

**14 -ാം കേരള നിയമസഭ**

**22 -ാം സമ്മേളനം**

**നക്ഷത്ര ചിഹ്നം ഇല്ലാത്ത ചോദ്യം നം. 79**

**12-01-2021 - ൽ മറുപടിയ്ക്ക്**

**കോഴിക്കോട്ടെ ശാസ്ത്ര സാങ്കേതിക സ്ഥാപനങ്ങളിലെ വികസന പ്രവർത്തനങ്ങൾ**

ചോദ്യം	ഉത്തരം
<p align="center"><b>ശ്രീ പി .ടി .എ . റഹീം</b></p>	<p align="center"><b>Shri. Pinarayi Vijayan</b> <b>(മുഖ്യമന്ത്രി)</b></p>
<p>(എ) കോഴിക്കോട് ജില്ലയിൽ ശാസ്ത്ര സാങ്കേതിക വകുപ്പിന് കീഴിലുള്ള മലബാർ ബോട്ടാണിക്കൽ ഗാർഡൻ, സി.ഡബ്ല്യു.ആർ.ഡി.എം, സ്കൂൾ ഓഫ് മാത്തമാറ്റിക്സ് എന്നിവിടങ്ങളിൽ ഈ സർക്കാർ വന്നതിനുശേഷം നടത്തിയ വികസന പ്രവർത്തനങ്ങളും പുതിയ പദ്ധതികളും എന്തെല്ലാമാണെന്ന് വിശദമാക്കാമോ;</p>	<p>(എ) ഈ സർക്കാർ അധികാരത്തിൽ വന്നതിനുശേഷം നടത്തിയ വികസന പ്രവർത്തനങ്ങൾ:- 1. സി.ഡബ്ല്യു.ആർ.ഡി.എം. (i)ബാച്ചിലേർസ് ഹോസ്റ്റൽ - (പരമാവധി 24പേർക്ക് ഒരേ സമയം താമസിക്കാവുന്ന 12 മുറികളുള്ള മൂന്നു നില കെട്ടിടം. 484 ചതുരശ്ര മീറ്റർ (5210 ചതുരശ്ര അടി) വിസ്തീർണ്ണം (ii) സോളാർ പവർപ്ലാന്റ് - (325 വാട്ട്സ് ശേഷിയുള്ള 155 സോളാർ പാനലുകൾ) എന്നിവ ഈ സർക്കാർ നിലവിൽ വന്നതിനു ശേഷം നടത്തിയ വികസന പ്രവർത്തനങ്ങളാണ്) iii) സി.ഡബ്ല്യു.ആർ.ഡി.എം. ക്യാമ്പസിൽ 2020-21 കാലയളവിൽ 4 നിലകളിലായി (2134 m2) ഒരു ട്രെയിനിംഗ് ഹോസ്റ്റൽ പണിയാൻ ഉദ്ദേശിക്കുന്നു. 2. കേരള സ്കൂൾ ഓഫ് മാത്തമാറ്റിക്സ് :- പണിത അവബോധം വളർത്തുന്നതിന് വേണ്ടി സ്കൂൾ കോളേജ് വിദ്യാർത്ഥികൾക്കായി വർക്ക് ഷോപ്പുകളും, സെമിനാറുകളും സംഘടിപ്പിച്ചു, അന്താരാഷ്ട്ര തലത്തിലുള്ള കോൺഫറൻസും വർക്ക് ഷോപ്പുകളും സംഘടിപ്പിച്ചു. ഇന്റഗ്രേറ്റഡ് Msc-PhD കോഴ്സിന് 2020 ഡിസംബർ 18 ന് തുടക്കം കുറിച്ചു. കന്യാശാലയും എം.എൽ.എ. യുടെ ആസ്തി വികസന ഫണ്ടിൽ നിന്നും അനുവദിച്ച 27,79,000/-രൂപയ്ക്ക് കോഴ്സ് കാര്യക്ഷമമായി നടത്താൻ ആവശ്യമായ smart classroom, കമ്പ്യൂട്ടർ സൗകര്യങ്ങൾ എന്നിവ ഒരുക്കിയിട്ടുണ്ട്. ഡയറക്ടറേയും 2 അസിസ്റ്റന്റ് പ്രൊഫസർമാരെയും നിയമിച്ചിട്ടുണ്ട്. 3. മലബാർ ബോട്ടാണിക്കൽ ഗാർഡൻ, ജലവിഭവ വികസന വിനിയോഗ കേന്ദ്രം എന്നിവയുടെ വിശദാംശങ്ങൾ അനുബന്ധം I ആയി ചേർത്തിരിക്കുന്നു.</p>
<p>(ബി) പ്രസ്തുത സ്ഥാപനങ്ങളിൽ പുതുതായി ആവിഷ്കരിക്കുന്ന പ്രവർത്തനങ്ങൾ എന്തെല്ലാമാണ്;</p>	<p>(ബി) 1. സ്കൂൾ ഓഫ് മാത്തമാറ്റിക്സിലെ നിലവിലുള്ള ലൈബ്രറിയെ Automated ലൈബ്രറി ആക്കി മാറ്റുന്നതിനുള്ള പ്രാരംഭ നടപടി സ്വീകരിച്ച് വരുന്നു. കാര്യക്ഷമമായ പ്രവർത്തനങ്ങൾക്ക് കൂടുതൽ</p>

		<p>ഫാക്കൽറ്റി നിയമനത്തിനായി നടപടികളെടുത്തിട്ടുണ്ട്. Retd. ചെയ്ത പ്രൊഫസർമാരെ വിസിറ്റിംഗ് പ്രൊഫസർമാരായി നിയമിക്കുന്നതിനുള്ള നടപടി സ്വീകരിച്ചിട്ടുണ്ട്. ദേശീയ തലത്തിലും അന്തർദേശീയ തലത്തിലും പേരുകേട്ട സ്ഥാപനങ്ങളുമായി കേരള സ്കൂൾ ഓഫ് മാത്തമാറ്റിക്സിന് ധാരണാപത്രം നിലവിലുണ്ട്. തുടർന്നും ദേശീയ അന്തർദേശീയ സ്ഥാപനങ്ങളുമായി ധാരണാപത്രം ഒപ്പ് വെക്കുന്നതിന് തത്വത്തിൽ ധാരണയായിട്ടുണ്ട്. 2. മലബാർബൊട്ടാണിക്കൽ ഗാർഡൻ, ജലവിഭവ വികസന വിനിയോഗ കേന്ദ്രം എന്നിവയുടെ വിശദാംശങ്ങൾ അനുബന്ധം II ആയി ചേർത്തിരിക്കുന്നു.</p>
(സി)	<p>സ്കൂൾ ഓഫ് മാത്തമാറ്റിക്സിൽ പുതിയ പഠന കോഴ്സുകൾ ആരംഭിച്ച സാഹചര്യത്തിൽ കട്ടികൾക്കായി ഹോസ്റ്റൽ നിർമ്മിക്കാൻ പദ്ധതി ആവിഷ്കരിച്ചിട്ടുണ്ടോ; വിശദാംശങ്ങൾ ലഭ്യമാക്കാമോ?</p>	<p>(സി) വിദ്യാർത്ഥികളുടെ എണ്ണം കൂടുന്നതിന് അനുസരിച്ച് അവർക്കു ആവശ്യമായ ഹോസ്റ്റൽ സൗകര്യങ്ങൾ ഒരുക്കേണ്ടതിനായി പുതിയ ഹോസ്റ്റൽ നിർമ്മിക്കാൻ പ്രാരംഭ നടപടി സ്വീകരിച്ചു വരുന്നു.</p>

സെക്ഷൻ ഓഫീസർ

**KSCSTE-Malabar Botanical Garden and Institute for Plant Sciences  
Kozhikode -673014**

**Activities and facilities established since 2016**

**Major Facilities Established**

❖ **Infrastructure**

1. Networking (LAN) of campus completed by extending Campus LAN facility to the newly established research lab, Guest House, Dormitory, etc
2. Garden Cafe - Campus canteen started functioning
3. Installed CCTV surveillance (25 nos) throughout the campus
4. Biometric attendance system implemented
5. Intercom facility established between all building of the campus.
6. Established a public amenity Complex (Toilet Complex) near the seminar hall and beautified the nearby areas.
7. Construction of new Research Block is completed at the top area of the campus. Molecular biology and Biotechnology lab shifted to the new building and started functioning.
8. Guest House and Dormitory facility established.
9. The campus road tarring is nearing completion.
10. The official website [www.mbgs.in](http://www.mbgs.in) revamped.
11. A Star Forest at Mavoor Panchayat, Kozhikode was established as per the request from Mavoor Grama Panchayat
12. Campus road re-tarring work of MBGIPS campus after 25 years.
13. The entire garden including all conservatories got upgraded to digital format using QR code for availing of information to any visitors using smart phone.
14. Steps initiated for the establishment of an Aquatic Biopark in MBGIPS, in association with Block Panchayath, Kozhikode, with the focus on watershed management, conservation, ecotourism and eco education. This can lead to be an extensive live gene bank for the aquatic plant resources of the country. The plan also focuses to include a controlled drainage system to maintain the water level during rainy season to meet the water scarcity.
15. The administrative building got renovated with a room for Director and a Mini Conference hall.

❖ **Conservatories**

1. Bio-fortification Garden; a new section demonstrating the vitamin sources in plants are developed.
2. Spices of Malabar, a new section started incorporating the spices of Malabar region.
3. Fogger & drip irrigation system established in Systematic garden and Mist Chamber in Gardenia

4. Establishment of Victoria pond completed.
5. Refurbishing of Aquagene – the aquatic plant conservatory completed.
6. Renovation works in Hortus Valley completed.
7. 24 Gen-bank submissions of oil degrading bacteria and algae.
8. Pteridophyte conservatory got extended and separated from bryophyte conservatory.
9. Introduced 487 plants to the garden flora, including 2 new species; *Nymphoides balakrishnanaii* & *Nymphoides palyii*.
10. In-vitro gen-bank facility strengthened through Ecosystem Restoration Programmes of MBGIPS.
11. Successfully established the micro-propagation and reintroduction of 5 RET plants.
12. Displayed name boards for the newly introduced plants, showing scientific name, common name and family in various sections of MBGIPS.
13. A conservatory for carnivorous plants established.
14. Established a conservatory exclusively for such aromatic plants initially planted 50 plants in this area and all the plants are labelled with boards depicting information like scientific name, common name, family and their significance.
15. Established a new pond for the germplasm collection of Nymphaea and initiated the beautification works by planting different varieties of Helicolia throughout this section.
16. Initiated a nursery facility for the multiplication of plants for sales and distribution to various conservatories of the campus and propagated 17272 plants.
17. Established a germplasm collection of Musaceae and Zingiberaceae and introduced 21 specimens of Musaceae and 152 specimens of Zingiberaceae.
18. Established a Carnivorous House for the conservation of insectivorous plants. Plants like *Nepenthes* spp., *Drosera* spp., *Utricularia* spp., *Sarracenia* spp., etc., were displayed here.
19. Established central nursery for mass production of plants.
20. Established Butterfly park
21. Established new sales point for plants at KSCSTE-MBGIPS
22. Sitting room near Star Forest for the use of the visitors of the garden
23. Erected Humidity chamber for mass plant multiplication.
24. Established Heliconia germplasm
25. Established a conservatory for Gingers.
26. Developed a pond for halophytic palm in Hortus valley
27. Established a compost unit in association with Kozhikode Block Panchayath at MBGIPS.
28. Hydroponics and Aquaponics systems established
29. Established a Carnivorous plant conservatory
30. Established a section of Traditional Flowering Plants.

### Academic Programmes organized.

1. **Sastra Sameeksha:** The 4-day Science Orientation Programme sponsored by KSCSTE is being organized annually at MBGIPS since 2016 to inculcate interest among school children of in basic sciences such as Physics, Chemistry and Biology.
2. **Bionidhi:** Bionidhi 2017 & Bionidhi 2018, one day garden attachment programmes for the selected high school students of entire Kozhikode district in the Human Resource Development in Biodiversity studies. In connection with this externally funded programme a model medicinal garden was also set up in the Govt. HSS Iringalloor.
3. **Lecture workshop on Plant Taxonomy:** sponsored by the Science Academies of India viz. India Academy of Sciences (Bengaluru), Indian National Science Academy (New Delhi) and the National Academy of Sciences India (Allahabad). 120 young botanists participated in this. Eminent taxonomists of the country Dr. M. Sanjappa (Former Director BSI), Prof. S. R. Yadav (Vice President, Indian association of Angiosperm Taxonomy), Dr. C. Sathishkumar (Orchidologist & Consultant to Govt. of Arunachal Pradesh) and Prof. P. V. Madhusoodanan (eminent Pteridophyte taxonomist).
4. **Certificate course on Waste management:** The course was Organised at KSCSTE – MBGIPS during 22<sup>nd</sup> September to 30<sup>th</sup> November 2018. The programme was sponsored by MoEF&CC and KSCSTE under Green Skill development Programme (GSDP) , Government of India. Amount allocated for the programme was Rs. 13,75,000/- and utilised Rs. 3,91,973/- for the same.. 19 students participated in this programme. Class taken by various eminent scientist and experts in the area of waste management.
5. **Certificate course on management of small botanic garden:** The course was organised from 25<sup>th</sup> October to 30<sup>th</sup> November 2018. The programme was sponsored by MoEF&CC and KSCSTE under Green Skill development Programme (GSDP), Government of India. Amount allocated for the programme was Rs. 7,41,000/- and utilised Rs. 2,34,091/- for the same. 15 students participated in this programme. The classes were taken by various eminent scientist and experts in the area of Botany and Botanical garden.
6. **Two days workshop on Research methodology, writing practices, language and soft skills for young scientists:** The workshop was conducted on 14<sup>th</sup> and 15<sup>th</sup> March 2019 at MBGIPS. The workshop was helpful to M. Phil, PhD scholars and young researchers and academicians in addressing the core questions of doing food quality research, adopting suitable methodologies, critical analysis of the data and interpretation of results and their publication process systematically. The programme was sponsored by KSCSTE and allocated an amount of Rs 40,000/-.

7. **Academic Attachment Programme (AAP)** - A new programme for UG & PG students of Botany/ Plant Sciences was initiated at MBGIPS. It is a work- based experience programme providing a real-life organisational experience for undergraduate and post graduate students to develop specific or generic skills valuable to their academic development. 47 Botany students and two faculties of St. Therasas College, Eranakulam participated in this two-day programme.
8. **Ecological Niche Modelling Workshop (ENM)** was organized during 22<sup>nd</sup> to 24<sup>th</sup> November 2019, wherein 31 students from Kerala, Tamil Nadu, Karnataka, UP, Utharakhand participated.
9. **Botanical Nomenclature workshop** was held on 06<sup>th</sup> & 07<sup>th</sup> February 2020 with the participation of 22 students
10. **National Webinar on Conservation of Biodiversity: Laws, Methods and ABS** was conducted online from 29th to 31st July 2019 with 53 participants and 20 invited lectures.
11. **Webinar on IP Generation, Protection & Commercialization** was conducted online by MBGIPS on 29th and 30th September 2020. There were 62 registered participants and 15 invited speakers.

#### **R&D Projects Sanctioned:**

1. Exploration and Establishment of Conservation Repository of Pteridophytes of Western Ghats of Kerala (Planning & Economic Affairs (E) Dept. Govt. of Kerala)
2. Algal diversity of selected fresh water ecosystem and its application as Ecological indicators, Bio fertilizers and Phytoremediation agents (DoECC Kerala)
3. Isolation and purification of Catechol 2,3- dioxygenase – a key hydrocarbon degrading enzyme from industrial wastes (DST-SERB)
4. Production & Distribution of Quality Seedlings/Planting Materials of Medicinal Plants of Kerala (SMPB, Kerala) Grihachaithanyam –Production of Seedlings (SMPB)
5. Physiological and biochemical basis of seed storage behaviour of three multi-purpose tree species of Western Ghats (KESS, KSCSTE)
6. SMPB-Grihachaithanyam Project (SMPB, Kerala)

7. Taxonomic and biological studies of the genera *Tephrosia* Pers and *Vigna* savi (Fabaceae – Papilionoideae) in India (SERB, DST Govt. of India NPDF) Evaluation of anticancer and acrylamide reduction potential of fungal L-Aspariginase and development of a low cost biosensor for leukemia (SERB, DST Govt. of India NPDF) Application of bacterial strains for the production of biodegradable plastic from weed plants – (KSCSTE-KBC-YIPB)
8. Resource Augmentation and *ex-situ* conservation of five RET medicinal plant species. – NMPB
9. Assessment of wetland diversity including Aquatic Flora Riparian Vegetation etc, in the flood / Landslides affected areas of Chaliyar, Korapuzha and Kuttyadi river - KSBB

**Recognitions:**

1. Recognized as the member of the International Society for Horticultural Science (ISHS), PO Box 500 - 3001 Leuven 1 - Belgium.
2. The United Nations University -Institute for Advanced Studies (UNU-IAS), the academic and research arm of the United Nations, recognized MBGIPS as the Regional Centre of Expertise (RCE) in sustainable education.
3. The herbarium of MBGIPS made its entry into the prestigious Indexed Herbariorum, a directory of global herbaria published from the New York Botanical Garden, United States with an acronym MBGH in 2017. 1345 plants added to the herbarium of MBGIPS.
4. Continuing as member of Botanic Gardens Conservation International (BGCI)

## Annexure - I

### KSCSTE\_CWRDM

#### Key activities under taken

- Developed an engineered nano material for removal of nitrates from water.
- Application of Novel Hybrid Nanocomposites for the Treatment of Waste Water.
- Microbial degradation of Microplastic/Nano plastic from waste water.
- Modelling of crop growth and yield response for selected crops in humid tropical Kerala using Decision Support System
- Physiological characterization of bush pepper for high temperature stress tolerance under humid tropical environment of Kerala
- Soil discrimination and parameter estimation using hyper spectral data in humid tropical and tropical regions
- Spectral library development for forest species types and their phenological stages.

#### 1. Technology Demonstrations

- i. Demonstrations on domestic waste water management for vegetable production.
- ii. Demonstrations of micro irrigation techniques for spices.
- iii. Demonstration and evaluation of drip fertigation technique.
- iv. Isotopic/chemical tracer techniques employed to find out the pathway of pollutants in groundwater and source identification of pollutants in rivers.

#### 2. Popularization of science

- a) Water Resource Museum of CWRDM took part in 10 exhibitions in different parts of the country and Kerala State during 2019-20.
- b) Around 4500 number of students and public visited the Water Resource Museum. They were exposed to different water and soil conservation methods.
- c) Training programmes for farmers / state level officers on irrigation management and related aspects.
- d) Conducted Dr. C. Unnikrishnan Warriar Memorial Lecture on 30th November 2019 and Prof. Elango Lakshmanan, Head, Department of Geology, Anna University, Chennai, delivered the Memorial Lecture on „Numerical modelling of radionuclide transport of uranium in groundwater“.
- e) CWRDM has organised an Open house programme (Jal Darshan) for students at CWRDM HQ on 11<sup>th</sup> February 2020. Around 200 students from different schools of Kozhikode District participated in the programme.
- f) The Scientists and Technical Officers delivered lectures on different aspects of isotope hydrology/water resources/nano technology in different venues.

- g) As part of the Swachh – Nirmal Tat Abhiyaan – Mass Beach Cleaning cum Awareness Drives were conducted in various parts of Kannur and Kozhikode districts during 11th – 18th November 2019. This programme was supported by Ministry of Environment, Forest & Climate Change (MoEF& CC), Government of India, and Kerala State Council for Science, Technology & Environment (KSCSTE), Government of Kerala. During this programme awareness classes on Coastal ecosystem conservation and Demonstration of waste upcycling model were also arranged. Competitions like Photography/Quiz/Painting/Slogan/Videography were also conducted during the event.
- h) Conducted two days regional workshop on Conservation and Management of Wetlands for Wetland Managers and Nodal officers of Wetlands of Southern States- Andhra Pradesh, Tamil Nadu, Kerala, Karnataka, Pondicherry and Telangana from 06-07 January, 2020. This workshop was supported by MoEF&CC.
- i) Observed the World Wetlands Day on Feb 10 2020 with various talks on Wetland Biodiversity, Coastal Wetlands and their conservation and Health of Wetlands and Health Card for Wetlands etc. Approximately 120 students from various colleges of Kozhikode attended the programme.
- j) Project launching workshop on “Water for change – Integrative and Fit for Purpose Water Sensitive Design Framework for Fast Growing Livable Cities” The project was funded by Department of Science and Technology (DST) and Netherlands Organization for Scientific Research (NWO) Under India – Netherlands Bilateral Programme. The workshop was held on 26<sup>th</sup> November 2019. The Workshop was inaugurated by Shri. A. Pradeepkumar, Hon<sup>ble</sup> Member of Legislative Assembly (MLA) and Shri. Thottathil Raveendran, (Worshipful Mayor, Kozhikode Corporation) presided over the function. More than 100 participants from various stakeholder departments attended the workshop.
- k) World Environment Day was organised with the support of KSCSTE at CWRDM campus on 13<sup>th</sup> June 2019 with various competitions for School Children and an invited talk by an expert on the current year’s theme of World Environment Day.
- l) Awareness creation on using domestic waste water management for vegetable production through field level demonstrations
- m) Distribution of Soil health cards (nutrient status) and nutrient recommendation for specific crops.
- n) Publications namely "Papers Published in Journals and Chapters in Books" and "Research Findings of Water Management (Agriculture) Division, CWRDM" has been circulated among 50 scientific institutions within Kerala during October 2019 and January 2020, respectively.

### 3. Any new innovative activities

- i. Initiated a research program on Quantitative assessment of infection risk from exposure to Corona Virus during monsoon and estimating corona virus spread in the community through the surveillance of sewage.
- ii. Using chemical and isotopic techniques potential submarine discharge zones (SGD) were identified in the coastal stretch of Kasaragod to Kozhikode districts

- iii. The input and pathways of cloud water in the water balance studies of forest watersheds was understood
- iv. Initiated the development of nano materials capable of removal of polluting ions from water.
- v. Prepared Management Action Plan for Rejuvenation of Manjalithodu in Angamali and submitted report to Department of Environment and Climate Change, Government Kerala. And also prepared Management Action Plan for the Rejuvenation of Poonurpuzha in Kozhikode.
- vi. A one-day workshop organized at CWRDM campus on 12th July 2019 for all Scientists on Quality Management System in connection with EIA accreditation process.
- vii. Conducted Young Innovators Programme 2019, annual work planning session for water technologies held at CWRDM on 28<sup>th</sup> of February 2020.
- viii. CWRDM-ICNMS (Integrated Crop Nutrient Management Software) Decision Support System has been developed for sustaining the soil health and improving crop productivity in TIFAC-DST funded project under India-Austria program.

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**KSCSTE-Malabar Botanical Garden and Institute for Plant Sciences**

**Future programmes:**

1. Establishment of Institute entry and Security system
2. Rain harvesting facility.
3. Seminar Complex
4. Establishment of a Commercial Tissue culture lab in association with, Kozhikode Block Panchayath.
5. The establishment of Beach campus at Kozhikode for carrying out the extension activities of the centre and as a sales centre.
6. Establishment of Aquatic biopark.

**KSCSTE\_CWRDM**

**Future Programs**

- 1) Preparation of concept note for setting up of a National Water Museum.
- 2) Application of advanced isotope techniques and development of isotopically modified nanoparticles for finding explicit solutions to field as well as theoretical hydrological problems.
- 3) Nanotechnology for water treatment and Nano-phytotechnology for soil remediation. Microplastics, Nano plastics-Monitoring and development of degradation technique.
- 4) Research on Corona Virus in water and waste water – Monitoring-research on survival rates- Impact of flood on the virus spread-techniques to treat the virus if present in drinking or wastewater.
- 5) Groundwater Recharge Methodologies.
- 6) As analytical service provider to National/International institutions/agencies.
- 7) Collaborative mission mode research studies with National/International institutes.