

27 Aug 2021: PIB Summary & Analysis

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1. BRICS-Agricultural Research Platform

Context:

BRICS-Agricultural Research Platform operationalized.

What's in the news?

- Union Minister for Agriculture and Farmers' Welfare announced the operationalization of the BRICS Agricultural Research Platform.
- The platform was prepared and set up in India for strengthening the cooperation in the field of agricultural research & innovations amongst the [BRICS](#) member States.
- The platform's operationalization was announced at the 11th meeting of BRICS Agriculture Ministers under the theme 'BRICS Partnership for Strengthening Agro Biodiversity for Food Security and Nutrition'.

What is the BRICS-Agricultural Research Platform (ARP)?

- It is a global platform for science-led agriculture that will help in addressing the issues of world hunger, undernutrition, poverty and inequality by promoting sustainable agricultural development through strategic cooperation in agriculture and allied sectors.
- It is expected to intensify cooperation among the BRICS countries in the areas of agricultural research, technology, policy, innovations and capacity building including technologies for smallholder farming and to sustainably increase yields and farmers' incomes.
- The Coordinating Centre of the Platform is housed at NASC Complex, Pusa under the governance of the Department of Agricultural Research & Education/ICAR, Ministry of Agriculture & Farmers' Welfare.
- The focal organisation for the BRICS ARP from India is the [Indian Council of Agricultural Research \(ICAR\)](#).

2. BRICS Environment Ministerial 2021

Context:

At the 7th meeting of the BRICS Environment Ministerial 2021, the environment ministers of the BRICS nations adopted the New Delhi Statement on Environment.

Details:

- The New Delhi Statement on Environment is aimed at furthering the spirit of Cooperation for Continuity, Consolidation and Consensus in Environment among the BRICS nations.
 - The key areas proposed in the BRICS Environment Ministers' Statement, 2021 are guided by the issues, which may have primacy in COP 15 and COP 26.
 - COP 26: Conference of the Parties to the UNFCCC re-scheduled to take place in November 2021, in Glasgow, UK.
 - COP 15: Conference of the Parties to the [Convention on Biological Diversity \(UNCBD\)](#) scheduled to be held in October 2021 and April-May 2022, in Kunming, China.
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3. QSim – Quantum Computer Simulator Toolkit

Context:

Union Minister launched QSim – Quantum Computer Simulator Toolkit to enable Researchers and Students to carry out research in [Quantum Computing](#) in a cost effective manner.

What are quantum simulators?

- Quantum Simulators are devices that allow scientists to study quantum effects, which are otherwise difficult to study in a lab.
- They are important tools for developing and debugging quantum algorithms.
- The simulator is a software library that simulates quantum computation on our classical computers.

About QSim:

- The QSim platform is built by the Indian Institute of Sciences (IISc), Bengaluru, Indian Institute of Technology (IIT), Roorkee, and the Centre for Development of Advanced Computing (C-DAC).
- The platform will not require researchers to install any software on their devices.
- They can sign into it from any browser using [qctoolkit.com](#).
- The simulation will be done using computing resources from C-DAC's high-performance computers, like PARAM Shavak and PARAM Siddhi.
- Quantum algorithms like Deutsch-Jozsa, etc. are also built into the platform.
- The novelty of this simulator is that it includes various types of errors that can occur in a realistic practical device, while other available simulators, including ones from Google, IBM and Amazon, only simulate quantum systems that have no errors.

- Tech giant Google had announced a similar QSim in December 2020, which allows researchers to simulate 30 qubits on a laptop and up to 40 qubits on the Google Cloud.
 - Qubits, or quantum bits, are the quantum computing analogue of classical computer bits. They form the basic information in quantum computing.
- QSim can handle up to 10-12 qubits on laptops and about 50 qubits on larger workstations.
- **Feature Highlights:**
 - Intuitive UI: QSim offers a robust QC Simulator integrated with a GUI based Workbench allowing students/researchers to create Quantum programs, visualize the instant circuit generation and simulated outputs.
 - Simulate noisy Quantum logic circuits: Helps simulate Quantum circuits with and without noise and test how well various algorithms work with imperfect quantum components. This is essential to simulate real-life conditions.
 - Pre-loaded Quantum algorithms and Examples: QSim comes loaded with Quantum programs and algorithms providing a head start to the users. E.g. QFT, Deutsch Jozsa, Grovers and so on.
 - Integrated with HPC: The quantum simulations are performed on powerful HPC resources allowing multiple users to submit jobs simultaneously with different QuBit configurations.
- **QSim – Offering Models:**
 - PARAM SHAFAK QSim – Standalone system with Quantum Simulator in a box
 - PARAM QSim Cloud – Available on cloud using HPC infrastructure PARAM SIDDHI AI

Also read: [National Mission on Quantum Technologies & Applications \(NM-QTA\)](#)

4. Upstream Oil & Gas Sector

- Upstream oil and gas production and operations identify deposits, drill wells, and recover raw materials from underground.
 - They are also often called exploration and production companies.
 - This sector also includes related services such as rig operations, feasibility studies, machinery rental, and extraction of chemical supply.
 - Upstream and downstream oil and gas production refer to an oil or gas company's location in the supply chain.
 - Downstream oil and gas production engages in anything related to the post-production of crude oil and natural gas activities.
 - Midstream links upstream and downstream and includes transportation and storage services.
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5. Supermassive black holes

Context:

Indian researchers have discovered three supermassive black holes from three galaxies merging together to form a triple active galactic nucleus, a compact region at the centre of a newly discovered galaxy that has a much-higher-than-normal luminosity.

Details:

- Supermassive black holes are difficult to detect because they do not emit any light.
- But they can reveal their presence by interacting with their surroundings.
- When the dust and gas from the surroundings fall onto a supermassive black hole, some of the mass is swallowed by the black hole, but some of it is converted into energy and emitted as electromagnetic radiation that makes the black hole appear very luminous.
- They are called active galactic nuclei (AGN) and release huge amounts of ionized particles and energy into the galaxy and its environment.
- Both of these ultimately contribute to the growth of the medium around the galaxy and ultimately the evolution of the galaxy itself.
- According to the researchers, a major factor impacting galaxy evolution is galaxy interactions, which happen when galaxies move close by each other and exert tremendous gravitational forces on each other.
- During such galaxy interactions, the respective supermassive black holes can get near each other. The dual black holes start consuming gas from their surroundings and become dual AGN.

Who conducted the Study?

- Researchers from the Indian Institute of Astrophysics.
- The study used data from the Ultra-Violet Imaging Telescope (UVIT) onboard the first Indian space observatory ASTROSAT, among others.