



**ANNUAL ACTIVITIES REPORT**  
**FOR THE YEAR 2014-15**  
**OF**  
**SCIENCE & TECHNOLOGY**  
**DEPARTMENT**

# **REPORT ON THE ACTIVITIES OF SCIENCE & TECHNOLOGY DEPARTMENT FOR THE YEAR 2014-15**

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## **1. INTRODUCTION**

The Science & Technology Department is the nodal Department for the promotion of the Science & Technology in the State. The manifold scientific and technological activities are carried out by different agencies like Odisha Renewable Energy Development Agency (OREDA), Odisha Space Application Centre (ORSAC), Odisha Bigyan Academy (OBA), Pathani Samanta Planetarium (PSP), Institute of Mathematics & Applications (IMA) and Institute of Materials Science (IMS) working under the aegis of this Department with the following objectives:-

- 1.1** To keep abreast of the latest developments in the field of Science & Technology and to take steps for dissemination of these among institutions, industries, research laboratories, Universities, scientists and technologists.
- 1.2** To co-ordinate the R&D Programs of different departments, industrial and research institutions and to ensure scientific and technical co-operation among these institutions and agencies.
- 1.3** To formulate and fund, research and application programs in the field of science and technology,
- 1.4.** To encourage, develop and extend the use of renewable sources of energy including energy plantations.
- 1.5** To popularize Remote Sensing Technology and make effective use of it.
- 1.6** To popularize science and technology among students and the people so as to inculcate a scientific temper and attitude in them.
- 1.7** Promote and popularize appropriate rural technologies.
- 1.8** Development of Library cum Documentation Centre for Science & Technology.
- 1.9** Science & Technology communication through awareness promotion, support to Institutions for Seminars/Workshops etc., development of Science Centres and administration of Pathani Samanta Planetarium.
- 1.10** To conduct Science & Technology Entrepreneurship Development Programmes.
- 1.11** To undertake fundamental research in mathematics and its application.
- 1.12** To conduct basic and applied research in the frontier areas of Material Science & Engineering.

## **2. STATE COUNCIL ON SCIENCE & TECHNOLOGY**

The State Council on Science & Technology functions as the highest policy making body for development of Science & Technology and oversees the implementation of the programs undertaken in the field of Science and Technology in the State. The activities pertaining to various programs / schemes undertaken during the year 2014-15 are stated below:

## **2.1 Scholarship at Post-Graduate Level on Basic Sciences**

To promote and encourage the meritorious students to pursue their Post-Graduate studies in Basic Science subjects, such as Physics, Chemistry, Mathematics, Botany, Zoology and Geology, Government of Odisha in Science and Technology Department is implementing a Scholarship programme @ Rs.2000/- per month for 200 students under the aegis of the State Council on Science and Technology.

## **2.2 UNESCO- Kalinga Prize**

The UNESCO Kalinga Prize for popularization of Science is an International Award and created in the year 1951. The prize is being administered by UNESCO, Paris since 1952. The State Council on Science & Technology, Odisha coordinates UNESCO- Kalinga Prize. The donation for this prize is shared by the Government of India, Govt. of Odisha and Kalinga Foundation Trust, Bhubaneswar since the year 2005.

## **2.3. Establishment of Sub-Regional Science Centers**

A Sub-Regional Science Centre is being set up at Mouza-Tukurla under Bhatli Tahasil in Bargarh District in the State, which is under progress. Further, steps are being taken up for setting up of Sub-Regional Science Centres in Koraput and Keonjhar Districts.

## **2.4 Financial support provided for holding State Level Science Exhibition**

Financial support has been provided to Regional Science Centre, Bhubaneswar for holding a State Level Science Exhibition.

## **2.5 Establishment of Patent Information Centre in the State.**

The State Council on Science & Technology has taken steps for the establishment of Patent Information Centre (PIC) in Odisha. The project will run for a period of 5 years with the financial assistance from the Department of Science & Technology (DST), Government of India. Action has been initiated for selection of one Project Scientist on contractual basis for Patent Information Centre. The project will be implemented after appointment of the Project Scientist.

## **2.6 Documentation Centre-cum-Library**

This Department has a Documentation Centre-cum-Library which establishes a close link with the Research Activities in the State and provides up-to-date information to Research Scientists in various fields of specialization. The Library has a good number of Books and Journals. State Council on S&T has released Rs.7,20,600/ to Odisha Bigyan Academy to start a Digital Science Library.

## **3. DEVELOPMENT OF BIOTECHNOLOGY**

Biotechnology is a frontier area of technology with immense benefits to society in diverse areas such as Food Security, Nutritional Supplementation, Health-Care products and industrial applications. Considering the diversified resources of the State, this cutting edge technology has a potential to make a significant contribution to the economy of the State.

- Research grant has been sanctioned to thirteen new Research & Development projects in Biotechnology.

- Financial support has been provided for holding two Workshops/ Seminars etc. on Biotechnology.
- 32 scholarships are being provided to students pursuing Post-Graduation studies in Biotechnology in different Universities and Colleges of the State.
- Government of Odisha is developing a state of the art Biotech Pharma IT Park (Konark Knowledge Park) over an area of 64.613 acres at Mouza- Andharua under Bhubaneswar Tahasil in a Public private Partnership (PPP) mode. The project has been handed over to Odisha Industrial infrastructure Development Corporation (IDCO), Bhubaneswar as the nodal agency for execution as per the Lease-cum-Development Agreement.
- Within this Park, a Biotechnology Incubation Centre (BTIC) will be developed over an area of 9.753 acres of land by the State Government for use by researchers, entrepreneurs and students.
- Funds have been sanctioned to conduct two Skill and Entrepreneurship Development Programmes (SEDPs) each at Orissa University of Agriculture & Technology and College of Engineering and Technology ( CET), Bhubaneswar.

#### **4. ODISHA RENEWABLE ENERGY DEVELOPMENT AGENCY (OREDA)**

##### **4.1 National Biogas and Manure Management Programme.**

The National Biogas and Manure Management Programme (NBMMP) is a centrally sponsored scheme and a part of 20-point programme. Under the programme the people are taking advantage for cooking and lighting by establishing Biogas plants. During the year 2014-15 (upto January 2015) 1774 Nos. of biogas plants have been constructed against the target of 5000.

##### **4.2 Wind Power Project**

The estimated wind power potential in Odisha is about 910 MW. Resource assessments are being taken up in 9 locations. The programme is supported by Centre for Wind Energy Technology (C-WET), Chennai, an organization under Ministry of New and Renewable Energy (MNRE), GOI, New Delhi.

##### **4.3 Solar Photovoltaic Power Projects:-**

###### **a. Grid Connected solar power plant:-**

During 2014-15 one 5 MW Grid Connected Solar Power Project has been commissioned on 19.8.2014 in the district of Bolangir under RFS, Batch-I.

Besides, to meet the Renewable Purchase Obligation (RPO) of GRIDCO, OREDA has given Letter of Intent (LOI) for installation of 25 MW Solar Power Plant in favour of M/s Acme Odisha Solar Power Pvt. Ltd. in the State, which is under progress.

Regarding development of off grid Solar Power Plant in the State, OREDA has installed 50 KW roof top solar power plant in different Govt. buildings of the State during 2014-15.

###### **b. Off grid Solar Photovoltaic (SPV) Programme.**

The programme is supported by Ministry of New and Renewable Energy, Govt. of India. The Prime objective of the programme is to provide illumination and running of

different electrical appliances. Reduction in use of diesel and kerosene will also indirectly help to reduce carbon dioxide emission. The State has achieved 458.5 Kwp under solar photovoltaic system.

3799 solar lanterns have been supplied to handloom weavers families with the support of Textile & Handloom Department.

#### **4.4 Solar Energy Based Dual Pump Piped Water Supply Scheme**

Small irrigation and drinking water are the most potential applications of solar power. The main advantage is that solar radiation is intense when the need of water for irrigation/drinking is high. Further, Solar power is available at the point of use, making the farmer/villagers independent of fuel supplies or electrical transmission lines.

IAP (Integrated Action plan), PVTG and OTELP areas are typically characterized by small remote habitations. Bore well/tube wells are the only sources of drinking water in these habitations. When water level in the wells depletes or hand pumps go out of order providing minimum life supporting drinking water in these villages, it possess a very big challenge. Since most of these habitations are either un-electrified or the power supply is highly erratic, energizing the wells with normal grid power also becomes very difficult. In such scenario, Solar PV water pumping systems in tandem with regular existing hand pumps (called as dual pump) emerge as viable option for ensuring uninterrupted drinking water supply with minimum recurring expenses.

OREDA has taken up the scheme of Solar Energy Based Dual Pump Pipe Water Supply in collaboration with the RWS&S under NRDWP in 1762 villages IAP areas of the state in the year 2013-14. The total project cost is Rs. 83.89 core. RWS&S has allotted another 1397 project for the year 2014-15.

The achievement under the said scheme in the year 2013-14 was 257. The total target/plan for the current year is 2902 (1762 + 1397-257). The progress up to January, 2015 is 1465.

#### **4.5 Biomass Resource assessment study**

For development of biomass power projects in the state, action is being taken to float tender for inviting consultant to conduct a biomass resources assessment study during the current financial year 2014-15.

#### **4.6 Setting up of Solar Radiation Resource Assessment unit**

During 2013-14, four Solar Radiation Resource Assessment units (SRRA) were installed in different Engineering Institutes of the state for better understanding of the solar resources on micro level.

#### **4.7 Solar Pumping Program for irrigation in the state of Odisha**

MNRE has launched a major program for irrigation using solar powered pumps with 30% subsidy wherein the ministry had indicated a target of 1750 pumps for Odisha. In the meanwhile, the ministry enhanced the target to 2560 No. of pumps and sanctioned an amount 26,75,18,700/- towards CFA which includes service charge to OREDA amounting to Rs 26,48,700/-. Out of the sanctioned amount, an amount of Rs.7,94,61,000/- has been released by the MNRE. For implementation of the above programme in the State, a Steering Committee meeting was constituted. The above work will be taken up soon.

#### **4.8 Publicity**

Exhibitions, wall paintings, and hoardings are made for wide publication of Renewable Energy schemes among the common people. During current year OREDA has participated in two numbers of exhibitions and installed 20 wall paintings.

#### **4.9 Renewable and Co-generation Purchase Obligation (RCPO)**

The OERC has designated Odisha Renewable Energy Development Agency (OREDA) as state agency to promote co-generation and generation of electricity for Renewable Energy sources.

OREDA has identified 50 numbers of obligated entities having captive power plants of 5 MW or above. In 2014-15 OREDA has collected the information on the open access consumers and revised the list of obligated entities.

#### **4.10 Renewable Energy Certificate (REC) Mechanism**

Central Electricity Regulatory Commission (CERC) has notified Regulation on Renewable Energy Certificate (REC) in fulfillment of its mandate to promote renewable sources of energy and development of market in electricity. OERC has designated Odisha Renewable energy Development Agency (OREDA) as State Agency for accreditation and recommending the renewable energy projects for registration and to undertake functions under the RCPO Regulations. The state agency shall function in accordance with the directions issued by the commission and shall act consistent with the procedures/ rules laid by central agency for discharge of its functions under Central Electricity Regulatory Commission (Term and Conditions for recognition and issuance of Renewable Energy Certificate for Renewable Energy generation), Regulation, 2010. OREDA has issued two accreditations certificates during current year.

### **5. INSTITUTE OF MATHEMATICS AND APPLICATIONS (IMA)**

The main aims and objectives of the Institute of Mathematics & Applications are to pursue research in Mathematics & Applications to search and nurture talents in Mathematics, to build a reference library and documentation centre, to set up advanced computing centre and to offer specialized courses.

#### **5.1 Research Activity**

Some of the areas in which research work were undertaken in the period under reference were (i) Application of Stochastic Process to Mathematical Finance (ii) Computational Finance (iii) Optimization Theory (iv) Computational Fluid Dynamics (v) Numerical Analysis (vi) Cellular Automate Theory (vii) Computational Biology (viii) Machine Learning. One scholar has been awarded Ph.D by Utkal University. Six research papers have been published in International Journals.

#### **5.2 Teaching**

Three year B.Sc (Hons) program in Mathematics & Computing and two year M.A/ M. Sc Programme in Computational Finance to produce competent financial engineers to face innovative financial market, are offered by the Institute. Students of the institute have been selected for higher studies in different premier institutes of the country such as IITs and IISERs.

#### **5.3 Nurture Programme**

(a) On Sundays the Institute conducts Problem Solving classes for school children. Students of both urban and rural areas are attending these classes.

(b) Training camps

The Institute conducted 7 training camps and trained 428 students and 192 teachers during vacation to improve their competence in Mathematics, Training Programme for teachers of SC/ST schools under SC & ST Development Department, Govt. of Odisha. Two training programs in Mathematics and IT were conducted for 34 Junior Lecturers of Ekalabya Model Residential Schools by SC & ST Development Department.

#### 5.4. Seminar/Conferences/ Symposium/ Workshop

Seminars / Conferences / symposium / Workshops have been conducted regularly to develop the knowledge of the students in the Institute. Invited Professors from outside and internal faculty members delivered talks. Faculty members participated in two seminars and presented research papers. Faculty members were invited to five seminars / conferences.

#### 5.5 Summer Project

Two students of NIT, Rourkela did their projects in the Institute. One Ph.D scholar of NIT, Rourkela also conducted research as a visiting scholar.

#### 5.6 Nodal Agency of State Level P.G. Scholarship in Basic Sciences

The Institute coordinates for award of the scholarship offered by State Council on Science & Technology, Science & Technology Department, Govt. of Odisha to students pursuing P.G. in Basic Sciences in the State. Visitors of the Institute.

### 6. INSTITUTE OF MATERIALS SCIENCE (IMS)

The main objectives of the Institute of Materials Science (IMS) are to execute various well-defined research programs in the frontier field of materials science and technology including interdisciplinary research programme on advanced materials, their development, optimization, production and utilization. In order to exploit huge untapped natural resource materials available in Odisha and to upgrade these to value added products, it is necessary to provide adequate research facilities for the above research and development programme.

Three research scholars of IMS have submitted their Ph.D. thesis to Utkal University and Ravenshaw University.

- An experimental collaborative research between UNISA, South Africa, Naval Research Laboratory, USA & Norfolk State University, USA is underway.
- Two research scholars are inducted to do research work on multiferroics and magnetic super-capacitor.
- Eight research papers have been published in International journal By scholars of IMS
- The Institute organized three invited talks during the year. Padmabhusan Dr. B.B.Rath (NRL, USA), Prof. A.K. Pradhan (Norfolk State University, USA) and Dr. D.K. Mishra (UNISA, South Africa) delivered talks.
- International Conference attended – 04

- TSP programme has been initiated through scientific exposure visit covering 318 schools (selecting one best student from each school securing highest marks in Mathematics and Science) functioning under the administrative control of ST & SC Development Department, Govt. of Odisha.

## 7. PATHANI SAMANTA PLANETARIUM (PSP)

Pathani Samanta Planetarium is a premier institute of the state for popularization of science in general, Astronomy, Astro-Physics and Space Science in particular under the administrative control of Science and Technology Department, Government of Odisha.

Pathani Samanta Planetarium, Bhubaneswar was inaugurated on 8<sup>th</sup> of January, 1990. Since its inauguration, PSP has increased its activities manifold and it has established a link throughout the state. Various programmes are being conducted throughout the year. About 1,55,000 visitors visit Planetarium during the year.

	PSP show
Total show	1307
No. of Adult visited	82692
No. Of children visited	52032
Total No. of visitors visited upto January 31,2015	134724
Total Amount Collected (in Rs.) up to January 31, 2015	Rs.25,48,290/-

The main objectives and functions of the Planetarium are to bring to the public the awe and wonders of the universe through the planetarium shows. At present, Pathani Samanta Planetarium is showing planetarium shows in three distinct languages with different programmes such as (i) Akashara Asaranti Katha (in odia) (ii) Viswora Rahasya (in Hindi) and (iii) IBEX : Search for the edge of the Solar System (in English). In the open air, the Astronomy Park established in the premises of PSP with many astronomical models are being appreciated by student community, teacher community & general public. Like every year, this year on 13th December, on the birth Anniversary of Pathani Samanta, 20 selected Young Astronomers of the state were awarded by the Hon'ble Chief Minister of Odisha. Students covering all most all districts of Odisha participated in the YATS programme. They are encouraged to pursue their career in science in general, Astronomy, Astrophysics & Space Science in particular and take up future research activities to build the nation and create mile stone in space exploration.

Besides, presenting Planetarium shows, PSP has taken up a no. of activities for popularization of science, specifically Astronomy and for creating consciousness and its culture in the state. Further, it is also deeply engrossed in research and development works. Some of the activities include Night Sky Watch (NSW) programme, publication of wall magazine 'Chhayapath' Teachers Training programme for talented secondary school Students, Astronomy Olympiad, demonstration of astronomical models, Amateur astronomer's meet, workshops, seminars, symposia monthly meeting of SCAAA, Bigyan Lekhaka Sammukhya (Science writers forum) etc.

## 8. ODISHA BIGYAN ACADEMY (OBA)

The aim and objectives of Odisha Bigyan Academy (OBA) are to promote and popularize science, amongst people of Odisha, based on informed knowledge emanating from various frontier fields of Science & Technology.

During the financial year 2014-15, the achievement of the Institute are as follows;

8.1. Ten issues (upto January, 2015) of monthly popular science magazine in Odia "Bigyan Diganta" have been released and distributed to all Government recognized High Schools of the State free of cost.



8.2. One issue of quarterly magazine in abridged version of popular science magazine "Bigyan Diganta" has been published in Braille Odia script and distributed to the blind students and their institutions free of cost.

8.3. Nine issues (upto January 2015) of Science Magazine "Science Horizon" in English language have been released and distributed to Govt. English Medium High Schools and +2 Science Colleges of the State free of cost.

8.4. Odisha Bigyan Academy (OBA) celebrated its foundation day on 01.04.2014 (Utkal Divas). Padmabhusan Prof. Trilochan Pradhan, Founder Director, Institute of Physics, Bhubaneswar and Former Vice-Chancellor, Utkal University and Prof. Ashok Kumar Mohapatra, Director, AIIMS, Bhubaneswar were the Chief Guest and Guest of Honour respectively. On this occasion, Quiz and Sit & Draw competition were conducted among the High School Students of Odisha. The Chief Guest presented the Awards to the Awardees of the above competitions. Students interacted with Scientists of Odisha and enjoyed a science magic show presented by Regional Science Centre, Bhubaneswar.

8.5. The Investiture ceremony of different Awards of Odisha Bigyan Academy for the year 2012 was organised at Jaydev Bhawan, Bhubaneswar on 05.08.2014 wherein Hon'ble Chief Minister of Odisha graced the occasion as Chief Guest. Hon'ble Minister, Higher Education, Science & Technology & Rural Development (Rural Water Supply), Odisha and the Commissioner-cum-Secretary to Government, Science & Technology Department, Government of Odisha were the Guests of Honour. Hon'ble Chief Minister felicitated and awarded eminent scientists of Odisha.

8.6. Odisha Bigyan Academy organised the Popular Science Lectures on 16.08.2014 and 20.09.2014 wherein Vice-Chancellor, Ravenshaw University and Visiting Professor, Indian Institute of Technology, Bhubaneswar & Awardee of "Biju Patnaik Award for Scientific Excellence-2012 were the resource persons. Students from different Colleges of Bhubaneswar, Life Members and Patrons of the Academy and general public attended the programme.

8.7. Odisha Bigyan Academy organised a Writers Workshop for writing in 'Bigyan Diganta' & 'Science Horizon' at its Conference Hall on 26.09.2014. The purpose of the workshop was to improve the quality of popular science writing for 'Bigyan Diganta' & 'Science Horizon' published by Odisha Bigyan Academy. Many eminent popular science writers of Odisha were the resource persons for the said Workshop and gave their views. More than 70 science writers participated in the Workshop.

## **9. ODISHA SPACE APPLICATION CENTRE (ORSAC)**

### **9.1 GRAMSAT Project**

Two Interactive Training Programmes have been conducted by the user departments from 1<sup>st</sup> April, 2014 to 31<sup>st</sup> January, 2015. Developmental news programmes of 23 episodes of "Sunar Odisha" & 16 episodes of "Swapnara Odisha" have been transmitted through OTV & Doordarshan Kendra, Bhubaneswar respectively.

### **9.2 Block level Resource Atlas & GIS database Generation**

The web version of Block Level GIS "Odisha Sampad" has been updated. Database on Banks and ATMs of Odisha state has been incorporated in the geoportal.

### **9.3 NLRMP Project**

ORSAC has been a technical partner in the implementation of NLRMP in the state. Quality checking of digital cadastral maps has been carried out in the centre.

#### **9.4. EDUSAT Programme**

Class room teaching transmission on Mathematics, Science, English and Geography has been conducted for Class-IX & X students for 170 days covering 460 classes.

#### **9.5. Urban Land Information System**

Urban mapping for Boudh, Malkangiri, Raghunathpur, Paralakhemundi, Koraput towns has been completed.

#### **9.6 DGPS Survey of Mining Lease / Coal Block areas**

DGPS survey for six mining lease area and seven coal block areas has been completed and submitted to the users.

#### **9.7 Rajiv Gandhi National Drinking Water Mission-Bihar and Odisha State**

Mosaic of Groundwater prospects maps has been prepared and submitted to NRSC in WGS-84 datum.

#### **9.8 Space Based Information Support for Decentralised Planning (SISDP)**

Final output of thematic data like landuse, transport, settlement and drainage along with legacy data and stakeholders data have been sent to NRSC, Hyderabad.

#### **9.9 Survey of Forest Land Proposed for Diversion**

Vetting of forest diversion has been completed for 47 proposals. 10 proposals where survey has been carried out by other agencies have been vetted.

#### **9.10 Desertification status Mapping**

Thematic maps of DSM 1 and DSM 2 have been prepared on desertification/land degradation of Odisha state and sent to Space Applications Centre, Ahmedabad.

#### **9.11 FASAL Project**

ORSAC participated in the digital image analysis of RISAT SAR data for districtwise kharif paddy acreage assessment of Odisha state at Mahanalobis National Crop Forecast Centre (MNCFC), Ministry of Agriculture, Govt. of India, New Delhi. The information collected from wall to wall groundtruth has also been submitted to MNCFC for post classification accuracy assessment.

#### **9.12 Georeferencing of Forest Blocks of Odisha.**

Georeferencing of Forest blocks (RF, PRF, PF, DPF, UDPF) received from Forest Department has been done using ortho image of Cartosat-I prepared under SISDP Project. 900 sections have been verified in association with Forest Department Section officers for all 50 Forest Divisions.

#### **9.13. Application software Development for TDCCOL**

Application software for the management of Minor Forest Produce in the state has been developed and web hosted.

**9.14 OPTCL Project**

The power atlas of Cuttack circle has been hosted in public domain. Capacity building on use of the application software has been made for the OPTCL officials.

**9.15 Forest Change Mapping and Atlas Preparation**

The forest change analysis has been carried out for 25 Forest Divisions using FSI Forest layer of 2011 & 2013. Beatwise change matrix, change area and geo-coordinates of the central points have been generated. Forest change maps of Nayagarh and Angul Division have been submitted to Forest Department for verification. Forest administration boundaries of the rest of the Divisions are in progress.

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