

REPORT ON THE ACTIVITIES OF SCIENCE & TECHNOLOGY DEPARTMENT FOR THE YEAR 2012-13

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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 like industries, research laboratories, Universities and among scientists and technologists.
- 1.2. To co-ordinate the R&D Programmes 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 programmes 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 in them a scientific temper and attitude.
- 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 programmes undertaken in the field of Science and Technology in the State. The activities pertaining to various programmes / schemes undertaken during the year 2012-13 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 during the year-2012-13 under the aegis of the State Council on Science and Technology. The Institute of Mathematics and Applications, Bhubaneswar is the Nodal agency to implement this scheme.

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 for UNESCO- Kalinga Prize. The donation for this prize is shared by the Govt. of India, Govt. of Odisha and Kalinga Foundation Trust since the year 2005. The UNESCO – Kalinga prize for the year 2013 will be awarded during November, 2013.

2.3 Establishment of Sub-Regional Science Centers.

The State Council on Science & Technology is taking active steps for establishment of Sub-Regional Science Centers at different Regions in Odisha to develop scientific temper, to promote creative activities, to highlight important and relevant issues in science and technology and to popularize these for the benefit of the community especially for students and young mass. A piece of developed land measuring 5.00 acres shall be provided by the state government free of cost. The capital expenditure of Rs.5.00 crore will be share by the Centre and the State at 50:50 proportions. The Sub-Regional Science Centre will be operated and maintain by a registered society form by the Govt. of Odisha. The National Council of Science Museum,. (NCSM) Kolkata will provide necessary technical guidance for establishment of the above centre. NCSM will also train the staff of the centre after completion of project. The recurring expenditure will be born by the State Government. The approximate time schedule for completion of the project is 2 to 2.5 years. The Sub-Regional Science Centre shall contain one Main Building, Science Gallery, Science Park, Taramandal, Exhibit Development Laboratory, Library, Conference Hall, Office room etc. Action has been taken for setting up Sub Regional Science Centre, in Bargarh, Koraput and Keonjhar Districts.

2.4 Establishment of District Science Centers

The State Council on S&T is taking steps for establishment of District Science Centre as State initiatives. The proposed District Science Centre will be a small one in comparison to the Sub Regional Science Centre. The site selection criteria prescribed by NCSM will be followed scrupulously. Since the proposed District Science Centre is a small one and does not fit to the norm of NCSM, the creative Museum Designers (CMD) a wholly owned company of NCSM Kolkata, Ministry of Culture, GOI has been requested to supply a Model Project Report of District Science Centre for implementation in Odisha.

2.5 Celebration of National Science day- 2013

The State Council on Science & Technology is taking steps for celebration of National Science Day -2013 on 28th February, 2013 by involving various academic in Scientific Institutions of the State through Odisha Bigyan Academy. The theme of this year is **“Genetically Modified Crops and Food Security”**. The National Science day is celebrated in every year on 28th February in the memory of Laureate Prof. C.V.Raman.

2.6 Participation in the 100th Indian Science Congress (ISC) Kolkata.

State Council on Science & Technology took initiatives for participation in the 100th Indian Science Congress held at Kolkata from 3-7, January, 2013 and successfully coordinated with the Organizers and the participating Institutions. The Team Odisha participated in the 100th Indian Science Congress. The Additional Secretary to Government, Science & Technology Department was the state Coordinator and OREDA, Bhubaneswar was the Nodal Agency to organize the participation in the Mega event. The theme of 100th ISC was “Science for shaping the future of India”. The participating agencies like OREDA, ORSAC, PSP, Biotechnology Cell, IM&A, and OBA displayed exhibits in accordance with the theme of the 100th Indian Science Congress.

2.7 Research Grant under “Development of Biotechnology”

State Council on Science & Technology is sanctioning Research Grant under the scheme “Development of Biotechnology” and releasing to the Principal Investigators of different research projects.

2.8. Establishment of Patent Information Centre in the State.

The State Council on Science & Technology has taken steps for 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. The project would be monitored by a monitoring committee comprising of experts from DST, Govt. of India. The MOU has been signed between Science & Technology Department, Odisha and DST, Govt. of India. The Project will be implemented after appointment of project staff.

2.9 Participation in the Expert Group meeting on Patent Information Centre (EGPIC)

State Council on S&T, Odisha participated in the 1st Expert Group meeting on Patent Information Centre (EGPIC) held during 7th -8th June, 2012 at Bangalore to discuss on policy issues and to take decision on the future expansion of activities of the PIC. The meeting was hosted by the Karnataka State Council for Science & Technology with support from DST, New Delhi. Experts from DST, GOI, Officials from all the PIC's of the Country and special invitees from National Level Institutions were attended the meeting and participated in the deliberations.

2.10 Constitution of Task force on Technology Labs and improving Educational Curriculum for the courses on Advance Technology.

The State Council on Science & Technology has taken steps for constitution of Task Force under the Chairmanship of Prof. D.K. Tripathy, former Vice Chancellor, VSSUT, Burla to identify the equipment at different levels of Research and Development and to assess the budget thereof in the areas of Micro electronics, New Materials and Nanotechnology, Advance Mechanical and Civil engineering Design, Software Development and Technologies. The Task Force on Technology Labs and improving Educational Curriculum for the Courses on Advance Technology has been constituted vide Govt. Resolution 3142/ST., dated 25.06.2012. The Chairman, Task Force has submitted the Report Necessary budgetary provision, based on Task Force report, shall be made under Employment and Technical Education & Training, Department, Odisha for improving the condition of Labs in different Educational Institutions of the State after approval of Government.

2.11 Awards for Innovation, documentation of Important Technologies, Documentation of Indigenous and Traditional Knowledge (ITK) and Publication of half yearly Science Magazine on new Technologies.

The State Council on Science & Technology has taken steps for preparing a new programme viz. " Awards for Innovation, Documentation of Important Technologies, Documentation of Indigenous and Traditional Knowledge (ITK) and publication of half yearly Science Magazine on new Technologies" to be implemented by the Odisha Bigyan Academy under "Popularization of Science & Technology Programme".

The objective of Innovation awards is to promote new ideas for finding technical solution and to facilitate linkage of technology with product development for industrialization.

Technological development takes place chronologically over a period of time may be century by century and is a continuous process. The aim of documentation is to make available the technical know-how and product history for subsequent users like students, researchers, engineers, operators, patent agents, public prosecutors etc.

Indigenous and Traditional Knowledge (ITK) is an integral part of the culture and history of a local community. Documentation of ITK provides useful clue for

planning projects for conservation of biological diversity, sustainable uses of natural resources, indigenous health practices etc.

Similarly publication of this half yearly Science Magazine aims at developing the scientific outlook of students as well as the general people and to give them information on scientific developments on new technologies like Information Communication Technology, Biotechnology, Nanotechnology and Renewable Energy. Each issue will have the information on scientific discoveries / invention on new technologies and may be useful for the R&D students on Science & Technologies.

2.12 Formation of Innovation Council in the State of Odisha

The State Council on Science & Technology has taken steps for formation of Innovation Council in the state of Odisha. India has declared 2010-20 as the **“Decade of Innovation”**. National Innovation Council has been established, GOI have introduced Science, Technology and Innovation (STI) Policy-2013. To take this innovation policy forward and to create a cross-cutting system to boost innovation performance in the Country, National Innovation Council is facilitating the setting of State Innovation Councils in each State. The Councils would drive the innovation agenda in the states and harness the core competencies, local talent, resources and capabilities to create new opportunities. State Innovation Council would include members representing all stake holders under the aegis of Chief Secretary, Odisha to prepare road map for innovation in the State, to suggest system of Innovative Awards and Incentives to students and scientists, to create Innovative funding strategies for academic and research institutions for addressing issues of importance as per local requirement especially in the are of health, environment management, water and sanitation, to develop strategies for creation of Innovation Ecosystem and to provide incentives for scientific and technical talent to addressing State and Regional Development challenges.

2.13 Formulation of Policy on Science, Technology and Innovation in the State.

The State Council on Science & Technology has taken steps for formulation of policy on Science, Technology and Innovation in the state. Science & Technology play a crucial rule in socio-economic progress and sustainable development of nation. Presence of Science & Technology is found in every sphere of human life and no development can be imagined without it.

Application of Science & Technology in different field help in amelioration of social problem of masses and it provide better service in the field of education, health and sanitation and other social sector. Development of scientific temper and attitude among the people help them to solve their problem in smooth manner and save from hazards consequence of superstition and blind believe.

A committee with an eminent Scientist will be constituted under the chairmanship of the Commissioner-cum- Secretary to Govt. , S&T Department to formulate policy on Science & technology to develop strategy for Innovation in Science & Technology to identify key emerging technological areas where state can leverage its resources for taking advantage of Science & Technology, to suggest measures for popularizing Science among the people of the State, to

suggest Institutions, Research Labs at State and District level, to suggest measures for strengthening Science & Technology education in the State and to suggest system of Awards and Incentives to students and scientists.

2.14. Workshop on Energy Conservation under “Mission-Energy Conservation Efficiency and Renewable Energy”.

The State Council on Science & Technology has taken steps for organizing awareness Workshop on Energy Conservation through OREDA and OBA in collaboration with PCRA to communicate methods and steps to conserve energy that we use in our day to day life. PCRA is extending necessary support for such an important endeavor for organizing awareness building programmes and training to different stake holders at the State Hqs. Bhubaneswar. Bhubaneswar Municipal Corporation (BMC), Cuttack Municipal Corporation (CMC), at 30 district Hqs. and at Block level. The State level workshop was organized on 11th January, 2013 in the Conference Hall of Odisha Bigyan Academy, B/2, Saheed Nagar, Bhubaneswar. The Nodal officers from 30 district Education Office, Officers from OREDA, OBA, BMC, CMC and from different Govt. Departments participated in the Workshop.

2.15 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 is also regularly subscribing Magazine, Journals and Books for the said Library of Science & Technology Department.

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 productions and industrial applications. Considering the diversified resources of the State, the cutting edge technology has a potential to make a significant contribution to the economy of the State.

- 3.1** Research grant has been sanctioned for 02 on-going Research & Development projects in Biotechnology.
- 3.2** Government of Odisha is developing a state of the art Bio-tech Pharma IT Park (Konark Knowledge Park) over an area of about 64.613 acres at Mouza Andharua under Bhubaneswar Tahasil in a Public Private Partnership (PPP) mode.
- 3.3** Within this Park, over about 10 acres, a Biotechnology Incubation Centre (BTIC) will be developed by the State Government for use by researchers, entrepreneurs and students.
- 3.4** Active steps have been initiated for development of two more Biotech parks in the State i.e. one at Deras, Khurda and another Marine Biotechnology Park in Ganjam district.
- 3.5** A Sub- Scheme “ Germplasm and DNA Bank” has been prepared with approval of Government and concurrence of Finance Department and Planning & Co-ordination Department for development of Germplasm and DNA /Gene Bank in the State.

- 3.6** A Sub-Scheme“ Biotechnology Labs and Scholarship for Government Biotechnology Institutions” has been prepared with approval of Government and concurrence of Finance Department and Planning & Co-ordination Department for strengthening Biotechnology Laboratories, Scholarship for Government Biotechnology Institutions and BT Finishing School Course.
- 3.7** The Science & Technology Department through its agencies and Biotechnology Wing have participated in the 100th Indian Science Congress held from 3- 7th January, 2013 in Kolkata.

4. ODISHA RENEWABLE ENERGY DEVELOPMENT AGENCY

Odisha Renewable Energy Development Agency (OREDA), under the Department of Science & Technology, Govt of Odisha is a society constituted under societies Registration Act-1860. The main objectives of this Agency in the development of New and Renewable Source of Energy are:

- to encourage the development and accelerated utilization of renewable energy sources wherever they are technically and economically viable.
- to improve the access to and availability of renewable , decentralized sources of energy particularly for the rural population.
- to contribute towards balanced rural and urban development as well as development of backward, hilly and tribal areas by enabling the use of locally available decentralized renewable energy sources and to create gainful employment opportunity with due importance for ensuring access to woman and other disadvantaged group to employment opportunities.
- to reduce environmental degradation resulting from deforestation.

4.1. Remote Village Electrification Programme (RVEP)

The objective of the programme is electrification of those un-electrified remote census villages and remote un-electrified hamlets of electrified census villages where grid connectivity is either not feasible or not cost effective through conventional sources of energy with the financial assistance of Government of India and State Government. So far 366 villages out of 761 sanctioned villages under RVEP-2010-11 have been electrified under this programme during 2012. Almost 90% of these remote villages are lying in LWE areas. The State Government has provided Rs.5.98 crore towards state share. Further, the MNRE, GOI has sanctioned 296 villages under RVEP-2011-12 covering the districts of Ganjam, Kalahandi, Keonjhar, Koraput & Sundargarh. The execution work is under process. The Remote Village Electrification Programme was approved by the Govt. of India till the end of the 11th plan period.

A new scheme for providing basic lighting facilities through renewable energy sources is being planned by the Ministry of New & Renewable Energy, Govt. of India under the title “Energy Access Programme” during the 12th five year plan. Action has been initiated for identification of eligible villages for coverage under the programme..

4.2. Solar Photovoltaic Power Projects

OREDA has been proactively promoting solar power projects under the Jawaharlal Nehru National Solar Mission with a view to fulfill the solar power purchase obligation of the State as well as for trading Renewable Energy Certificates (REC) in the power exchange.

So far 9 Grid Connected Solar Power Projects have been commissioned in the state for a total capacity of 13 MW under JNNSM Scheme.

Besides, to meet the Renewable Purchase Obligation (RPO) of GRIDCO, Bhubaneswar OREDA has given letter of intent (LOI) for installation of 30 MW Solar Power Plant in the state. It is expected to commission the above projects during the financial year of 2013-14.

Regarding development of off grid solar power plant in the state, OREDA has installed 50kw roof top solar power plant in the secretariat building during the year 2012-13.

4.3 Special Area Demonstration Programme

Under this programme two projects have been sanctioned by MNRE, GOI towards demonstration of Renewable Energy Systems in prominent places. So far one project at Raj Bhawan and another at Shri Jagannath Temple, Puri have been taken up. Two SPV power plants of 20 KWP battery backup and 10 KWP grid interactive have been commissioned at Raj Bhawan. Another Grid interactive SPV Power Plant of 30 KWP has been commissioned at Shri Jagannath Temple, Puri.

4.4 Biomass Power Projects

The Biomass Power potential of the State has been estimated to be about 300 MW.

So far the State Technical Committee has cleared a total of 11 projects for a cumulative capacity of 138 MW. Of these, 9 developers have already signed PPAs with GRIDCO for a total capacity of 118 MW. The first 20 MW project in Dhenkanal has already been commissioned on 11.12.2011. It is proposed to establish another 35 MW biomass power plant during the year 2013-14.

4.5 Wind Power Projects

The estimated wind power potential in Odisha is about 800 MW. Resource assessments are being taken up in 6 locations and steps are being taken up to install another 4 met masts. 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.

4.6 National Biogas and Manure Management Programme (NBMMP)

The National Biogas and Manure Management Programme (NBMMP) is a Centrally sponsored programme and a part of the 20-Point Programme. Under this programme the people are taking advantages for cooking and lighting by establishing the Biogas plant. It is proposed to set up 8000 biogas plants during the financial year 2013-14.

4.7 SPV Programme.

This programme is supported by MNRE, Govt. of India. The prime objective of the programme is to provide illumination and running of different electrical appliances and reduction in use of diesel and kerosene also indirectly help to reduce carbon dioxide emission. It is proposed to set up 70kwp capacity of SPV Power plant and 3000wp capacity of SPV Pumping system in the state during the year 2013-14.

4.8 Renewable Energy Industrial Park.

Consequent upon announcement of Renewable Power Obligation for State utilities as well as other obligated entities and introduction of the REC mechanism a large no of developers are showing interest to set up renewable power projects base on solar, wind & biomass etc in the state. In order to facilitate the developers by providing common infrastructure facilities in locations where the particular renewable energy resource would be available a scheme for creation of such parks is being introduced. The State Technical Committee for Renewable Power has taken the decision to set up Renewable Energy Parks for setting up power projects based on Solar, Wind and Biomass in different parts of the State depending on the availability of resources. During the year 2012-13, land identification has been done in the district of Sambalpur and Nuapada. The Collectors of Sambalpur and Nuapada have been requested to provide lease of the land to OREDA for the purpose. Further development of infrastructure, such as, road, water & grid connectivity etc. will be done during the Financial Year 2013-14.

5. ODISHA SPACE APPLICATION CENTRE

The following are the brief activities of the Odisha Space Application Centre Bhubaneswar.

5.1. GRAMSAT Project:

30 Interactive Training Programmes have been conducted by the user Departments from 1st April,2012 to 19th February,2013. Developmental news programmes of 38 episodes each of “**Sunar Odisha**” & “**Swapnara Odisha**” have been transmitted through OTV & ETV respectively.

5.2 Block Level Resource Atlas & GIS Database Generation :

The web version of Block Level GIS “**Odisha Sampad**” has been updated so that all layers can be visualized for each block boundary of the State. The attribute data is being compiled for incorporation in the Block Level Resource Atlas as well as in “**Odisha Sampad**”.

5.3 N LRMP 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.

5.4. EDUSAT Programme:

Class room teaching transmission on Mathematics, Science & English has been conducted for Class-IX & X students for 134 days. The restructuring of Edusat programme is in progress which will be introduced from the academic year 2013-14.

5.5 Urban Land Information System

Urban mapping for Dhenkanal, and Balasore towns has been completed.

5.6 Geomorphology & Lineament Mapping :

Geomorphology & Lineament mapping for Odisha state has been completed and submitted to National Remote Sensing Centre (NRSC), Hyderabad.

5.7 DGPS Survey at Mining Lease Areas :

DGPS survey for 217 mining lease area have been completed and submitted to the users.

5.8 Rajiv Gandhi National Drinking Water Mission – Bihar & Odisha State :

Post field correction and finalization of ground water prospects maps for Bihar state is in progress. Data organization and analysis of ground water quality data collected from 18 districts of North Bihar and 30 districts of Odisha is in progress.

5.9. Space Based Information Support for Decentralized Planning (SIS-DP) :

Scene wise ortho image generation from Cartosat data has been completed for the entire state. Thematic maps on landuse, settlements, transport and drainage for 15 districts have been completed.

5.10 Survey of Forest Land Proposed for Diversion :

DGPS survey and authentication has been completed for 44 proposals. 57 proposals where survey has been carried out by other agencies have been vetted.

5.11 PDS Information System :

Village wise spatial information on fair shops, Kerosene Wholesalers and Sub-wholesalers has been generated and added as a layer under Odisha Sampad available in public domain.

5.12 Natural Resources Census (2nd Cycle) – Landuse Mapping of Odisha State

Landuse change analysis of 18 districts of Odisha has been completed using satellite image of 2005-06 and 2011-12.

5.13 AIBP Project – Irrigation Potential Study :

Assessment of Irrigation potential has been completed for Poteru Irrigation Project, improvement of Salki and Sason canal systems jointly by ORSAC and NRSC.

5.14 Landuse/Land Cover Mapping Of Joda-East Mining Area :

The landuse/land cover maps of Joda-East Mining area has been prepared.

5.15 Rural & Urban Health Information GIS :

Creation of Health Infrastructure GIS is in progress.

6. PATHANI SAMANTA PLANETARIUM

Pathani Samant 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 8th January 1990. Since its inauguration, PSP has increased its activities manifold and has established a link throughout the State. Various programmes are being conducted throughout the state. About 1,00,000(One Lac) visitors visit Planetarium every year.

Visitor & Revenue Collection

	PSP Show	Light & Sound Show
Total show	1113	32
No. of Adult Visited	64513	1594
No. of Child Visited	45270	4242
Total No. of Person Visited	109783	5836
Total Amount Collected (in Rs.)	20,76,883	83,780

The main objective and function 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 languages with different programmes of around 40 minutes duration such as “**Akashara Asaranti Katha**” (in odia), “**Viswora Rahasya**” (in Hindi) and “**The Secrets of the Sun**” (in English). A unique Light, Sound & Water show on **Samrat Kharavela** is being presented every evening at 6 pm. An Astronomy Park has been established in the premises of PSP with many astronomical models. Like every year, on 13th December, the birth Anniversary of Pathani Samanta is being celebrated, where in, 20 selected Young Astronomers of the State are awarded by the Hon’ble Chief Minister of Odisha.

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 on Astronomy, Astro –physics and Space Science, contact programme for talented secondary school Students, Astronomy Olympiad , demonstration of astronomical models , Amateur astronomers’ meet, workshops, seminars, symposia. monthly meeting of SCAAA , Bigyan Lekhaka Sammukhya (Science writers forum)etc are being organized in PSP during 2012-13.

7. INSTITUTE OF MATHEMATICS & APPLICATIONS

The Institute of Mathematics & Applications, Bhubaneswar was established by the Govt. of Odisha in 1999 (Vide Notification Gazette No-18, July 23, 1999). The main aims and objectives of the Institute are to pursue research in Mathematics and Application, to search and nurture talents in Mathematics, to build a reference library and documentation centre, to set up advanced computing centre.

7.1 Research Programme

The Institute undertakes the following research work during 2012-13.

- i) Stochastic Filtering and its Applications to Signal Process
- ii) Application of Stochastic Process to Mathematical Finance.
- iii) Operator Theory
- iv) Graph Theory and its applications
- v) Combinatorial Optimization
- vi) Non Commutative Geometry, Number Theory
- vii) Numerical Analysis
- viii) Cellular Automata Theory
- ix) Linear Algebra
- (x) Computational Fluid Dynamics
- (xi) Computational Biology
- xii) Machine Learning
- xiii) Fractals and Discrete Dynamical System

7.2 Nurture Programme.

Under this programme the Institute trains about 800 children per year during vacation to improve their competence in Mathematics. This has borne fruit in the shape of some of the rural students qualified in National Olympiad and International Olympiads respectively

- Every Sunday, the Institute conducts Problem Solving classes for school children. Students of both urban and rural areas are attending these classes.
- A Memorandum of Understanding (MoU) has been reached by IMA with Abhilash Mishra, Metron College, Oxford on Science Education Initiative for training and nurture of rural meritorious school students of Odisha.

- The institute organizes Interactive Mathematics Training Camp for undergraduate students in an area of rural setting of Odisha. These camps are held at vacation time of the year.
- State level Rural Mathematics Talent Search Training camp for class VIII students of 3 zones of the State were organized during 22nd to 31st December 2012 in which 120 students and 15 guide teachers were participated.
- State INMO training camp for the selected students was held during 23rd to 25th January 2013.
- A State level Ekalabya Model Residential School teachers training under SC/ST Development Department for Mathematics and IT was conducted in the Institute of Mathematics and Applications, Andharua, Bhubaneswar during 2012-13.
- The Institute of Mathematics & Applications was involved in a state level student's festival "Sargiful" being organized by ST & SC Development Department, Govt. of Odisha held at Adivasi Ground, Bhubaneswar during 2012-13.

7.3 Teaching Programmes:

The Institute organizes a three year B.Sc (Hons) programme in Mathematics & Computing. Students across the Country take admission in the course.

This Institute offers two years M.A/M.Sc Programme in Computational Finance to produce competent financial engineers to face innovative financial market.

7.4 Organization of Seminar/Conference/Symposium/Workshop:-

The Institute organizes Seminars, Workshops and Conference etc. in regular intervals.

7.5 Library:

The institute is equipped with more than 7000 references / journals on mathematical, financial, computational and also in related subjects as well as professional journals, both national and international having dedicated computer systems to access on line journals.

7.6 Programme for SC/ST students:

- The Institute of Mathematics & Applications has been conducting various programme for capacity building for tribal schools in Koraput & Nawarangpur District. A special training programme for +2 ST/SC students of KBK Districts have been undertaken by the Institute.
- In collaboration with SC & ST Development Department, Govt. of Odisha, Teacher's training programme and Tribal student counseling programme had been taken by Institute of Mathematics & Applications, Bhubaneswar.

7.7 Visit of Dignitaries

On 30th November 2012, His Excellency Abdul Rahman Ghafari, President General, Central Statistical Organization (CSO) of Afghanistan Along with four members visited IMA with a view to possible interaction of CSO with IMA.

8. INSTITUTE OF MATERIALS SCIENCE

The Institute of Materials Sciences, has undertaken the following are the important activities during 2012-13.

- 8.1** Two research scholars of IMS have qualified CSIR-SRF (Extended) and CSIR-SRF award through an open interview conducted by CSIR (Govt. of India) at CSIR complex, Pusa, New Delhi.
- 8.2** The Faculty of IMS visited University of Witwatersrand, Johannesburg and University of South Africa Pretoria & Florida campus and presented his invited talk on, "Rare earth doped Bismuth Ferrites Multiferroics", "Spintronics & Multiferroics" and "Diluted magnetic semiconductor" respectively.
- 8.3** Experimental research collaboration between University of Witwatersrand, South Africa (Dr. Dipti Ranjan Sahu), Naval Research Laboratory, USA (Dr. B. B. Rath) & Norfolk State University, USA (Prof. Aswini Pradhan) are continuing.
- 8.4** Installation of DC and RF thin film sputtering unit has been made in IMS laboratory.
- 8.5** Colloquium / invited talk organized by IMS:
 - (I) "Recent development of vacuum Science and Technology" by Prof. V.V. Rao (Head, Cryogenic Engineering centre, IIT Khargapur) on 30.06.2012.
 - (II) "Nanomaterials for green energy, biomedical & innovative electronic applications" by Prof. A. K. Pradhan (Director, CREST Center for Nano & Bio Inspired Materials & Devices and DoD Centre for advanced Nanomaterials & Devices, Norfolk State University, USA.) on 13.12.2012.
- 8.6** IMS published 08 international Journal and attended 07 National Conferences during the year 2012-13.
- 8.7** The G.A Dept. has been alienated a piece of Govt. land measuring area of Ac.2.00 in favour of IMS for construction of IMS Building The Plan and Estimate of building is being prepared by IDCO.

9. ODISHA BIGYAN ACADEMY

During the financial year 2012-13, Odisha Bigyan Academy has organised the following important activities.

- 9.1** Eleven issues of monthly popular science magazine in Odia "**Bigyan Diganta**" have been released and distributed to all Government recognised High Schools of the State in free of cost.
- 9.2** Three issues of quarterly magazine in abridged version of popular science magazine "Bigyan Diganta" have been published in Braille odia script and distributed to the blind students and their institutions free of cost.
- 9.3** Ten issues of monthly Science Magazine "Science Horizon" in English language have been released and distributed to Govt. English Medium High Schools and +2 Science College of the State free of cost.
- 9.4. Honour & Awards :**
- A. In a special investiture ceremony, the following awards were awarded to the eminent scientists and popular science writers for the year 2010 :
- (a) "Biju Patnaik Award for Scientific Excellence" awarded to One scientists
 - (b) "Samanta Chandra Sekhar Award" awarded to Four scientists
 - (c) "Odisha Young Scientists Award" awarded to Three scientists
 - (d) "Pranakrushna Parija Popular Science Award" awarded to Two popular science writers
 - (e) Four Senior Eminent Scientists felicitated.
- B. In a special investiture ceremony, the following awards for the year 2011 are to be presented to the awardees shortly
- (a) One scientists to be awarded "Biju Patnaik Award for Scientific Excellence".
 - (b) Four scientists to be awarded "Samanta Chandra Sekhar Award".
 - (c) Three scientists to be awarded "Odisha Young Scientists Award".
 - (d) Two popular science writers to be awarded "Pranakrushna Parija Popular Science Award".
 - (e) One Senior Eminent Scientists to be felicitated.

Apart from this, Odisha Bigyan Academy has already invited the nominations for different awards namely "Biju Patnaik Award for Scientific Excellence", "Samanta Chandra Sekhar Award", "Odisha Young Scientists Award",

"Pranakrushna Parija Popular Science Award" and Senior Scientists for felicitation for the year 2012.

- 9.5** Hon'ble Chief Minister, Odisha has inaugurated the new building of Odisha Bigyan Academy "Bigyan Bhawan" at Saheednagar, Bhubaneswar on 21.12.2012 in presence of Hon'ble Minister, Science & Technology, Odisha, Hon'ble M.P., and Hon'ble M.L.A.s of Bhubaneswar Constituencies.
- 9.6** Odisha Bigyan Academy has sent 10 High School Science Teachers and 20 High School Students of different districts viz. Bolangir, Dhenkanal, Ganjam, Jagatsinghpur, Kalahandi, Koraput, Mayurbhanj, Phulbani, Sundargarh and Nawarangpur to Kolkata for Exposure Visit to different Laboratories, Science Park, Science City, Pride of India Expo., 100th Indian Science Congress etc. from 02.01.2013 to 07.01.2013.
- 9.7** Odisha Bigyan Academy participated in the 100th Indian Science Congress held at Kolkata from 03.01.2013 to 07.01.2013.
- 9.8** Odisha Bigyan Academy, Odisha Renewable Energy Development Agency, Science and Technology Department, Government of Odisha and Petroleum Conservation Research Association (PCRA) jointly organised a Workshop on "Energy Conservation in the State under Mission-Energy Conservation Efficiency and Renewable Energy Programme" at Conference Hall of Odisha Bigyan Academy, Bhubaneswar on 11.01.2013. The Commissioner-cum-Secretary to Government, Science & Technology Department, Government of Odisha has presided over the workshop and the Principal Secretary to Government, H&UD Department, Government of Odisha graced the occasion as Chief Guest.
