

**Government of West Bengal**  
**Department of Science & Technology and Biotechnology**

**Identified Need/ Problem Statement for R&D (2022-23) – Series1**

Sl.	Subject Areas for R&D	Identified Need/ Problem
1	<b>Agriculture &amp; Horticulture</b>	<ul style="list-style-type: none"> <li>i) Plant breeding for the production of available high yielding seed varieties</li> <li>ii) Alternative practice for adoption of Organic cultivation and high return crops</li> <li>iii) Drug development from already discovered plant bioactive molecules through clinical trial in</li> </ul>
2	<b>Animal &amp; Fishery Sciences</b>	<ul style="list-style-type: none"> <li>final phase through collaborative effort</li> <li>iv) Identification of indigenous animal resources, potential benefit and use</li> <li>v) Development of veterinary green medicine for easy application and wide scale adoption</li> <li>vi) Application of Artificial Intelligence and bioinformatics in Agriculture and Animal Livestock</li> </ul>
3	<b>Biological Sciences &amp; Biotechnology</b>	<ul style="list-style-type: none"> <li>i) New diagnostics/ low Cost screening tools, especially for diseases relevant to India</li> <li>ii) Epidemiological surveys for objective quantification of diseases relevant to Bengal, both communicable and non communicable diseases</li> <li>iii) Study of Host - pathogen interactions for infectious diseases relevant to the State</li> <li>iv) Fingerprinting of medicinal plants in West Bengal</li> <li>v) Identification and efficient use of biological tools to reclaim the tannery effluents for safe environment</li> <li>vi) Shelf-life improvement of agricultural and food products</li> <li>vii) Efficient and single-phase tissue culture protocols for the production of horticultural plantlets</li> <li>viii) Low-cost technologies for the production of aeroponics based potato and other seed (tubers)</li> </ul>
4	<b>Chemical Sciences</b>	<ul style="list-style-type: none"> <li>i) Advanced Functional Materials and Interfaces for industrial, healthcare and domestic application</li> <li>ii) Chemistry at the interface with Biology and Medicine in Pharmaceutical, Cosmetic &amp; Food</li> </ul>

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		Industry iii) Environmentally sustainable/ low cost chemicals and materials for green energy solutions iv) Catalysis technology for Industries like paper, food, oil, etc. v) Antiviral drug discovery and safety materials vi) Low cost chemicals and materials to control air, water and noise pollution vii) Exploring prospects of green sustainable chemistry
5	<b>Earth Sciences, including Geoinformatics</b>	i) Use of data generated from different sensors/ satellites/ sources to address/ identify challenges in various domains like earth sciences, agriculture, health sector, environment etc. (Optical, Hyperspectral, Thermal, Radar (SAR), Lidar, Drone, IoT ) ii) Exploring ways of applying various state-of-the-art techniques to solve different problems as well as explore the scope of application of different existing techniques in new areas of concern (Photogrammetry, Geoprocessing, Machine Learning, Geospatial Data Science) iii) Western districts of West Bengal: Water & soil conservation and vegetation management iv) Sundarbans: Carbon sequestration, soil erosion, impact of climate change, coastal hazards like cyclones, sea level rise, embankment failures, salinisation etc. v) Space based monitoring Indian Sundarbans island system and assessing vulnerability & risk vi) Geospatial information support towards planning and scheme implementation vii) Assessment of land erosion, embankment vulnerability and risk zonation viii) Landuse/landcover change dynamics and alternative livelihoods ix) Northern districts: landslides, earthquakes, extreme precipitation, flood etc.
6	<b>Engineering &amp; Technology and Energy including Non-conventional Energy</b>	i) Mitigation technology in terms of vibration ii) Improvement of industrial (MSME) machine tools iii) Improvement of solar, alternative green technology viable for carbon emission iv) Hydrogen Fuel, an alternative energy source

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		v) Vulnerability of old, heritage structures and technology solutions vi) Improved solar cells and energy storage devices
7	<b>Environment, Ecology and Climate Change</b>	i) Plastic waste management and Biodegradable Plastic ii) Solid, Liquid and E-waste Management iii) Low Cost Sustainable solution on Fecal Sludge Treatment Plant (FSTP) iv) Air Pollution monitoring, health impacts, heat wave monitoring and solution v) To control Particulate Matter 2.5 with Vegetative Cover vi) Recycling and GHG reduction Technologies vii) Climate vulnerability assessment towards supporting State Action Plan of Climate Change viii) Monitoring of wetlands and environmental assessment ix) Forest carbon sequestration, forest fire monitoring and man & environment conflict area
8	<b>Medical Sciences Including Public Health</b>	i) Prevention of lifestyle diseases at the community level ii) Effect of climate change on diseases/ Artificial intelligence iii) Early detection of visual and hearing problems at the population level iv) Early detection of malignant conditions and Cancer genetics v) Prevention of development of drug resistance in antimicrobials vi) Assuring safer delivery vii) Improvement of neonatal health conditions viii) Adolescent mental and physical health problems ix) Impact of Zoonoses x) Nutritional disorders xi) Researches on Food Adulteration and its impact on health xii) Increase in Hypothyroidism in women affected with several co-morbidities xiii) Vitamin deficiencies

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		xiv) Tribal health/ Anaemia xv) Trauma with disabilities xvi) Trauma awareness (brain trauma etc.) xvii) Clinical trial and translational research after completion good outcome projects/ awareness for adolescent period with menstrual hygiene and school dropout
9	<b>Physical Sciences and Mathematics</b>	i) Electronic Devices and technologies having high performance application in defence, communication and healthcare ii) Application of HEMT (High electron mobility transistor), Multiple Quantum Well Laser, infrared detectors in Defence sector for high end applications. iii) Application of HEMT as high speed device as well as in microwave communication system. iv) Application of MESFET (Metal Semi-conductor Field Effect transistor) and MOSFET (Metal oxide Semi-conductor Field level transistor) in microwave communication system. v) Application of MESFET and MOSFET as high speed voltage controlled devices. vi) High Electron Mobility Transistor (HEMT), Modulation Doped Field Effect Transistor (MODFET) for Defence & high end Commercial Application. vii) Insulated Gate Field Effect Transistor (IGFET) & Metal Semiconductor Field Effect Transistor (MESFET): for high frequency, high Temp application.
10	<b>Water Resources including Conservation</b>	i) Water resource quality and management study ii) Flood zoning/ Mapping for Lower Damodar, Keleghai, Halidi, Mayurakhshi and other important streams of WB iii) Erosion along stretches of River Hugli and Sunderbans iv) Development of master plan of water challenged zones in WB with adoptable solutions v) Performance study of existing water resource systems vi) Saline water intrusion in ground water and adoptable solutions

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		<ul style="list-style-type: none"> <li>vii) Physical (prototype/ basic) model study for river morphology, hydraulic structures and sedimentation</li> <li>viii) Public Health Issues: Potable water supply in Arsenic and Fluoride affected areas.</li> <li>ix) Groundwater Recharging and sustainable withdrawal</li> <li>x) Water use efficiency enhancement in Agriculture with effective crop rotation</li> <li>xi) Enhancement of navigability by sustainable measures</li> <li>xii) Wastewater quality, management and reuse</li> </ul>
11	<b>Economics, Management, Technology Policy and IPR</b>	<ul style="list-style-type: none"> <li>i) Analytical methods on reduction of Carbon Footprint and adopting strategies towards Economical gain through Carbon Credit Trading</li> <li>ii) Analysis of State's STI potential and assessment/ projection of value of its return on investments with respect to the Society, Industry and Economy</li> <li>iii) Practical survey/ analysis and adoption of STI in this post-Covid and any other disaster scenario to strengthen the socio-economic status of people and mitigate vulnerabilities</li> <li>iv) Adopting efficient technology, process upgradation/ management in rural sectors towards increase of income, employment, quality of life and reduction of drudgery, risks and uncertainties</li> <li>v) Analytical projects on unorganised service sectors and necessary technology intervention to strengthen their potential and stability</li> <li>vi) Mapping/ potential analysis of the economically important zones (micro zones) in WB from the S&amp;T point of view</li> <li>vii) Mapping/ Addressing gender issues in different socio- economic (livelihood) sectors and encouraging growth through S&amp;T intervention</li> </ul>