**VIII. SCIENCE, TECHNOLOGY AND ENVIRONMENT**

**8.1 SCIENTIFIC SERVICES AND RESEARCH**

Public investment in science and technology sector in Kerala has been focusing on technological advancement, promoting scientific knowledge and thereby generating new income, employment opportunities and well- being of the people in the State. Department of Science and Technology, Government of Kerala plays the key role in promotion of science and technology in the State. The department helps to identify and implement programmes to achieve excellence in Science and Technology and to provide service to the society at large.

The Kerala State Council for Science, Technology and Environment (KSCSTE) and Regional Cancer Centre (RCC) are the major institutions coming under the Science & Technology sector in taking forward the vision of the State in science and technology development through various focused research, development and allied activities which are beneficial to the society as a whole. The 13thplan envisages implementation of programmes to achieve excellence in S&T focusing sustainable development and inclusive growth in socio cultural economic context of the state.

An amount of ₹20264.00 lakh is provided as outlay in the Budget 2021-22 for these two institutions as detailed below:

|  |  |  |
| --- | --- | --- |
| **Sl.No.** | **Name of Institution** | **Amount (**₹ **in lakh)** |
| A | Kerala State Council for Science,  Technology & Environment(KSCSTE) | 13164.00 |
| B | Regional Cancer Centre(RCC) | 7100.00 |
|  | **Total** | **20264.00** |

**A. Kerala State Council for Science, Technology & Environment (KSCSTE)**

Kerala State Council for Science, Technology & Environment (KSCSTE) is functioning as an agency responsible for leading developmental activities related to scientific research and for financing research and development projects in the scientific domain in the State. The functional units of KSCSTE are Research & Development centres and Grant-in-aid institutions. The other activities of the Council include science popularisation, environment related programmes, awards and recognition for science promotion, technology development and transfer, support for women and biotechnology development. The Council focus on strengthening education and research in basic sciences and also address issues/ challenges on science and technology pertaining to key sectors.

An amount of ₹13164.00 lakh is provided to KSCSTE in 2021-22 and the various schemes and programmes are as follows:

**1. Research and Development Institutions under Kerala State Council for Science, Technology and Environment.**

**(Outlay:** ₹ **5085.00 lakh)**

KSCSTE promotes and activates programmes for increasing the stock of knowledge in science by supporting R&D centres. Contribution of R&D centres for providing S&T based skills and solutions for issues/challenges in water management, health and sanitation, conservation of plant and microbial wealth, research and innovations in transportation etc. is highly essential. There are seven R&D centres under the umbrella of KSCSTE which are engaged in carrying out research and development works in specific identified domains. The on-going scheme provides funding for these institutions to conduct research and development activities in Science & Technology sector. The overall objective of the scheme is to encourage high quality research and development to take the State, to much higher levels of original research and cutting edge technologies and to provide S&T based skills and solutions for issues in the State. An amount of ₹5085.00 lakh is provided for 2021-22 as budgeted outlay for these institutions and funds allotted are to be utilised for specific research and development projects, up gradation of physical infrastructure, purchase of physical and scientific equipment, upggradation of library and laboratory facilities, human resource development, extension, training and publications. The R&D proposals are to be approved based on evaluation by KSCSTE.

Institution wise outlay provided for schemes /programmes are as follows:

|  |  |  |
| --- | --- | --- |
| **Sl.No.** | **Institution** | **Outlay**  **(**₹ **in lakh)** |
| i. | Centre for Water Resource Development &  Management (CWRDM) | 1200.00 |
| ii. | Kerala Forest Research Institute (KFRI) | 1000.00 |
| iii. | Kerala School of Mathematics (KSoM) | 660.00 |
| iv. | National Transportation Planning & Research Centre  (NATPAC) | 550.00 |
| v. | Jawaharlal Nehru Tropical Botanical Garden &  Research Institute (JNTBGRI) | 1250.00 |
| vi. | Srinivasa Ramanujan Institute for Basic Sciences  (SRIBS) | 100.00 |
| vii. | Malabar Botanical Garden & Institute for Plant  Sciences (MBGIPS) | 325.00 |
|  | **Total** | **5085.00** |

**i. Centre for Water Resource Development & Management (CWRDM) (₹1200.00 lakh)**

CWRDM is a premier R&D institution in the water resources sector under KSCSTE which provides research inputs/output for water resource development and management. It is envisioned as a Centre of Excellence catering to the R&D demands in all spheres of Water Management. An amount of ₹1200.00 lakh is provided in the budget 2021-22 for the institute for physical and scientific infrastructure development, human resource development, library development, office automation and various R & D activities of the institute.

**ii. Kerala Forest Research Institute (KFRI) ( ₹1000.00 lakh)**

KFRI is envisioned as a Centre of Excellence in Tropical Forestry to provide scientific support for decision making on matters related to forestry, with particular emphasis on conservation, sustainable utilisation and scientific management of natural resources. An amount of ₹ 1000.00 lakh is provided in the budget 2021-22 for physical and scientific infrastructure strengthening, human resource development, library upgradation, extension & training activities and various research & development programmes.

**iii. Kerala School of Mathematics (KSoM) (₹660.00 lakh)**

KSoM is an institute established as a joint venture between KSCSTE and Department of Atomic Energy (DAE), GoI for carrying out advanced learning and research in Mathematics. An amount of ₹660.00 lakh is provided in the budget 2021-22 for continuing the programmes of the institute including

* Training camps and training to Mathematics Olympiads
* Mathematics talent search followed by training at higher level
* Summer training for college teachers
* National and international workshops and seminars
* Orientation programmes and refresher training to college teachers

Out of the total amount provided, ₹500.00 lakh is earmarked for the construction of hostel building of the institute and the total project cost of the proposed building is ₹800.00 lakh.

**iv. National Transportation Planning & Research Centre (NATPAC) (₹550.00 lakh)**

NATPAC, a premier research and development institute in the country works on multi – model system of transportation covering road, rail, waterways and allied sectors undertaking research and consultancy works in the fields of traffic engineering, transportation planning, highway engineering, public transport system, alternate options for transport system, transport energy, inland water transport, tourism planning and rural roads. An amount of ₹550.00 lakh is provided for 2021-22 towards R& D activities, extension programmes, enhancing physical and scientific infrastructure facilities at NATPAC campus and regional offices.

**v. Jawaharlal Nehru Tropical Botanical Garden & Research Institute (JNTBGRI)**

**(₹1250.00 lakh)**

JNTBGRI undertakes research programmes for the sustainable utilisation of plant resources of Kerala. The institute functions as an inventory for conservation and sustainable utilization of plant wealth through appropriate R & D efforts. An amount of ₹1250.00 lakh is provided for 2021-22 as budget outlay for physical and scientific infrastructure development, library upgradation, human resource development and various R&D activities of the institute.

**vi. Srinivasa Ramanujan Institute for Basic Sciences (SRIBS) ( ₹100.00 lakh)**

SRIBS is a capacity building institute envisaged for research, teaching and learning in Basic Sciences. The prime objectives of the institution are to undertake research studies which will make significant contributions in any of the broad areas in basic sciences, cater intellectual interactions among scientists all across the globe, build a strong network of scientists who could conduct original research in challenging theoretical areas and facilitate training of young scientists in basic sciences. An amount of ₹100.00 lakh is provided in the budget 2021-22 for infrastructure strengthening, conducting training programmes/seminars/workshops and for the R&D programmes of the institute.

**vii. Malabar Botanical Garden & Institute of Plant Sciences (MBGIPS) (₹325.00 lakh)**

MBGIPS is an institution of KSCSTE dedicated to the conservation and research on aquatic plant diversity, lower group plants, endangered plants of the erstwhile Malabar Region as well as disseminating knowledge on various facets of plant sciences. An amount of ₹325.00 lakh is provided in the budget 2021-22for physical and scientific infrastructure development, schematic programmes and research programmes.

**2. Infrastructure Strengthening of Kerala State Council for Science, Technology and Environment**

**(Outlay: ₹100.00 lakh)**

Kerala State Council for Science, Technology and Environment is responsible for the development of scientific research in Kerala through assisting research and development projects in the scientific domain within the State. An amount of ₹100.00 lakh is provided in the budget 2021-2022 for infrastructure development of KSCSTE including purchase of furniture and equipment, E-office management and Management Information System (MIS), strengthening of council library and AMC of various equipment and maintenance of building.

**3. Schemes and Programmes of Kerala State Council for Science, Technology and Environment**

**(Outlay: ₹2078.00 lakh)**

KSCSTE through various programmes/schemes leads research and developmental activities in science and technology sectors. The council promotes science and technology activities by providing financial assistance for scientific research, human resource and infrastructure development, technology and innovation, environment conservation, science popularisation and communication. An amount of ₹2078.00 lakh is provided in the Annual Budget 2021-22 for implementing the following programmes of KSCSTE

A. Human Resource Development in Science &Technology

B.Ecology & Environment Programmes

C. Science Popularisation Programmes

D. Infrastructure Development in S&T

E.Technology Development &Transfer

F. Support for Women in Science

**A.Human Resource Development in Science &Technology (₹1100.00 lakh)**

The activities under these programmes are envisaged for enhancement of scientific research, upgradation of technical capabilities of scientific sectors and encouraging innovation and to utilise the research expertise of eminent academicians/scientist for the benefit of younger generation thereby attracting them to take up their career in science research. An amount of ₹1100.00 lakh is provided for the following activities in the budget 2021-22.

i. Science Research Scheme (SRS)-SRS aims towards promotion of R&D activities in the State both in fundamental and applied research. Under the programme, research and development projects in emerging areas of science and engineering are supported in university departments, colleges and R&D institutions by providing financial assistance for implementation.

ii. Emeritus Scientist Scheme – Emeritus Scientist Scheme is a programme meant for senior scientists engaged in R&D activities. The objective of the programme is to tap knowledge and experiences of superannuated outstanding scientists/academicians to pursue research in their respective field of specialisation in addressing important issues pertaining to the State.

iii. SPYTis/Student Projects/CRYSTAL

(a) SPYTis – SPYTis (Scheme for Promoting Young Talents in Science) is a programme for supporting young talents. (i)SPYTis I is for school students for doing science projects (ii)SPYTis II aims to support students in Polytechnics/ undergraduate courses in colleges who have innovative ideas in science and technology.

(b) Student Projects -The objective of Student project is to provide financial support to students in Science Stream of University departments and colleges in the State, studying for post-graduate and professional courses to conduct scientific projects.

(c) CRYSTAL - CRYSTAL (Crafting Young Scientists of Tomorrow) is a programme with the objective of creating a platform for students to identify their talents at an early age and nurture them.

iv. Training in Science, Technology Management– The objective of the programme is to provide training in scientific administration and management to scientists/technologists in government organisations, public sector undertakings, R&D institutions and research laboratories in the State.

v. Science Education Centre – Programme for providing facilities for students and teachers of Government and Aided schools to perform scientific experiments, organising training programmes to motivate them in basic science research and improving quality of science teaching and learning. The centre is in tune with the Centre for Science in Society (C-Sis), CUSAT.

vi. Fellowship Programmes

KSCSTE Research Fellowship for post graduates in science stream to promote and motivate research in science

Post Doctoral Fellowship for Ph.D. holders in science stream to pursue research and to

develop technical and leadership skills for developing their career as scientists.

vii. Partnering Academic Industrial Research (PAIR) programme for Ph.D. scholars in science stream to establish partnership between R&D institutions, academia and industry for high quality collaborative research with fellowship provided by the industry.

**B. Ecology and Environment Programme (₹100.00 lakh)**

The activities under ecology and environment programme are to be taken up in consultation with Environment Department to avoid duplication in programmes/ activities. Thrust areas for initiating R&D activities under the programme are development of waste management technology for flood prone area, restoration of eco system and hazard mapping initiatives. The programmes included are

1. Ecology & Environment scheme – Programme for providing grants to scientists and academicians for research work on the ecological and
2. Environmental Education & Eco Clubs - Programme is for encouraging awareness and actions for environmental protection among educational institutions/R&D centres/NGOs
3. Environment Management Training - Programme for conducting short-term courses on environment management

**C. Science Popularisation Programmes (₹300.00lakh)**

Science Popularisation Programmes are envisaged for providing technical and financial support for implementing projects/activities focusing popularisation of principles and practices of science and technology.

1. Science Awards

* Kerala Sasthrapuraskaram –Award for lifetime contribution of a scientist of Kerala origin working anywhere in the world
* Kerala State Young Scientist Award – Award for honouring talented young scientists in recognition of their outstanding contributions in any branch of science and technology coming within the purview of the council
* Science Literature Award -Award for significant contributions for the promotion of science literature in Malayalam

1. Kerala Science Congress -Kerala Science Congress is an annual science event of State, targeting young researchers, academicians, technologists, students and others and acts as a forum to exchange knowledge, share research findings and development of technologies relevant to the State.
2. National Children’s Science Congress is the programme conducted for the children in the age group of 7-14 to spread the concept and method of science among them through their project activities.
3. Programmes related to observation of National Science Day & National Technology Day
4. Science Media Support, Documentation & Publication to promote science writing
5. Technology Festival (TECHFEST) – TECHFEST is a programme conducted for engineering students from the state, NITs and IITs with the objective of providing opportunity to present and exhibit their inventions and innovations and acts as platform for interaction with senior technocrats in the country on various issues related to development of innovative ideas and concepts
6. Rural Innovators Meet (RIM) – RIM is an annual event conducted for unorganised rural innovators and grass root innovators for exhibiting their products/research outputs.

**D. Infrastructure Development in Science &Technology (₹200.00 lakh)**

This programme is envisaged for upgradation of education and effective learning environments by providing infrastructure facility.

1. Selective Augmentation of Research & Development (SARD) - SARD is the programme for upgrading facilities in colleges and universities for augmenting research in specified R&D areas by providing support to strengthen laboratory infrastructure by procuring scientific infrastructure.
2. Sasthraposhini and Nurturing Excellence in Science Teaching (NEST) – Sasthraposhini Programme aims towards strengthening science education in schools by setting up model laboratories in selected Government and Aided schools of the state for conducting science experiments and to promote science education. Upgradation of school labs as part of rebuilding infrastructure is also included in this programme. NEST aims at providing training to science teachers and students at school level.

**E. Technology Development and Transfer (₹178.00 lakh)**

This programme is envisaged for supporting technology development, research and innovation. Support to rebuilding Kerala process through sustainable infrastructure development in housing technologies for flood affected areas, technologies for cost effective water purification system and cost effective renewable energy system are also included in 2021-22.

1. Engineering and Technology Programme (ETP) – ETP is a programme for providing support to engineering colleges/R&D institutions for promoting high quality research projects in the emerging areas of engineering and technology.
2. Technology Development & Adaptation Programme (TDAP) – TDAP is a programme for technology development and demand driven adaptation of technologies.
3. Rural Technology Programme (RTP) – RTP is a programme with the objective of encouraging and promoting grass root innovators to raise their innovations to an enterprise level.
4. Patent Information Centre-Kerala (PIC) - PIC provides IPR related services through IPR awareness generation and facilitation of filing of patents.

**F. Programmes for Women in Science &Technology (₹ 200.00 lakh)**

Programmes for women are envisaged to enhance the place of women in science and technology, more access to girls in scientific studies, careers through which achieving greater equality in the relations between men and women in the society for providing equal access to all women in quality education and research

1. Back to Lab Programme – Back to Lab is a programme envisaged for providingresearchandpostdoctoralfellowshipsinsciencetoqualifiedwomenofKeralawho had went career break and wish to return to the main stream research.
2. STARS ( Students with Talent and Aptitude for Research in Science) The objective of STARS programme is to encourage talented girl students to pursue higher education in Basic or Applied Sciences through Prathibha Scholarship scheme and SPEED programme (Student Programme for Excellence in Experimental Design) programme.
3. SC & ST unemployed women in Science, Technology, Engineering and Mathematics – Programme for identifying unemployed women science professional belonging to SC and ST community in the State and support them for science and technology intervention for social benefits in the specific areas of Science, Technology, Engineering and Mathematics.

**4. Grant in Aid Support to Science & Technology Institutions (Outlay: ₹200.00 lakh)**

The council provides support as grants against project proposals to the following autonomous institutions to implement the programmes and projects after evaluation and approval by KSCSTE.

1. Sophisticated Test and Instrumentation Centre (STIC) – STIC is an autonomous institution jointly sponsored by the KSCSTE and CUSAT.
2. Integrated Rural Technology Centre (IRTC) – IRTC is a research and development organisation and it takes up problems of social relevance like energy conservation and management, green energy promotion, natural resources conservation programmes, local level interventions and technology transfer.

iii. M S Swaminathan Research Foundation (MSSRF) Regional Station, Wayanad- A centre functioning in the area of conservation and sustainable and equitable use of biodiversity, specifically agro-biodiversity.

An amount of ₹200.00 lakh is provided in the budget 2021-22 for the above mentioned institutions.

**5. Biotechnology Development**

**(Outlay: ₹110.00 lakh)**

The following programmes are included in 2021-22 under this scheme for supporting projects mainly based on waterborne diseases and pathogen resurgence, heavy metal pollution due to flooding and electronic waste in water bodies and bioremediation and phytoremediation.

* Young Investigators Programme in Biotechnology (YIBP) - Programme for providing quick research support to young scientists engaged in biotech research in the state to pursue their ideas in emerging areas of research in biotechnology
* Industry Linked Biotechnology Research Scheme (IBRS) – Programme to facilitate collaborative research between academia and industry.
* Kerala Biotechnology Re-entry Fellowship (KBiREF) - Fellowship instituted for well trained and highly skilled Indian researchers with good track record of research.
* Biotechnology Training and Workshop (BTW)/Biotechnology Young Entrepreneur Award (BYEA) – BTW is to provide financial support to R&D institutions/ Universities/College departments for conducting training and workshops in emerging areas of biotechnology and BYEA is instituted with the objective of raising awareness of commercialisation of bioscience ideas among post graduate students in biotechnology and to encourage them to develop biotechnology entrepreneurship
* Biotechnology Innovations for Rural Development (BIRD)-BIRD providing financial assistance for conducting training and demonstration projects with an objective to promote rural innovation in developing biotech based products for creating employment opportunities in rural areas.
* Chief Ministers Career Advancement Programme - Programme for providing opportunity to young scientists and faculties in biotechnology to have national and international collaborative research training in emerging fields of biotechnology.

An amount of ₹110.00 lakh is provided in the budget 2021-22 for the implementation of the scheme.

**6. Special Programmes of KSCSTE**

**(Outlay: ₹370.00 lakh)**

An amount ₹370.00 lakh is provided for the following programmes under the scheme.

1. Sophisticated Analytical and Instrumentation Facility (SAIF) -The centre is launched in the premises of Kerala Forest Research Institute, Peechi. It is conceptualized as an active analytical and diagnostic centre as well as a facilitation centre for outsourcing sophisticated instruments for the Research and Development needs of the institutions in the northern part of Kerala. With the major objective of acting as a research facilitation centre, it is also engaged in taking up research and development programmes that focus on the region-wise specific needs.
2. APJ Abdul Kalam Youth Challenge Programme - Programme targeting youth in the State for taking up challenges in specialised sectors.
3. Food Technology Development & Testing Facility – Programme for setting up Food Technology Development & Testing Facility at Sophisticated Test and Instrumentation Centre (STIC) focusing on value addition of food, food preservation as well as testing in the wake of pesticide loads in vegetables and food products.

Following are the new programmes included under the scheme.

1. SHRESTA – State Higher Research Centres in Science and Technology Applications is a programme for supporting high quality research centres of excellence in five prospective research areas : water, biotechnology, nanotechnology, climate change and Robotics & artificial intelligence
2. SPIIRC –Scheme for Promotion of Inter Institutional Research Collaboration is a programme for improving research capacity of researchers of research centres and higher educational institutions by facilitating academic and research collaborations between these institutions.
3. Tenure Track Faculty Programme - Programme for supporting Ph.D holders in the State through universities/R & D institutions.

**7. Karamana River Scientific Management Project (Pilot)**

(**Outlay:** **₹120.00 lakh**)

The objective of the project is to develop and implement a Comprehensive Action Plan for scientific management of the Karamana River Basin. This is on a pilot mode and is being implemented in an identified stretch of Karamana River by the Science & Technology Department in co-ordination with Trivandrum Development Authority (TRIDA), State Biodiversity Board & Irrigation Department under the guidance of a “River Restoration Co- ordination Committee” comprising of KSCSTE, TRIDA, Biodiversity Board, Irrigation Department, Revenue Department, Environment Department, Thiruvananthapuram Corporation, Panchayats through which the river passes, Environmental Experts, Federation of Residents‟ Associations Trivandrum (FRAT), MPs, MLAs, and Councillors.

An amount of ₹120.00 lakh is provided in the Budget 2021-22 for completing the ongoing sub projects as well as project implementation expenses.

**8. Institute of Advanced Virology (IAV)**

**(Outlay: ₹5000.00 lakh)**

The Virology Institute is envisioned as an institute of global standards networking Global Virology Institutes with most modern laboratories focusing research, diagnose and management of emerging and re-emerging infectious viral diseases, focusing Kerala scenario. It will be a centre of excellence to work in collaboration with international institutions for training and education in the context of research covering basic science and translational research, providing sufficient scientific inputs to enable the prevention and control of viral infections.

The institute with a total project cost of ₹202.00 crore is aimed to work for industrial transfer /facilitation of technology and Kerala State Industrial Development Corporation will be a partner in providing land and infrastructure. The campus at Thonnakkal, Thiruvananthapuram, spread over 25 acres of land has two phases, Phase I and Phase II consisting of Phase IA Prefab building (25,000 sq.ft.) with 2 floors housing Administrative block, Bio labs, Common Instrumentation room, Bio-safety level facilities and Diagnostic facilities and Phase IB main building (78,000 sq.ft.) with 3 floors having Administrative block, Bio labs, Bio safety level facilities and functional division. To make Phase 1A building of the institute functional with R& D and diagnostic and other infrastructural facilities, and completing construction of Phase IB building, which is expected to be commissioned in 2021, an amount of ₹5000.00 lakh is provided for the institute in the budget 2021-22 in which an amount of ₹200.00 lakh is earmarked under the h/a ‘31- grant in aid salary’ for meeting the expenses on manpower component and other expenses of the institute on project mode.

**9. Institute of Diabetic Research**

**(Outlay: ₹1.00 lakh)**

The vision of institute of Diabetic Research is to prevent manage and cure diabetes through alternate systems of medicine. The institute will look in to the social and scientific reasons behind high incidence of diabetics’ in various agegroups.Thefocuswillbe on integrated systems of medicine, emphasizing traditional practices and indigenous systems of medicines, through applied research and allied activities in prevention cure and management of diabetics. There will be collaborative alliance with leading international centres of research through co-operative, philanthropic and academic partnerships.

An amount of ₹1.00 lakh is provided in the budget 2021-22 for the scheme.

**10. Institute of Climate Change Studies (ICCS)**

**(Outlay:** ₹**100.00 lakh)**

Institute of Climate Change Studies (ICCS), Kottayam has been brought under the KSCSTE in 2020-21 and the institute focus on regional/ state specific issues, regarding the effects of global climate change on biosphere, with an ecosystem approach towards, biodiversity conservation, sustainable agronomy and disaster risk reduction. The institute undertakes research and development activities in relation with the climate change of Kerala. An amount of ₹100.00 lakh is provided for the institute in 2021-22.

**B. Regional Cancer Centre (RCC), Thiruvananthapuram**

Regional Cancer Centre is an internationally recognized centre providing facilities for cancer diagnosis, treatment, palliative care, rehabilitation and undertakes major research and development activities in cancer care. An amount of ₹7100.00 lakh is provided for RCC in the Budget 2021-22.

1. **Regional Cancer Centre** (**Outlay:** ₹**6100.00 lakh**)

An amount of ₹6100.00 lakh is provided for the following activities under the scheme Regional Cancer Centre in the budget 2021-22.

* Expansion of Physical Infrastructure (₹3000.00 lakh)

The preliminary works of the construction of the new block with state of the art facilities building in 14 floors with 2.75 lakh sq. Feet built up area hosting radiotherapy block, new Blood Bank, 10-bed Bone Marrow Transplant Unit, Modular Operation Theaters, 8-bed Nuclear Medicine Ward, Robotic Surgery Unit, Advanced Microbiology Laboratory, ICUs, Surgical and Medical Wards, Pay wards and hostels costing ₹18722 lakh has been started by RCC in a phased manner with the target of improved space for patient care facilities. All permits for constructing the new building have been received. An amount of ₹3000.00 lakh is provided in the Budget 2021-22 for the construction of building.

* Augmentation of facilities for early detection and treatment of general cancer (₹2500.00 lakh)

The scientific equipment and machinery required for the new 14 storey building need to be procured well in advance in order to start functioning. An amount of ₹2500.00 lakh is provided in the budget 2021-22 for purchase of various instruments and equipment for various departments.

* Augmentation of facilities for early detection and treatment of women oriented and pediatric cancer (₹500.00 lakh)

Augmenting infrastructure for early diagnosis and treatment of cancer is urgently required in the present scenario of increasing number of female cancers. An amount of ₹500.00 lakh is provided in the Budget 2021-22 to enhance the facilities for early detection and focusing prompt treatment with high precision and less side effects of women oriented and pediatric cancers.

* Upgradation of facilities for training and research (₹100.00 lakh)

RCC is a premier centre for cancer research with activities in the area of basic research, epidemiological studies and clinical research. An amount of ₹100.00 lakh is provided for upgradation of research and training facilities in 2021-22.

**2. Upgradation of RCC as State Cancer Institute (State Share) (Outlay:** ₹**1000.00 lakh)**

Under the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular diseases & Stroke (NPCDCS) , the Central Government has approved a project costing ₹12000.00 lakh for upgradation of RCC as State Cancer Institute on cost sharing mode of 60:40 between Government of India and Government of Kerala. The expected outcome of this Centrally Sponsored Scheme includes capacity building at various levels of health care for prevention, early diagnosis, treatment and operational research, ensuring support for diagnosis and cost effective treatment at primary, secondary and tertiary levels of health care and support for development of database of NCDs through a robust Surveillance System and to monitor NCD morbidity, mortality and risk factors. Government of India had released ₹4695.70 lakh as 1st installment for the Scheme. An amount of ₹1000.00 lakh is provided for the scheme in 2021-22 for continuing the activities under the scheme so that RCC can approach the central government for availing the balance central share.

**8.2 ECOLOGY AND ENVIRONMENT**

The Department of Environment and Climate Change co-ordinates implementation of policies and programmes relating to conservation of the State’s natural resources, biodiversity and the prevention and abatement of pollution. During the year 2021-22 an amount of ₹2605.00 lakh is earmarked in the budget for various schemes under the sub sector Ecology and Environment. The scheme wise outlay is detailed below.

1. **Strengthening of the Department of Environment and Climate Change**

**(Outlay: ₹50.00 lakh)**

The department of Environment and Climate Change co-ordinates various environment related programmes implemented by various departments, agencies, PRI’s etc. The Directorate serves as the nodal agency in formulating climate change related schemes, plans, programmes and their execution. The Department is also working as the Secretariat of State Level Environment Impact Assessment Authority (SEIAA) and State Level Expert Appraisal Committee (SEAC).

The outlay provided will be utilized for infrastructure development of DoECC, including new administrative building for the Directorate, capacity building programmes, procurement of IT and related infrastructure, setting up of geographical information lab, GPS, Exposure Visit and training programmes for staff, preparation of consultancy reports for the development of the sector and performance auditing activities, instruments for environmental monitoring, software and Geo Spatial Data.

An outlay of ₹50.00 lakh is earmarked in the budget 2021-22 for the above activities.

1. **Environmental Awareness and Education**

**(Outlay: ₹150.00 lakh)**

The scheme components include conducting environmental sensitization programmes, to create awareness about climate change mitigation and adaptation, Kerala climate change conference, incentives for sustainable environmental practices etc. The Bhoomitrasena scheme initiated during 2011-12 across educational institutions in the state will be extended to more colleges and higher secondary schools in the State. These clubs also promote responsible entrepreneurships among the students by promoting the production of cloth bags, medicinal plants, nursery, butterfly park, rainwater harvesting & recharge pits, nakshathravanam, starbee interpretation & organic farming. The outlay will also be utilised to carryout conservation/restoration activities with the support of educational institutions, community organisations, NGOs etc. documenting the best environmental practices in Kerala, observing environment related days, Paristhithimitram awards/other incentives, conducting symbosium/seminars/workshops/training programmes/scientific documentaries etc. and ongoing programmes such as Paristhithikam and other Environmental sensitization programmes.

An outlay of ₹150.00 lakh is provided in the budget 2021-22 for the above components.

1. **Environment Research and Development**

**(Outlay: ₹200.00 lakh)**

The objective of the scheme is to promote need based and problem oriented environmental research in the priority areas of pollution monitoring, disaster management mitigation, low cost waste treatment, river/lake water quality monitoring, solid waste management, climate change studies and other need based areas. The Environmental Research and Development scheme envisages the planning and coordination of environmental research in public interest for enhancing the understanding of the environment and ecology and devising strategies and solutions for effective environmental protection and management of the State. The scheme also provides fellowship for student researchers who desirous of working at the forefront of Environment Management, Environmental Sciences, Environmental Engineering, Environmental Economics and Climate Change, with a focus on problem solving by way of research in environmental schools/institutions in Kerala.

The outlay will be utilized for innovative projects on environment, environment impact species protection, climate change, wetland, coastal area, indigenous knowledge and practice documentation etc. after ascertaining the feasibility. The objective of the scheme is to develop and demonstrate the models suitable for environmental conservation, climate change adaptation and mitigation etc. at local level for adoption in the development plans of the local self governments. The Directorate of Environment and Climate Change (DoECC) envisages to continue the Research Fellowship programme ‘Paristhithiposhini’ and Student Fellowship Programme ‘Vidhyaposhini’ during 2021-22 also.

The outlay will be utilized for the following programmes also.

* + - 1. To strengthen and update the traditional practices in the conservation of natural resources by utilizing scientific insights and to map and conserve the special habitats.

1. To identify and augment the sustainable knowledge and practices of indigenous communities of selected areas of Kerala.
2. Capacity development of the students and researchers to evaluate local environmental issues and to develop technologies and formulate strategies for better environment management.
3. Geo-spatial Laboratory Facility at Directorate of Environment and Climate Change to support the better environmental governance
4. Detailed bathymetric study and analysis of wetlands of Kerala and Pilot scale hydrometric study of aquatic systems of Kerala

An amount of ₹200.00 lakh is provided in the budget 2021-22 for the above activities.

1. **Biodiversity Conservation**

**(Outlay: ₹800.00 lakh)**

The scheme Biodiversity conservation is formulated to ensure conservation and sustainable utilization of Kerala’s biodiversity by a decentralized system comprising of State Biodiversity Board at State level and Biodiversity Management Committees (BMC) at local level, with increased public participation in local decision making. The programmes under the scheme are proposed to be implemented at the LSG level and benefit the local community by improving their livelihood. The objective of the scheme is to ensure conservation and sustainable utilization of Kerala’s biodiversity in a decentralized manner with increased public participation and local decision making.

The provided budget outlay of ₹800.00 lakh will be utilized for updation, documentation and for completion of Peoples Biodiversity Registers (PBRs) in the remaining local self Governments, completion of Kerala Biodiversity Park, Biodiversity conservation programme and Biodiversity research and awareness programmes. Other sub components of the scheme includes Implementation of PBR based and other Biodiversity conservation activities at district level, Kerala Biodiversity Information System, Documentation of specialized ecosystem and Monitoring of Biodiversity Status, empowering Biodiversity Management Committees, ABS cell in selected departments, Theme based Biodiversity Conservation Areas, Identification of Biodiversity rich areas outside PAs and their Conservation as BHS/ Local Biodiversity Heritage Areas, Kerala Biodiversity Museum, Fellowships for Biodiversity Research, Kerala State Biodiversity Awards, Biodiversity Seminars and Workshops, State Biodiversity Fund, Malabar Biodiversity Museum, Infrastructural facilities and operational costs of KSBB Head Office.

An outlay of ₹800.00 lakh is earmarked in the budget 2021-22 for the above activities.

1. **Environment Impact Assessment**

**(Outlay: ₹160.00 lakh)**

State Environment Impact Assessment Authority is a statutory authority enacted under the guidance of MoEF, Govt. of India, as per the Environment (Protection) Act, 1986. EIA is a prerequisite for most of the projects in water resources, industries, infrastructure etc. During 2021-22 the outlay will be utilized for Capacity building programmes, training and fee of standing councels in High Court and NGT, AMC, for the statutory functioning of the SEIAA and SEAC which started functioning from 2011. The provision is also provided to meet the functioning of District Environment Impact Assessment Authorities/District Level Appraisal Committees being constituted by MoEF, Government of India. The outlay will also be used for conducting studies and EIA on ecologically sensitive areas.

An amount of ₹160.00 lakh is provided in the budget 2021-22 for the above components.

1. **Climate Change**

**(Outlay: ₹145.00 lakh)**

Climate change poses a grave challenge to the sustainability of social and economic development, livelihoods of communities and environmental management in Kerala. The Department of Environment and climate change has been nominated as the nodal agency for coordinating activities related to climate change in the state. The main objective of the scheme is to take appropriate action to address climate change related issues on human rights, health, the indigenous peoples, local communities, migrants, children, persons with disabilities and people in vulnerable situations, gender equality and empowerment of women.

An outlay of ₹145 lakh is earmarked in the budget 2021-22 for the following activities.

1. To revise the existing SAPCC in the wake of recent extreme climatic changes with the technical support of Research and Academic institutions.
2. To promote in-depth or specific studies paying special attention to cost evaluation in relation to climate change adaptation/ mitigation measures.
3. Ujjwal - post-doctoral Fellowship Programme - to encourage and retain young Ph.D scholars and who wish to pursue a regular career in research, teaching and social activities to empower the weaker and vulnerable sections of the society/community /areas.
4. Formation of a Local Level Climate Change Cell and preparation of Local Action Plan on Climate Change (LAPCCs) in LSGs by developing implementation plans for each of the LSG
5. To focus on climate change adaptation and mitigation programmes, sustainable livelihood activities, water conservation etc.

**7. Kerala State Pollution Control Board**

**(Outlay: ` 700.00 lakh)**

The Kerala State Pollution Control Board is the statutory authority for planning, supervising and implementing a comprehensive programme for the prevention and control of pollution in the State. The Board is the statutory authority to implement the Acts and Rules of Water, Air (Prevention and Control of Pollution) Act and Rules, Environment (Protection), Hazardous and other Wastes (Management &Trans boundary Movement), Manufacture, Storage and Import of Hazardous Chemicals, Bio-medical waste, Plastic Waste, Solid waste, e-waste, Batteries (Management and handling) and Noise Pollution (Regulation and Control).

The thrust areas during the Plan Period 2021-22 include the following.

1. Strengthening of all District Laboratories of the Board attached to District offices to the level of NABL status.
2. Surveillance teams to monitor waste (Water, Air and Solid) management system and Night patrolling of Surveillance Squad to prevent unauthorized dumping /discharge of waste.
3. Awareness / Training on Waste Management for different level of Stake Holders.

An amount of ₹700.00 lakh is provided during 2021-22 for infrastructure upgradation, Public Awareness, regulatory mechanism, environment monitoring & management and capacity building.

Under Infrastructure Upgradation the following components are proposed

* Strengthening of Boards Laboratories
* Upgradation of IT Cell of the Board into State Level Data Centre
* Construction of office building and establishment of calibration lab

Under Regulatory mechanism training of stakeholders on rules/environmental issues and public awareness will be undertaken. There will be public hearing to collect public opinion in case of specific issues of complaint/general protests, awareness programmes, exhibitions, publishing of Paristhithivartha and pamphlets, getting support of media etc. will be covered under public awareness programmes.

The following sub components will be implemented under Environment Monitoring and Management.

* Ambient air and water quality monitoring surveillance programme
* Surveillance of Sabarimala
* Online water quality monitoring station at Periyar
* Establishment of night vision camera along Eloor-Edayar region
* Publication of water and Air Quality Directory
* Preparation of oil spill contingency plan
* R&D Projects
* Financial assistance to CBMWTDF

The component wise break up for 2021-22 is as follows.

|  |  |  |
| --- | --- | --- |
| **Sl No.** | **Components** | **Amount**  **(₹ in lakh)** |
| 1. | Infrastructure Upgradation | 200.00 |
| 2. | Public Awareness | 25.00 |
| 3. | Environment Monitoring And Management | 470.00 |
| 4. | Capacity Building | 5.00 |
|  | **Total** | **700.00** |

An outlay of ₹700.00 lakh is provided in budget 2021-22 for the above components.

1. **State Wetland Authority, kerala (SWAK)**

**(Outlay: ₹75.00 lakh)**

SWAK functions as nodal authority for all wetland specific activities within the state. It is constituted for the purpose of protection and rejuvenation of all wetlands in the state including the protection of genetic diversity of the ecosystem, formulation of policies and coordination of local self-Governments, NGO’s and other agencies to implement and regulate the activities. The outlay provided will be utilized for the activity oriented programmes on the restoration of mangrove ecosystem through Forest department with the expertise of scientific organization wherever necessary. Other activities include implementation of Eco-restoration activities of wetlands on the basis of approved management action plans, and preparation of DPRs for wetland protection and ecosystem improvement activities on the special wetland ecosystem such as myristica swamps, bogs, Marshes.

The outlay will also be utilised for a mobile wetland monitoring and surveillance unit, IT infrastructures, computer, stationary, filed survey, functioning of all project management units, integrated management action plan and wetland mapping.

An amount of ₹75.00 lakh is provided in the budget during 2021-22

1. **State Wetland Authority, Kerala (SWAK) (40% SS)**

**(Outlay: ₹ 40.00 lakh)**

SWAK functions as nodal authority for all wetland specific activities within the state. It is constituted for the purpose of protection and rejuvenation of all wetlands in the state including the protection of genetic diversity of the ecosystem, formulation of policies and coordination of local self-Governments, NGO’s and other agencies to implement and regulate the activities. The outlay provided will be utilized for the activity oriented programmes on the restoration of mangrove ecosystem through Forest department with the expertise of scientific organization wherever necessary. Other activities include implementation of Eco-restoration activities of wetlands on the basis of approved management action plans, and preparation of DPRs for wetland protection and ecosystem improvement activities on the special wetland ecosystem such as myristica swamps, bogs, Marshes, coastal ecosystems etc.

The outlay will also be utilised for the preparation and implementation of projects based on management action plans for Vembanad, Ashtamudi, Sasthamkotta, and other wetlands. A portion of the outlay will be set apart for study on carrying capacity of the House Boats - Vembanad, Ashtamudi and Kavvayi, DPR preparation for the Plastic shredding units installation in Vembanad, for studies on various aspects of wetland restoration and generating baseline database for continuous monitoring and surveillance. Assistance for sustainable rejuvenation of Monroe Thuruth Island in Kollam District is also included in this scheme.

An Amount of `40.00 lakh is provided in the budget 2021-22 as 40% state share.

1. **Kerala Coastal Zone Management Authority (KCZMA)**

**(Outlay: ₹110.00 lakh)**

Kerala Coastal Zone Management Authority is an independent authority constituted by MoEF & CC as per Environment (Protection) Act, 1986 to protect and conserve the coastal environment. The KCZMA ensures proper implementation of CRZ notification in the entire coastal stretches of Kerala. Examination of proposals and recommendation, inquiry into cases of alleged violation and complaints, enforce and monitor the provisions of CRZ Notifications, identification of ecologically fragile area in the CRZ are some of the functions of the authority. Directorate of Environment and Climate Change will be boarding office of KCZMA.

An amount of ₹ 110.00 lakhs is set apart during 2021-22 to meet the regular functioning of KCZMA which include purchase of office equipment and computers, stationery, convening the meetings, sitting fee to experts, field inspection charges, functioning of District Level Committees of KCZMA, professional fee for court cases, honorarium for members and expenses for preparation of draft CZMP on the basis of CZR notification 2019.

**11.Kerala Centre for Integrated Coastal Zone Management (KCICM) (20% SS)**

**(Outlay:** **₹100.00 lakh)**

The MoEFCC, Government of India has decided to extend the Government assisted ICZMP to the states including Kerala under Phase II. As per GO(Rt)No.12/2016/Envt. dated 04.02.2016 it was ordered that KCICM will have to be registered under Travancore Cochin Scientific and Charitable Societies Act 1955 and appointed the Director, Department of Environment and Climate change as Project Director of KCICM. The objective of the scheme is to upscale the economic benefits of marine ecosystem services and ensure sustainable management of coastal resources. The MOEFCC has approved preliminary project report and project implementation in a phased manner.

An outlay of ₹100.00 lakh is provided as 20% state share for integrated coastal zone management project during 2021-22. The outlay will be used for conservation of Coastal and Marine Bio-resources, Capacity building and Implementation of ICZMP, Coastal pollution abatement and related infrastructure upgradation, Livelihood security of coastal communities etc.

**12. Climate resilient farming**

**(Outlay:₹75.00 lakh)**

The scheme aims to enhance resilience of agriculture sector to climate change through strategic research, technology development and demonstration. Well framed adaptation policies and programmes are essential to increase the resilience of farming to climate change. Practices that help adapt to climate change in farming are soil organic carbon build up, in-situ moisture conservation, residue incorporation instead of burning, water harvesting and recycling for supplemental irrigation, growing drought and flood tolerant varieties, water saving technologies, location specific farming and nutrient management etc.

In 2021-22, in addition to the recurring programmes, the scheme will be implemented with more focus to enhance climate resilience in climate change vulnerable districts/regions with major objectives such as:

* Adaptive Cropping practices in agriculture hotspots especially in Idukki and Wayanad districts.
* Interventions in sustainable livestock and fisheries.
* Dissemination and utilization of weather forecast products to local level.
* Integrated Water Resource Management including rainwater harvesting and other water conservation measures.
* Incentive for preserving the gene pool of climate resilient cultivators.
* Building soil resilience through improved soil management techniques
* Development of climate resilient protocol for important agricultural crops.
* Climate Change Vulnerability and Risk Assessment of Agro-Ecological Zones of Kerala and adoption of agro ecological principles in the State.

An outlay of ₹75.00 lakh is earmarked in the budget for the scheme during 2021-22.