GOVERNMENT OF INDIA
MINISTRY OF SCIENCE & TECHNOLOGY
DEPARTMENT OF SCIENCE & TECHNOLOGY
RAJYA SABHA
UNSTARRED QUESTION No. 1403
ANSWERED ON 14/12/2023

Promoting females in the field of Science and Technology

1403. Dr. Anil Jain:
Dr. Anil Sukhdeorao Bonde:
Shri lranna Kadadi:

Will the Minister of Science and Technology be pleased to state:

(a) the details about India's participation in the Science-20 (S-20) and research innovation initiative gatherings;

(b) whether India's engagement in these initiatives is expected to impact its standing in the global realm of science and innovation;

(c) the measures implemented by the Department of Science & Technology to promote career prospects for women scientists and to motivate young students, especially girls, to choose science as their academic and career path; and

(d) the year-wise summary of the scholarship funds distributed to female students and scholars by the Department in the last five years?

ANSWER
MINISTER OF STATE (INDEPENDENT CHARGE)
FOR THE MINISTRY OF SCIENCE & TECHNOLOGY
(DR. JITENDRA SINGH)

(a) The details of Science-20 (S-20) and Research and Innovation Initiative Gathering (RIIG) G-20 meetings are placed at Annexure 1 & 2 respectively.

(b) India's engagement in RIIG G20 and S20 initiatives is expected to impact its standing in the global realms of Science and Innovation in terms of the critical role of research and innovation as an enabler for inclusive and sustainable development; gender equality; diversity; empowered citizenship; environmental integrity and protection; peace, prosperity and well-being.

The G20 nations under India's G20 Presidency recognized the importance of responsible research and innovation guided by the best available science; just and inclusive transitions; digital technologies and their impact on societal and industrial transformation; adoption of initiatives that promote lifestyles for sustainable development to accelerate the implementation of the 2030 Agenda for Sustainable Development and achievement of its Sustainable Development Goals (SDGs); goals of the Paris Agreement and objective of the UN Framework Convention on Climate Change; goals of the Kunming-Montreal Global Biodiversity Framework; and are committed to achieving a resilient, inclusive, and sustainable future.

(c) The Department of Science and Technology is implementing a holistic scheme, Women in Science and Engineering-KIRAN (WISE-KIRAN) to provide various opportunities to women in Science & Technology (S&T) domain through various programmes. The major initiatives under WISE-KIRAN are Women Scientists Scheme, WISE Fellowship for Ph.D. (WISE-PhD), WISE-Post Doctoral Fellowship (WISE-PDF), WISE-SCOPE and WIDUSHI through which women can pursue research in S&T. Further, another unique initiative 'Vigyan Jyoti' started in the year 2020, is aiming to encourage meritorious girls to pursue career in under-represented areas of STEM (Science, Technology, Engineering, Mathematics). Presently, around 21,600 girl students of Class IX-XII are enrolled under this programme from 250 districts of the country. Various year-round activities viz. parent-student counselling, career counselling, special academic classes, tinkering activities, role model interactions, lab/industry visits, science camps, etc. are being conducted under this programme.

(d) Under Vigyan Jyoti Programme, there is provision of one-year scholarship to the girls of Class XII. The year wise scholarship is as follows:

Year	Scholarship (in crore Rs.)
2020-21	3.00
2021-22	5.91
2022-23	11.14

Innovation in Science Pursuit for Inspired Research (INSPIRE) Scheme of Department of Science and Technology (DST), aims to attract meritorious youth to study basic and natural sciences at the college and university level. Scholarship for Higher Education (SHE) component of INSPIRE aims to enhance the rate of attachment of talented youth to undertake higher education in science-intensive programs by providing scholarships and mentoring through summer attachment with leading researchers. The scheme offers 12,000 (10,000 Direct Mode + 2000 Institutional Mode) Scholarships every year @ Rs 0.80 lakh per year for undertaking Bachelor and master's level education in natural and basic sciences for the talented youth in the age group 17-22 years. The component supports both the girls and boys. The ratio of girls: boys' beneficiaries is 53:47 under SHE-INSPIRE.

LAST 05 YEARS OF SCHOLARSHIP RELEASE UNDER INSPIRE-SHE		
Financial Year	**Total Number of INSPIRE Scholars (Male + Female)**	**Total Amount Released (in Rs.)**
2018-19	31,067	238,39,80,000
2019-20	27,179	228,12,90,000
2020-21	26,946	238,64,50,000
2021-22	27,892	220,63,80,000
2022-23	33,732	247,59,40,000

LAST 05 YEARS OF DATA RELEASED UNDER INSPIRE-SHE (Female Scholars Only)		
Financial Year	**Total Number of Female Scholars**	**Total Amount Released (in Rs.)**
2018-19	16,640	121,33,10,000
2019-20	14,370	113,87,30,000
2020-21	13,304	119,20,50,000
2021-22	13,649	111,74,20,000
2022-23	15,453	116,76,60,000

Annexure-1

Brief on G20 Science-20 Engagement Group

The Science-20 (S-20) was established as Engagement Group of G20 in 2017 during German G20 Presidency, to highlight the importance of science in our day-to-day lives and to encourage equitable infrastructure development among the G20 nations. Each year, S-20 holds a discourse on a specific theme selected primarily by the host country and based on the current global challenges where science may lend voice to providing policy advice to Govts.

G20 Secretariat, MEA entrusted a 3-member committee to lead S20 EG during India's G20 Presidency, which is as below-

1. Dr Vijay Bhatkar- Co-chair
2. Prof Ashutosh Sharma-Co-chair
3. Prof Ajay Sood, PSA to Govt of India

IISc Bangalore has been designated as Secretariat of S20 and DST continue to act as nodal administrative department for S20.

The main theme of S20 for India's G20 Presidency is **"Disruptive Science for Innovative and Sustainable Development"** and 3 sub-topics are:

i) Clean energy for a greener future
ii) Universal Holistic Health: Cure and Prevention of Disease
iii) Connecting Science to Society and Culture

The meeting schedule and venues of 5 S20 meetings during 2023 is as below-

i) Inception Meeting, 30-31 January 2023 (Puducherry). **Topic: Disruptive Science for Innovative and Sustainable Development**
ii) S20 Meeting1, 3-4 April 2023 (Agartala, Tripura). Topic: **Clean energy for a greener future**
iii) S20 meeting2, 1-2 May 2023 (Bangaram Island, Lakshadweep). **Topic: Universal Holistic Health: Cure and Prevention of Disease.**
iv) S20 Meeting3, 16-17 June 2023 (Bhopal) Topic: **Connecting Science to Society and Culture.**
v) S-20 Summit, 21-22 July 2023, (Coimbatore).

Science20 Communique Executive Summary:

The Science Academies of the G20 members and invitee countries, met in Coimbatore, India, on July 21-22, 2023, to recognize the need for transformative science for sustainable development in the spirit of Vasudhaiva Kutumbakam (One Earth, One Family, One Future). Science20 (S20) meetings, hosted by India during its G20 Presidency, were held under the theme "Transformative Science for Sustainable Development" and provided a platform for science academies. We brought together key ideas that

became the focus areas or sub-themes for the year. These were: ‘Clean Energy for Greener Future’, ‘Universal and Holistic Health’, and 'Connecting Science with Society & Culture’.

The S20 recommended that while advancing a sustainable, inclusive, green, and just transition, G20 member states should enhance innovation in all its stages through cooperation, collaboration, and partnership, and clean-energy access by utilizing advances in clean-energy technologies. We recommend that the G20 member states strengthen collaborations in strengthening surveillance and prediction systems that enables early detection and the prediction of emerging and re-emerging pathogens with pandemic potential, undertaking joint actions to tackle antimicrobial resistance (AMR) as well as zoonotic spill overs, development of non-resistance- forming drugs and novel antibiotics for AMR. It involves new drug-discovery approaches such as those based on artificial intelligence, using data science, especially AI and ML, to integrate multi-disciplinary knowledge that can help identify causal pathways of disease and develop predictive, diagnostic, and management algorithms; expanding joint efforts on mental health with an emphasis on community-centred, primary healthcare-led, and telehealth-supported services, developing a better understanding of the economics and market dynamics of healthcare products and services, deepening collaboration on traditional medicine and knowledge, sharing of experiences and best practices in the effective dissemination of such information to diverse populations, and emphasizing the importance of education and training in health care, including capacity building of health professionals and other stakeholders.

S20 recommended that the G20 member states enhance the positive linkages between science, society, and culture through two specific sets of collaborative actions: develop and promote a platform for digital technologies for the protection, preservation, and reproduction of heritage by strategically planning a set of activities; and Strengthen International Cooperation on Emerging Technologies by developing a broad-based venue, platform, or organization to bring together experts from governments, international organizations, academia, and civil society from across the G20 and promoting diversity and inclusion to create the conditions for creative and responsible innovations to be prioritized and supported.

Annexure-2

Research and Innovation Initiative Gathering (RIIG) Meetings & Conferences; and Ministerial Meetings

Brief summary of deliberations and Outcomes

Background:

The G20, an intergovernmental forum comprising of 19 member countries and the European Union (EU), works to address major issues related to the global economy, such as international financial stability, climate change mitigation, and sustainable development. It consists of most of the world's largest economies, including both industrialized and developing nations.

India assumed the G20 Presidency in 2023 starting from December 1, 2022 till November 30, 2023. During its Presidency, India strived to maintain the continuity of the inter-year agenda under the Research and Innovation Initiative Gathering (RIIG) and Research Ministers Meeting. Under the Presidency-theme of *"Vasudhaiva Kutumbakam"* or "One Earth One Family One Future", India identified ***'Research and Innovation for an Equitable Society'*** as the main theme of RIIG. The RIIG meetings / conferences were planned to provide platforms for stakeholders at all levels, to share ideas and create new partnerships to elevate Research and Innovation as a tool to achieve socio-economic equity and achievement of UN SDG 2030.

Policy Approach and Objective:

Government policy makers have an inherent focus on designing frameworks that would generate new markets and sustain macro-economic growth. These mission driven frameworks largely enables the Research-Innovation ecosystem, that leads to creation of new technologies, strengthening the socially beneficial nature of research and innovation. However, more efforts are needed to extend the research and innovation benefits towards achieving socio-economic equity, by enabling greater public participation in setting up research priorities. Through RIIG, G-20 members, proposed to address areas of common interest and working on developing sustainable solutions for science-driven equity.

Priority Issues and themes for discussion:

Following four themes were chosen for discussions under RIIG

1. ***Materials for Sustainable Energy***
2. ***Circular Bio-economy***
3. ***Eco-innovations for Energy Transition***
4. ***Scientific Challenges and Opportunities towards achieving a Sustainable Blue Economy***

Meetings and conferences organised:

Following meetings/ conferences were organised under RIIG:

1. *Inception meeting at Kolkata on 9-10 February 2023*
2. *Conference on Materials for Sustainable Energy, at Ranchi, 2-3 March 2023*
3. *Conference on Circular Bio-economy at Dibrugarh/Itanagar, 24-25 March 2023*
4. *Conference on Eco-innovations for Energy Transitions, Dharamshala, 19-20 April, 2023*
5. *Conference on Scientific Challenges and Opportunities towards achieving a Sustainable Blue Economy, Diu, 18-19 May 2023*
6. *RIIG Summit and Research Ministers meeting, Mumbai, 5-6 July, 2023*

Key deliberations and outcomes of deliberations:

1. Inception meeting at Kolkata on 9-10 February 2023

The RIIG Inception meeting was held in Kolkata (WB) during 8-9 February 2023, to deliberate on the RIIG main theme of 'Research and innovation for equitable society' and the chosen priority areas. A total of 36 foreign delegates representing 20 countries and International Organizations, participated in the meeting. About 40 Indian delegates and special invitees from various scientific departments/ organizations of Govt. of India also participated in the meeting.

The meeting was Co-chaired by Dr Srivari Chandrasekhar, Secretary DST; Dr Rajesh Gokhale, Secretary DBT; Dr M Ravichandran, Secretary MoES; Dr N. Kalaiselvi, Secretary DSIR & DG CSIR; and Dr Akhilesh Gupta, Sr Adviser DST and Secretary SERB. The Keynote address on the RIIG main theme ie 'Research and Innovation for equitable Society' was delivered by Dr A S Kiran Kumar, Former Secretary, Department of Space and Member, Space Commission. India introduced the four priority topics for discussions and finalized the agenda of the four RIIG conferences to be held in India at Ranchi, Dibrugarh, Dharamshala and Diu.

The delegates visited Eco park and Mothers wax museum on day 2 of the conference as part of excursion visits.

2. Conference on 'Materials for Sustainable Energy', Ranchi, 2-3 March 2023

The RIIG conference on 'Materials for sustainable energy' was held on 2-3 March 2023 at Ranchi. The conference was attended by 21 foreign delegates, from sixteen G20 members, invited guest countries and international organizations and about 40 Indian delegates, experts and invited speakers.

The meeting was Co-chaired by Dr Srivari Chandrasekhar, Secretary DST and Dr N. Kalaiselvi, Secretary DSIR & DG CSIR. The Keynote address on the RIIG priority topic-1 ie Materials for sustainable energy was delivered by Dr V.K. Saraswat, Member Niti Ayog and Dr G Satheesh Reddy, Scientific Adviser to Raksha Mantri.

The discussions were focused on understanding the fundamentals of material development and bottlenecks to achieve efficient large-scale green energy generation and storage. Materials for Sustainable Energy Storage, Solar Energy Utilization and Photovoltaic

Technologies, Materials and Processes for Green Energy, Policies and Programs for EV Implementation were some of the sub-themes discussed.

The meeting agreed to jointly work on solving the energy material challenges collectively to achieve carbon emission net-zero goals for environment protection and sustainability.

The delegates visited Patratu Lake Resort on day-2 of the Conference as part of excursion as part of excursion visit. Hon'ble Chief Minister of Jharkhand graced the 'cultural program and Gala dinner' event.

3. Conference on Circular Bio-economy, Dibrugarh/ Itanagar, 24-25 March 2023

The RIIG Conference on 'Circular bioeconomy' was held during 24-25 March 2023 at Dibrugarh. About 100 delegates (60 foreign and 40 Indian), and guest invitees participated in the conference. The meeting was Co-chaired by Dr Srivari Chandrasekhar, Secretary DST; Dr Rajesh Gokhale, Secretary DBT and Dr M. Ravichandran, Secretary MoES.

The deliberations were held on the bio-based circular carbon economy with emphasis on the utilization of biogenic materials and/or bioprocesses by adopting nature-based interventions within the economic system catalysis circularity making the ecosystem more resilient. The discussions provided an opportunity to deliberate and enhance commitments of actions and pledges from key stakeholders towards building a sustainable and circular bio-economy. The meeting focused on connecting thematic issues on agriculture, de-carbonization in industry, Bio-Energy and Bio-resource Management.

The conference brought together key actors, comprising national authorities and experts from the G20 members responsible for planning, setting up new, and managing existing programs on circular bio-economy. The areas of focus included challenges and opportunities in agriculture, de-carbonization of industry as well as bio-energy and bio-resource management. The conference also deliberated on national and regional programs and country experiences, regulatory environment and public/private sector collaboration, role of Research, Development & Innovation in creating new, resource-efficient, sustainable and more circular bio-based technologies, products and services and cooperation between G20 members on specific thematic areas.

The conference promoted active engagement between all key stakeholders, including the 3Ps (people, policies and places), and lead towards an inclusive policy-making approach providing a conceptual framework to mainstream circular bio-economy models across different sectors. The collaborations and partnerships among G20 members and stakeholders were agreed to strengthen the global efforts towards building a circular bio-economy.

The delegates visited Itanagar on a day long excursion visit, and scientific and innovation exhibition organized by Govt. of Arunachal Pradesh. Hon'ble Governor and Hon'ble CM of Arunachal Pradesh graced the 'cultural program and gala dinner' event.

4. Conference on Eco-innovations for Energy Transitions, Dharamshala, 19-20 April, 2023

The RIIG Conference on 'Eco-Innovations for Energy Transition' was held at Dharamshala (HP) during 19-20 April 2023. A total of 29 foreign delegates and 30 Indian

expert and invitees from various scientific departments/ organizations of Govt. of India participated. The conference was Chaired by Dr Srivari Chandrasekhar, Secretary DST. Ambassador D P Srivastava, Distinguished Fellow, Vivekanand International Foundation, delivered a keynote address on the topic 'India's Energy Transition in a carbon-constrained world'.

The G20 countries and International Organizations which participated in the conference are, Indonesia, Turkiye, United States of America, Russia, Saudi Arabia, Singapore, UAE, United Kingdom, Netherlands, France, Netherlands, Republic of Korea, Russia, United Kingdom, Spain, European Union and International Solar Alliance (ISA).

The discussions of the conference were held on topics like smart energy transformation, storage and management; mission-driven research in sustainable energy transitions; policy frameworks for research and innovation in carbon-neutral energy sources and green hydrogen. The conference deliberated on sharing the best practices and policy models of G20 nations for sustainable energy transition.

The meeting focused on eco-innovations for energy transitions, and deliberated institutional frameworks for greater permeability of affordable innovation in 'Energy Research' to grass root levels.

The delegates visited Maan Tea Estate and Kangra Art Museum on Day 2 as part of excursion visits.

5. Conference on Scientific Challenges and Opportunities towards achieving a Sustainable Blue Economy, Diu, 18-19 May 2023

The RIIG conference on 'Scientific challenges and opportunities towards achieving a sustainable Blue-economy was held at Diu during 18-19 May 202. A total of 35 foreign delegates and 40 Indian expert and invitees from various scientific departments/ organizations of Govt of India, participated in the conference.

Hon'ble Administrator (Daman & Diu) Shri Praful Patel and G20 Sherpa Shri Amitabh Kant delivered special addresses at the conference and inaugurated the scientific exhibition organized by Diu administration.

The RIIG conference was Co-chaired by Dr Srivari Chandrasekhar, Secretary DST and Dr M Ravichandran, Secretary MoES. Dr Shailesh Nayak, Director NIAS, Bangalore and Former Secretary MoES delivered the keynote address on the RIIG priority topic "Scientific Challenges and Opportunities for a Sustainable Blue Economy'.

The G20 countries and International Organizations, which participated in the conference are Brazil, Indonesia, Australia, Japan, Italy, France, Germany, Russia, Saudi Arabia, Singapore, UAE, United Kingdom, Netherlands, France, Netherlands, Republic of Korea, Russia, United Arab Emirates, United Kingdom, United States of America, European Union, Spain, Singapore, Norway and International Solar Alliance (ISA).

The discussions of the conference were primarily focused on topics namely Understanding the Blue Economy Science & Services; Blue Economy Sectors and

Opportunities; Observation Data and Information Services; Marine Ecosystems & Pollution; blue Economy Management and Perspectives; Coastal and Marine Spatial Planning; Marine Living Resources and Biodiversity; Deep Sea Ocean Technology; and Blue Economy Policy Perspectives. The conference deliberated on sharing the best practices and policy models of nations for sustainable blue-economy.

India presented the zero draft of the Research Ministers Declaration for discussions for adoption at the Research Ministers meeting in Mumbai in July 2023.

6. RIIG Summit/Ministerial meeting, Mumbai, 5-6 July, 2023

The RIIG Summit and Research Ministers Meeting was held in Mumbai during 4-6 July 2023. The RIIG Summit finalised the 'Outcome Document and Chair's Summary' (ODCS) which marked the culmination of the G20 research engagements, that took place through series of meetings and conferences in different parts of India. Union Minister of State (Independent Charge) for Science and Technology Dr. Jitendra Singh chaired the Research Ministers' Meeting (RMM) on 5th July 2023. More than 100 foreign delegates including Research Ministers from twenty-seven G-20 members, invited guest countries and international organizations participated in the meeting.

The 'Outcome Document and Chair's Summary' was adopted during the meeting which re-affirmed the critical role of research and innovation for enabling inclusive and sustainable development, and resolved to support each effort for transforming research and innovation systems to respond to the changing world of the 21st century and address the tomorrow's challenges.

The Research Ministers resolved and agreed to:

i. encourage research and innovation cooperation in the areas of Materials for sustainable energy; circular bioeconomy; eco-innovations for energy transition; and sustainable blue economy, which were the priority topics of the G20 RIIG during India's Presidency, the Research Ministers reaffirmed their commitment to open, equitable and secure scientific collaboration in these areas for developing solutions that address societal and global challenges.
ii. promote inclusiveness, empowered citizenship; environmental integrity and protection; peace, prosperity and wellbeing in the spirit of Vasudhaiva-Kutumbakam (One Earth, One Family, One Future) and build more sustainable, accessible, inclusive, resilient, and adaptive systems based on common principles that underpin open, transparent, reciprocal, and accountable international research cooperation.
iii. encourage cooperation to explore opportunities and challenges related to photovoltaic technology, carbon capture utilization & storage, and materials and technologies for clean energy as well as hydrogen value chain. In order to achieve a transition to a climate-neutral and environmentally friendly, circular carbon economy, and environmental justice, they will encourage research partnership in areas of renewable energy generation, conversion and storage particularly for production of low carbon hydrogen and its derivatives, renewable energy, end-to-end production of energy storage devices as well as supply chain management.
iv. enhance G20 cooperation on transitioning from the current linear economic system to a more circular and sustainable one based on a systematic approach characterized by a holistic bio-economy concept.

v. encourage the use of science and eco- system-based maritime/ marine spatial planning, integrated coastal zone management as a tool to balance and effectively accomplish the economic, ecological, and social objectives of sustainable Blue Economy endeavours, besides, scientific, and technological best practices will be shared to build technical capacities and knowledge and transfer new and emerging marine technologies, develop global, national and regional capacities for better coastal and ocean observations, monitoring and forecasting systems, and development of a digital twin of the ocean.

vi. work towards a common understanding of the values and principles that underline open, transparent and reciprocal international research cooperation to create a path where research and innovation can positively impact global development and foster a better understanding between nations through science diplomacy.

vii. support efforts in their academic communities to engage in dialogue and collaborations with countries around the world, particularly with developing and disadvantaged countries, to identify and address the challenges to progressing open science policies, and encourage countries to develop their own paths towards open science policies and supportive legal frameworks.

viii. encourage the mobility of students, scholars, researchers and scientists across research and higher education institutions by embracing mobility program, and examining ways to reduce barriers to cross-institutional collaborations to enhance sustainable development, vibrant sustainable economies and society.

ix. underline the importance of research and innovation, digital technologies and adoption of initiatives that promote lifestyles for sustainable development as accelerators that can advance the progress towards the implementation of the 2030 agenda for sustainable development and its sustainable development goals (SDGs), objectives of UNFCCC, the goals of the Paris Agreement and of the Kunming-Montreal Global Biodiversity Framework.

x. Recommended, for consideration of Sherpa's elevating the status of G20 RIIG to a formal Working Group, i.e. G20 Research and Innovation Working Group (RIWG) under the Sherpa Track.

Way forward and major recommendations of RIIG:

i. to work towards transforming research and innovation systems to responsibly and effectively respond to the societal and environmental challenges which G20 members are facing, including natural hazards and disasters, and support joint efforts to this effect, where required and will work openly in a transparent manner to build more sustainable, accessible, inclusive, resilient and adaptive systems.

ii. to encourage the mobility of students, scholars, researchers and scientists across research and higher education institutions through mobility programs and will strive to reduce barriers to cross-institutional collaborations for achieving inclusive and sustainable development and creating vibrant and sustainable economies and societies.

iii. Recommended for consideration of Sherpas, elevating the status of G20 RIIG to a formal Working Group, i.e. G20 Research and Innovation Working Group (RIWG) under the Sherpa Track. The RIWG will, inter alia, maintain the continuity of the inter-year agenda under the Research Ministerial Meeting.

*****