

2. **Prof. Amulya Kumar Panda**

Former Principal, Ravenshaw College (now University)

3. **Prof. Madhab Chandra Dash,**

Former Vice Chancellor, Sambalpur University

4. **Prof. Debi Prasad Ray**

Former Vice Chancellor, OUAT

5. **Dr. Bijay Ketan Patnaik, IFS (Retd.)**

Former PCCF (WL) & Chief Wildlife Warden, Odisha

6. **Er. Binod Chandra Padhi**

Former Engineer-in-Chief, Odisha

7. **Dr. Sachidananda Tripathy**

Former Professor of Geography, Utkal Univ.

8. **Dr. Bipra Charan Patnayak**

Former Director, ICAR

9. **Dr. Naba Kishore Mahalik**

Former Professor of Geology, Utkal University

10. **Dr. Sarat Chandra Mishra**

Former Chief Engineer (Works), Govt. of Odisha

11. **Mr. Shailendra Kumar Tamotia**

Former CMD, NALCO

12. **Dr. Sundara Narayana Patro**
Former College Principal
13. **Dr. Chitta Ranjan Mohapatra,**
Former Principal Chief Conservator of Forests (WL) and Chief Wildlife
Warden, Odisha
14. **Prof. Rebati Charan Das,**
Former Vice Chancellor, Berhampur University
15. **Dr. Jaya Krushna Panigrahi**
Associate Professor in Zoology,
16. **Dr. Jitendra Kumar Sundaray,**
Head, Division of Fish Genetics & Biotechnology, CIFA,



8. Patrons of OES

Sl.No.	Name/Address	Year
01.	Dr. Shailendra Kumar Tamotia 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 Mob: 09937011356; Email: sk_tamotia@yahoo.co.in	2015
02.	(Late) Dr. Lalit Narayan Patnaik Former Chairman, Odisha State Pollution Control Board, 116, Mechatech House, Kalyan Nagar, Cuttack - 753 013 Mob: 9437000973, Email: lnpatnaik116@gmail.com	2015
03.	Dr. Sundara Narayana Patro Former Reader in Botany and Principal, MIG-106, Phase-1, Khandagiri Enclave, Housing Board Colony, Khandagiri, Bhubaneswar-751030 Mob: 9437190420; Email: snpatro11@rediffmail.com	2015
04.	Prof. Debi Prasad Ray Former Vice-Chancellor, OUAT, House No: HIG -105,(K-5), Kalinga Vihar, Patrapara, Bhubaneswar-751019, Mob: 9881721435; 8087815770 Email: dpray1949@gmail.com	2015
05.	Dr. Jaya Krushna Panigrahi Reader in Zoology, 41-A, Prachi Enclave, Chandrasekharapur, Bhubaneswar-751016 Mob: 9437076100; Email: jk.panigrahi@gmail.com	2016
06.	Dr. Jitendra Kumar Sundaray Head, Division of Fish Genetics & Biotechnology, CIFA, Kausalyaganga, Bhubaneswar- 751002 C/o. Purna Chandra Sundaray,	2016

At/PO. Aiginia, Bhubaneswar-751019
Mob: 9437166872; Email: sundarayj@yahoo.com

- 07. Dr. Bipra Charan Patnayak** **2016**
Former Director, Central Sheep & Wool Research Institute (ICAR)
S/30, MaitreeVihar, Bhubaneswar-751023
Mob: 9937000824; Email: bpatnayak@yahoo.co.uk
- 08. Prof. Amulya Kumar Panda** **2016**
Former Principal, Ravenshaw College,
73, Cooperative Colony, (Near Chandrasekharpur),
PO: KIIT, Bhubaneswar-751024
Mob: 9937440390; Email: amulyapanda39@gmail.com
- 09. Dr. Ashutosh Das** **2018**
Vice-Chancellor & Director, Centre for
Research & Development, Centre for Environmental
Engg., PRIST University, Thanjavur, Tamilnadu, India
744, Sriram Nagar, Pillaiyarpatti,
PO- Vallam, Thanjavur- 613403, Tamilnadu, India
Mob: 9894122821,
Email: director_cee@prist.ac.in; acadas@gmail.com
- 10. Dr. Lala Aswini Kumar Singh** **2018**
Former Sr. Research Officer,
Govt. of Odisha, Forest Department,
1830, Mahatab Road, Friends Colony,
Old Town, Bhubaneswar-002
Mob: 9861092928; 7978335983,
Email: laksinghindia@gmail.com
- 11. Dr. Prakash Chandra Jena** **2018**
Founder cum President, Ever Green Forum,
At- Raisar, PO- Narada, Via- Tyendakura,
Dist.- Kendrapada, Odisha-754134
Mob: 9937623053; Email: prakashjena81@gmail.com

- 12. Dr. B. Seetarama Patro** **2019**
Former Dean & Prof. Mechanical Eng. BPUT,
L-1, Housing Board Colony, Baramunda, Bhubaneswar-03,
Mob: 9437309977; 9556342407,
Email: bspatro@gmail.com
- 13. Dr. Bijaya Kumar Rath** **2019**
General Manager (Geology), ONGC,
3rd Floor A2- 06, Hi-Tech Plaza, Sundarpada, Bhubaneswar
Mob: 9643301931, Email: bijay.rath1960@rediffmail.com
- 14. Dr. Chittaranjan Mishra** **2019**
Former Dy. General Manager, (R & D), NALCO,
B-3, HIG, Baramunda Housing Board Colony, Bhubaneswar
Mob: 9338204993, Email: crmishra49@yahoo.in
- 15. Dr. (Mrs.) Rekha Das** **2019**
Former, Secretary, Odisha Bigyan Academy
130, VIP Colony, Ekamra Vihar, IRC Village,
Bhubaneswar-751015
Mob: 9938454233, E-mail: rekhadas1957@rediffmail.com
- 16. Dr. Seba Mohapatra, M.D. O&G,** **2019**
Former Director, Health Services, Govt. of Odisha,
N1, A/10, IRC Village, Bhubaneswar-751015
Mob: 9437035531, Email: drsebamohapatra@yahoo.co.in
- 17. Mr. Bimal Krushna Mishra** **2019**
Director, Tiki Engineering Pvt.Ltd.
S-72, MaitreeVihar, Bhubaneswar-751023
Phone: 0674-2302485, E-mail: bimalkmishra@gmail.com
- 18. Dr. Jafran Keshari Roy** **2019**
Former Joint Director, NRRI, Cuttack
71, Surya Nagar, Unit-7, Bhubaneswar-751003
Mob: 9861182567, Email: dr.jafranroy@yahoo.com



9. Obituary

Prof. Satyananda Acharya

Former Professor of Geology,
Vice Chancellor of Utkal University;
President, Orissa Env. Society
Demise on: 22 February 2019



Prof. Naba Kishore Mahalik,

Former Professor of Geology,
Utkal University;
Demise on: 01 August 2019



Dr Lalit Narayan Patnaik

Former Chairman, OSPCB;
OES-Patron, Life Member
Demise on: 04 April 2019



Dr Dillip Kumar Behera

Former Chief Environmental Scientist
State Pollution Control Board
OES- Life Member
Demise on: 01 May 2019



10. OES Publications

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 and Development Strategies-Orissa Report	1991
10. Mahendragiri: The Pride of Eastern Ghats	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. Sahania 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 Dharana 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	2016
41. Lectures on Environment and Science, OES Annual Report	2017
42. Lectures on Environment and Science, OES Annual Report	2018

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

11. List of Life Members (From 2018)

- 653 Padhiary (Mr.) Aditya Kiran 09437425706**
(2018) Farm Manager, KVK, Sambalpur, OUAT
C/o- Rabindra Padhiary, Plot No.- F/563,
CDA-7, Cuttack, Email: aditya.ugl@gmail.com
- 654 Mishra (Mr.) Siba Prasad, 09437135939**
(2018) Scientist, Plot No.-1242/2201,
Sishupalgarh, Bhubaneswar-751002
Email: sibahort@gmail.com
- 655 Mahato (Ms.) Anupama 09862821156**
(2018) Research Scholar, C/o- Dr. Subhasish Mahato,
House No. 2B, Vaishali Nagar,
Srikant Verma Marg, Bilashpur, Chhattisgarh- 495001
Email: anupama.mahato4@gmail.com
- 656 Behera (Sj.) Pandaba, IFS, 08658034356**
(2018) Former Addl. PCCF
VIIM- 57, Sailashri Vihar,
Bhubaneswar-, Email: pandaba57@gmail.com
- 657 Das (Dr.) Ashutosh 09894122821**
(2018) Vice-Chancellor & Director,
Centre for Research & Development,
Centre for Environmental Engg., PRIST University
Thanjavur- 613403, Tamilnadu, India
744, Sriram Nagar, Pillaiyarpatti,
PO- Vallam, Thanjavur- 613403, Tamilnadu, India
Email: director_cee@prist.ac.in:acadas@gmail.com
- 658 Mishra (Mr.) Sudhanshu Sekhar, IRTS 09938622897**
(2018) Chief Safety Officer, East Cost Railway,

F- 112, Falcon Residency, Near KIIT, Patia,
Bhubaneswar-751024

C-74, BDA Colony, Palashpalli, Near Airport,

Bhubaneswar-751020, Email: ssmishra995@gmail.com

659 Mohanty (Er.) Gyana Ranjan, 09437281999

(2018) Engineer in Chief (Water Resources) Retd.

Qrs. No.- 4R/2, Delta Colony, Unit-8,

Bhubaneswar- 751012, Email: gyanawrd@gmail.com

660 Mishra (Dr.) Swopna, 08895275646

(2018) Director cum Principal, Talent India Public School

Plot No. 726/2880, E/5, Seshadri Nagar, Lingipur,

Bhubaneswar- 751002, swopnamishra68@gmail.com

661 Satapathy (Dr.) Hrudaya Ranjan, 09861124202

(2018) Former Reader in English,

Plot No. 726/2880, E/5, Seshadri Nagar, Lingipur,

Bhubaneswar- 751002, Email: satapathyhr@gmail.com

662 Khuntia (Dr.) Bandana, 09437271724

(2018) Lecturer in Zoology,

Inst. of Higher Secondary Education of ITER,

Siksha O Anusandhan University,

C/o- Atanu Sabyasachi Nayak,

112, Satya Nagar, Near Khelaghar Park,

Bhubaneswar-751007, bandanakhuntia38@gmail.com

663 Rao (Mr.) Korada Rajasekhara, 08917223043

(2018) Principal Scientist, Division of Crop Protection,

National Rice Research Institute, Cuttack.

HIG-3/125, Lane No. 19, Satya Sai Enclave,

Kolathia, Khandagiri, Bhubaneswar-

Email: rajasekhararao.korada@gmail.com,

- 664 Ms. Kuhoo, Student, (CET, BBSR), 08093720607**
(2018) F-101, Manjula Residency, Plot No. 1947,
Lane-6, Bhakta Madhu Nagar, Gandamunda, Khandagiri,
Bhubaneswar-751030, kuhoo.cet@gmail.com
- 665 Mishra (Dr.) Debahuti, Professor, 09337742719**
(2018) Dept. of Comp. Sc./ Engg. ITER, SOA University,
F-101, Manjula Residency, Plot No. 1947, Lane-6
Bhakta Madhu Nagar, Gandamunda, Khandagiri,
Bhubaneswar-751030, mishradebahuti@gmail.com
- 666 Das (Dr.) Kaberi, Associate Professor, 09437828370**
(2018) Dept. of Comp. Sc./ Engg. ITER, SOA University,
Plot. No 468, Sector-5, Lane- 6, Niladri Vihar,
Bhubaneswar- 751021
Email: kaberidas2008@gmail.com, kaberidas@rediffmail.com
- 667 Swain (Dr.) Mayadhar, Director 09438693724**
(2018) School of Electrical Engineering,
KIIT University, Bhubaneswar
Plot No. 70/7356, Laxmi Vihar, Phase-1,
Badagada Brit Colony, Bhubaneswar-751018
Email: mayadhar2002@yahoo.co.in,
- 668 Barik (Mr.) Purna Chandra 08895747511**
(2018) Retd. Bank Employee, Plot No. 1368/410, GGP Colony,
Near Post Office, Rasulgarh, Bhubaneswar- 751025
Email: barik331@gmail.com,
- 669 Panigrahi (Mr) Akshaya, 09025739499**
(2018) Principal Scientist, ICAR, Central Inst. of Brackish Water
Aquaculture, 75, Santiom High Road,
R.A.Puram, Chennai, Tamilnadu- 600 028
Rs: At/PO: Basudevapur, Dist.: Bhadrak,
Odisha-756125, apanigrahil@gmail.com

- 670 Rao (Dr.) C. Mohan** **08895501130**
(2018) Assistant Professor, KIMS, BBSR.
C-407, TRIDENT GALAXY, Paikarapur,
Bhubaneswar- 751003, dr.cmrao55@gmail.com,
- 671 Patnaik (Mr.) Swadesh Sundar,** **09437490927**
(2018) Retired Government Officer,
N-3/ 316, IRC Village, Bhubaneswar - 751015
Email: swadeshpatnaik@gmail.com,
- 672 Sahu (Mr.) Lalit Mohan** **09938455982**
(2018) Wildlife Warden (Honorary), Deogarh,
AT/PO: Ballam, Dist: Deogarh.
- 673 Dash (Dr.) Satyabrata,** **09937149767**
(2018) Associate Professor,
Plot No. 2842, NageswarTangi,
Sai Nibash, Bhubaneswar- 751002,
Email: dash_satyabrata@yahoo.co.in,
- 674 Mishra (Mr.) Bimal Krushna** **06742302485**
(2018) Director, Tiki Engineering Pvt.Ltd.
S-72, MaîtreVihar, Bhubaneswar-751023
E-mail: bimalkmishra@gmail.com
- 675 Mishra (Mr.) Satya Narayan** **9437178452**
(2018) Retd. Manager S.B.I, T-10/801, Vipul Garden,
Ghatikia, Bhubaneswar-751029,
Email: msnarayan108@gmail.com
- 676 Biswal (Mr.) Gagan Chandra** **8763005500**
(2018) Retd. Sr. Officer, L.I.C of India
M-02/PH-II, Housing Board Colony
Khandagiri, Bhubaneswar-751030
E-mail: gaganchbiswal@gmail.com

- 677 Sahu (Mr.) Subrat Kumar 9861263373**
(2018) Sr. Associate Professor
Plot No-H-5/14, Panchasakha Nagar
Dumduma, Bhubaneswar-751019
E-mail: subratksahu@gmail.com
- 678 Mishra (Er.) Manoranjan 7894454052**
(2018) Former Vice President, SMS Inida Pvt. Ltd.
Flat No. - F093, The Cosmopolis, Dumduma,
Bhubaneswar-751019,
Email: mmkbl08@gmail.com
- 679 Milian (Dr.) Manna 7978066329**
(2018) Asst. Prof. in Botany, Flat No. 428, Govind Block,
Balaji Complex, Jharpada, Bhubaneswar- 751006
Email: mannamilian07@gmail.com
- 680 Bag (Mr.) Rama Chandra 9438127888**
(2018) Senior Teacher Educator
District Institute of Education & Training,
Kalahandi, Bhawanipatna, Naktiguda, Kalahandi-766001
Email: rcb69@rediffmail.com
- 681 Dey (Mr.) Rajendra Kumar 9437487600**
(2018) Addl. PCCF (Central), Eastern Regional Office,
MoEF & CC, Govt. of India
A/3, Chandrasekharapur, Bhubaneswar- 751023
Email: rkdeyifs@yahoo.com
- 682 Patnaik Dr. (Er.) Arun Kumar 9437044789**
(2018) Consultant in Engineering & Management
Plot No. N-2/126, IRC Village, Nayapalli,
Bhubaneswar- 751015
Email: arunpatnik1954@gmail.com

- 683 Biswal ((Er.) Sudhansu Sekhar 7377101462**
(2018) Plot No. 2301/11767, Satya Vihar, 9090394662
Pandara, (Near Saptasati Temple),
NH-5, Po- Rasulgarh, Bhubaneswar-751010
Email: nana.biswal@gmail.com
- 684 Parida (Er.) Smruti Ranjan 9438515041**
(2018) Plot No. 721/2,
C/o- Dr. Chintamani Mohapatra,
Near Medplus, Backside of Damayanti Apartment,
Nayapalli, Bhubaneswar-751012
Email: cthei94@gmail.com
- 685 Tripathy (Dr.) Lilymoony 9861232027**
(2018) Assoc. Professor, Floriculture & Landscaping, OUAT
Plot No. 1068, Near Krishna Tower,
Nayapalli, Bhubaneswar 751012
Email: lilymoony25@yahoo.co.in
- 686 Mohanty (Dr.) Kalyani 09438422077**
(2019) Former Professor, Dept. of P M & I R, Utkal University,
201, Jagannath Complex,
M-56, Madhusudan Nagar, Bhubaneswar- 751001
Email: mkalyani58@yahoo.co.in
- 687 Patro (Mr.) Ch. Baleswar 9437035853, 8249741806**
(2019) G/D-1, Bishnupriya Apartment,
Jaydev Vihar, Bhubaneswar- PIN 751013
- 688 Tripathy (Dr.) Narayan 09930016216**
(2019) M/39, 1st Floor, Rajiv Nagar, Aiginia,
Bhubaneswar 751019
Email: tripathy_n@hotmail.com,

- 689 Behera (Ms.) Swapna 09337186672**
(2019) Former K.V. Teacher
301, 3rd Floor, Surekha Villa, Nigamananda Vihar,
Lane No. 2, Canal Road, Bomikhal, Bhubaneswar-751010
Email: swapna.behera@gmail.com,
- 690 Bisoi (Mr.) Sidhanta Sekhar 08093872293**
(2019) Research Scholar, Dept. of Botany,
Regional Institute of Education (NCERT),
Sachivalay Marg, Bhubaneswar 751022
C/o- Prasanta Kishore Bisoi, At- Samantarapur,
PO- Kishore Nagar (Cuttack Sadar), Dist. Cuttack 754131
Email: sidhantasekhar91@gmail.com,
- 691 Panda (Mr.) Sanjaya Kumar 09437079099**
(2019) Chartered Engineer cum Approved Valuer,
Old Block Chowk, Bagicha Sahi, PO/Dist.- Boudh-762014
Email: sanjayalily@gmail.com
- 692 Debi (Dr.) Sailabala, 08456834431**
(2019) Retd. Director (& Professor)
Plot No.-318/1827/4081, Sikharchandi Vihar,
Near Canara Bank, KIIT University Branch,
Bhubaneswar-751024, s-debi-99@yahoo.com
- 693 Pani (Mr.) Narayan Chandra 09438677409**
(2019) Retd, Dy General Manager, NABARD, 328, Govind Block,
Balaji Complex, Jail Road, Jharpada, Bhubaneswar- 351006
Email: ncpani10@gmail.com
- 694 Mohanty (Mrs.) Nirmali, 08328976521**
(2019) Dayananda Nagar, Plot No. 223/1864, Bomikhal,
Durga Mandap, Bhubaneswar 751010.
Email: nirmalihct@gmail.com

12. Executive Committee of OES Including Office Bearers

(2018-19 to 2020-21)

Sl. No.	Name and Address with E-mail	Designation	Contact No
01	Dr. Sundara Narayana Patro Former College Principal MIG-106, Phase-I, Khandagiri Enclave, Khandagiri, Bhubaneswar-751030 snpatro11@gmail.com	President	09437190420
02	Dr. Lala Aswini Kumar Singh Former Sr. Research Officer, Office of PCCF (WL), Puspawini, 1830- Mahatab Road, Friends Colony, Old Town, Bhubaneswar-751002 laksinghindia@gmail.com,	Vice president	9861092928 7978335983
03	Dr. Jaya Krushna Panigrahi Former Reader in Zoology, 41-A, Prachi Enclave, Chandrasekharpur, Bhubaneswar-751016 jk.panigrahi@gmail.com	Secretary	09437076100 0674-2741542
04	Dr Prakash Chandra Jena Director, Ever Green Forum, LIG- 877, K-4, Kalinga Vihar, PO: Patrapada, Bhubaneswar-751019 prakashjena81@gmail.com	Joint Secretary	09937623053 09437572053
05	Dr. B. Seetarama Patro Former Dean & Prof. Mechanical Eng. BPUT, L-1, Housing Board Colony, Baramunda, Bhubaneswar - 751003, bspatro@gmail.com	Treasurer	09437309977 09556342407 0674-2354330

- | | | | |
|-----------|--|---------------|---|
| 06 | Dr. Sudhakar Kar
Former Senior Research Officer,
Odisha Forest Dept.,
Durgamadhab Nagar, (Lane-1),
Near Central Ayurvedic Research Centre and Hospital,
Sampur, PO- Ghatikia, Khandagiri, Bhubaneswar- 751003,
kar.sudhakar@gmail.com | Member | 09438054614 |
| 07 | Mr. Raghunath Prusty
Former Chief Manager, Allahabad Bank,
Flat No. -103, Tower-10, Vipul Gardens,
Ghatikia, Bhubaneswar-751003,
rnprusty00782@gmail.com | Member | 07537004449 |
| 08 | Dr. Pradeep Kumar Rath
Former Dy. Chief Labour Commissioner,
A/ 102, Baishnab Vihar Apartment, Bomikhal,
Bhubaneswar- 751010,
pkrath.cls@gmail.com | Member | 09433941340
09437500556
033-22895797 |
| 09 | Dr. Abhay Kant Pathak, IFS,
Chief Conservator of Forest,
Plot No. - 101, Biswanath Villa,
Vivekananda Marg, Old Town, Bhubaneswar- 751002
ak.pathak@rediffmail.com | Member | 09438659962 |
| 10 | Dr. Rekha Das,
Former Reader in Zoology
130, VIP Colony, Ekamra Vihar, IRC Village,
Bhubaneswar-751015
rekhadass1957@rediffmail.com | Member | 09938454233
0674-2551011 |
| 11 | Dr. Ramesh Chandra Mishra,
Sr. Scientist, National Genetic Resources, ICAR
Plot No. 467/22, Shree Vihar, PO- Patia, Bhubaneswar - 751031
rcmisranbpgr@gmail.com | Member | 09861086811
0674-2741419 |

- | | | | |
|-----------|--|-------------------------------|---|
| 12 | Dr. Prativa Nanda
Former Reader in Botany,
Flat No. 208, Chandralok Apartment,
Professorpara, Cuttack- 753 003
nanda_pkn99@yahoo.com | Member | 09437226645 |
| 13 | Mr. Guru Charan Das
Formerly at Geological Survey of India,
Journalist Colony, Madhusudan Nagar, Tulsipur,
Cuttack-753008, 31.7gurudas@gmail.com | Member | 09437109321 |
| 14 | Er. K. Gandhi Choudhury
Former Supt. Engineer (Elctr.),
N-3/290, IRC Village,
Bhubaneswar-751015
kgchoudhury@rediffmail.com | Member | 09861072281
09438019382
0674-2554776 |
| 15 | Dr. Ladukesh Prasad Mishra
Lecturer in Botany,
22, VIP Area, IRC Village, Bhubaneswar - 15
lpmishra_2006@yahoo.co.in | Member | 09861238619
09437138228
0674-2550969 |
| 16 | Dr. Veerendra Pratap Upadhyay
Former Adviser, MoEFCC
B-1, Flat-303, New LIC Colony, Maitree Vihar
Bhubaneswar-751023, vpupadhyay@gmail.com | Coopted Member | 9437129945 |
| 17 | Er. Manoranjan Mishra
Former Vice President, SMS Inida Pvt. Ltd.
Flat No. - F093, The Cosmopolis, Dumduma,
Bhubaneswar-751019, mmkb108@gmail.com | Coopted Member | 7894454052 |
| 18 | Mr. Rama Chandra Patra
OSS (Retd.),
N-4 / 60, IRC Village, Bhubaneswar - 751015
rcpatrairc@gmail.com | Administrative Officer | 09337872220
0674-2558648 |

13. Advisory Body

- ❖ **Prof. Amulya Kumar Panda, Adviser**
Former Principal, Ravenshaw College
- ❖ **Dr. Bijay Ketan Patnaik, IFS (Retd.) Member**
Former PCCF (WL) & Chief Wildlife Warden, Odisha
- ❖ **Dr. Seba Mohapatra, Member**
Former Director, Health Services, Odisha
- ❖ **Er. Binod Chandra Padhi, Member**
Former Engineer-in-Chief, Odisha
- ❖ **Dr. Chitta Ranjan Mishra, Member**
Former Deputy 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@gmail.com,
Website: www.orissaenvironment.com

APPLICATION FORM FOR MEMBERSHIP

To

The Secretary, Orissa Environmental Society,
ND-4, VIP Area, IRC Village,
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 enrol 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@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:.....)





ORISSA ENVIRONMENTAL SOCIETY

ND-4, VIP Area, IRCVillage, Bhubaneswar-751015, Odisha, India

Telephone: 0674-2557423

Web: orissaenvironment.com, Email: oesbbsr@gmail.com