

## Prelim Bits 10-07-2023 | UPSC Daily Current Affairs

### Performance Grading Index

Ministry of Education releases report on Performance Grading Index 2.0 for States/UTs for the year 2021-22.

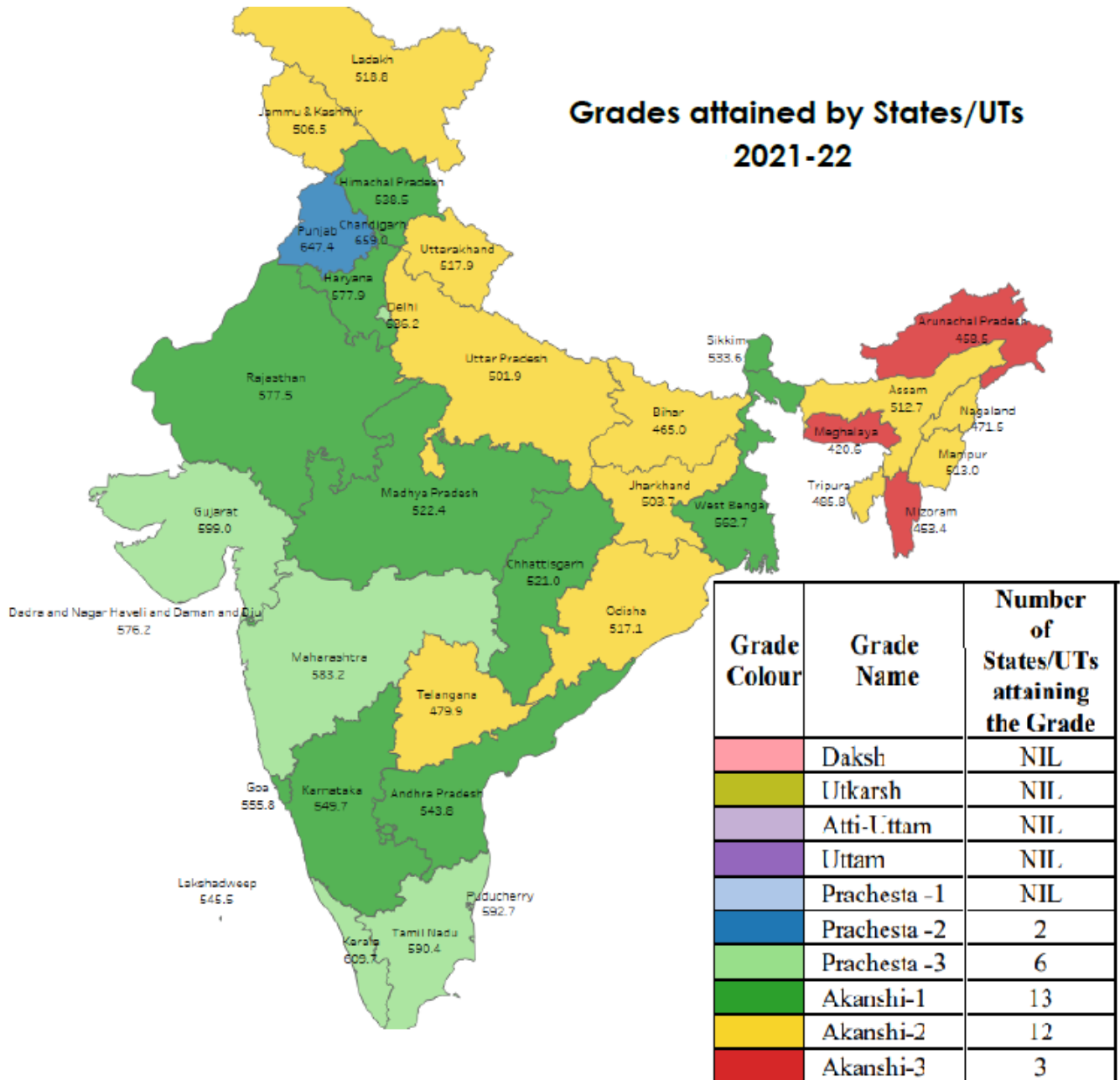
- Performance Grading Index (PGI) measures the performance of states/UTs in school education.
- **Launched** - In 2017-18 and so far, has been released up to the year 2020-21.
- **PGI 2.0** - To align with the National Education Policy, 2020, and to monitor indicators relating to Goal 4 of SDG, and to replace existing indicators which have achieved optimal target, the PGI has been revised and renamed as PGI 2.0.

*Sustainable Development Goal 4 (SDG4) adopted by India in 2015 seeks to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all by 2030.*

- **Aim** - To assess the relative performance of all the State/UTs in a uniform scale to encourage State/UTs to perform better.
- **Ministry** - Department of School Education and Literacy (DoSE&L), Ministry of Education.
- The PGI 2.0 is completely aligned with Unified District Information System for Education Plus (UDISE +), National Achievement Survey (NAS), PM POSHAN portal, PRABAND portal and Vidyanjali Portal data Outcomes.
- **Categories** - The PGI 2.0 is constructed based on 73 indicators grouped in to 2 Categories viz, Outcomes and Governance & Management.
- It further contains 6 domains.

Categories	Domain
1. Outcomes	Learning Outcomes and Quality (LO)
	Access (A)
	Infrastructure & Facilities (IF)
	Equity (E)
2. Governance Management (GM)	Governance Processes (GP)
	Teacher Education & Training (TE&T)

- PGI-D grades the State/UT into 10 grades - Daksh, Utkarsh, Ati-Uttam, Uttam, Prachesta-1, Prachesta-2, Prachesta-3, Akanshi-1, Akanshi-2, Akanshi-3.
  - **Highest achievable Grade** - Daksh (Districts scoring more than 90% of the total points in that category or overall).
  - **Lowest grade** - Akanshi-3 (scores upto 10% of the total points)
- None of the States/UTs has attained the highest Grade i.e., Daksh.
- The top-most grade attained in PGI 2.0 is Prachesta - 2 by Punjab and Chandigarh.



## References

1. [PIB | Report on Performance Grading Index 2.0](#)
2. [PGI Report | 2021-2022](#)

## Report Fish Disease App

*To further strengthen the farmer based reporting of diseases, Report Fish Disease App has*

been developed under the National Surveillance Programme for Aquatic Animal Diseases (NSPAAD).

- To further strengthen the disease surveillance and farmer-based reporting, an app named Report Fish Disease was launched.
- It was launched by the Ministry of Fisheries, Animal Husbandry and Dairying.
- The farmers can report disease cases in *finfish*, *shrimps* and *molluscs* on their farms.
- The app will be a central platform for connecting fish farmers, field-level officers and fish health experts.
- Through this app each disease case in aquatic animals are reported, investigated and scientific advice are provided.

### **National Surveillance Program for Aquatic Animal Diseases (NSPAAD)**

- **Launch Year** - 2013.
- **Funding** - National Fisheries Development Board, (NFDB), Hyderabad,
- **Implementation** - ICAR National Bureau of Fish Genetic Resources (NBFGR) Lucknow.
- **I phase** - This programme was initiated in *14 states of aquaculture importance* and involved 24 collaborating centres.
- **II phase** - Launched in 2023 for a period of 3 years.

### **Reference**

[PIB | Mobile App developed under PMMSY](#)

### **Majorana Fermion**

*Recently researchers at Microsoft figured out a way to create an elusive kind of particle that could potentially revolutionize quantum computing namely Majorana zero modes.*

- **Majorana Fermions** - All subatomic particles that make up matter are called fermions.
- In other words, only fermions can make up matter.
- Fermions that are their ***own antiparticles*** are called Majorana fermions.

*Antiparticle is a subatomic particle having the same mass as a given particle but having an opposite electric or magnetic property.*

- **Majorana Zero Mode** - All particles have four quantum numbers associated with them.
- No two particles in the same system can have the same four quantum numbers. (The numbers are together like each particle's ID).
- To be a fermion, one of the above said numbers, called the quantum spin, has only ***half-integer values***, like  $\frac{1}{2}$ ,  $\frac{3}{2}$ ,  $\frac{5}{2}$ , etc.
- Any particle, even something as large as an entire atom, can be a fermion, if its total quantum spin has a half-integer value.

- **Bound states** - Two particles that are bound to each other in some way can be a fermion, if their total quantum spin have a half-integer value.
- Most of the rules that apply to single fermions will also apply to these pairs, or bound states.
- When these bound states are their own antiparticles, they are called as Majorana zero modes.
- Majorana zero modes can be used to realise the more powerful topological quantum-computing.

### Application of Majorana Zero modes

- **Quantum computer** - It uses individual electrons as qubits - its fundamental units of information.
- Information can be encoded in some property of each electron, like its spin.
- Then, the computer manipulates that information by having the electrons interact with each other according to the quirky rules of quantum mechanics.
- These quirks are what make quantum computers better than classical computers.
- But *quantum computers are very fragile* and if someone tap a finger on quantum computer table it could lose its quantummy abilities. i.e it may **decohere**.
- **Majorana zero mode** - It is composed of two entities *electron and hole*.
- A hole is a point where there could be an electron but isn't and it effectively has a positive charge.
- A quantum computer made with qubit as Majorana zero mode and can be encoded with information onto some property of the mode.
- If it is configured with the two entities (electron and hole) apart and keep them at a distance from each other, physicists have found that even if one of the entities is disturbed, the overall qubit *doesn't decohere*, and continues to protect the encoded information.
- A popular example of a system that could give rise to Majorana zero mode is a *topological superconductor*.
- To be a Majorana zero mode, any bound state should satisfy 2 conditions
  - It should obey the Dirac equation
  - It should be its own antiparticle

### References

[The Hindu | Microsoft's planned quantum supercomputer](#)

[Nature | Majorana fermions](#)

### Candida Auris

Recently, *Candida auris*, a drug-resistant fungus that was identified as a global threat was found in hospitalised stray dogs in Delhi.

- **About** - *Candida auris* is an emerging *multidrug-resistant* oval-shaped fungus causing life-threatening outbreaks.

*The World Health Organization has declared Candida auris as one of the world's 4 'critical priority' fungal pathogens.*

- **Origin** - First reported in Japan in 2009, C. auris has since spread all over the world.
- It grows as yeast and causes candidiasis in humans.
- The fungus is hard to identify with standard laboratory methods and can be misidentified in labs without specific technology.
- **Infections Caused** - C. auris has caused bloodstream infections, wound infections, and ear infections.
- It also has been isolated from respiratory and urine specimens, but it is unclear if it causes infections in the lung or bladder.
- **Spread** - C. auris can spread in healthcare settings through contact with contaminated environmental surfaces or equipment, or from person to person.
- **Treatment** - Most C. auris infections are treatable with a class of antifungal drugs called *echinocandins*.
- However, some C. auris infections have been resistant to all 3 main classes of antifungal medications, making them more difficult to treat.
- In this situation, multiple classes of antifungals at high doses may be required to treat the infection.
- **Findings** - Report documents for the first time the isolation of live C. auris culture from an animal source.
- Overall, 4 of the 87 dogs (4.5%) contained evidence of C. auris infection or colonisation in their ear and on the surface of their skin.
- The recent finding suggests pets could act as *reservoirs for superbugs*, potentially transmitting infections to humans.

## References

[The Hindu | Drug-resistant fungus- Candida auris](#)

[Economic Times | Evidence of superbug found in Delhi's stray dogs](#)

[News-Medical.Net | Drug-resistant pathogen found in ears of stray dogs](#)

## Biosimilar Guideline (2016)

*Health activists and patient groups seek revision of existing Biosimilar Guideline for increased access to critical drugs.*

- **Biologics** - Biologics are medicinal products which are mainly composed of living tissues or cells.
- It mainly include vaccines, blood and blood components, gene therapy, tissues and recombinant therapeutic proteins.
- **Biosimilar** - A biologic which is found similar to another biologic is called a biosimilar (similar biologic).
- It is a medicine that is very close in structure and function to a biologic medicine and is safe and effective treatment options for many illnesses including arthritis, kidney conditions, and cancer.

- They increase access to lifesaving medications at potentially lower costs.

## **Biosimilar Guideline (2016)**

- **Prepared by**- Central Drugs Standard Control Organization (CDSCO), Ministry of Health & Family Welfare.
- **Aim** - To address the regulatory pathway regarding manufacturing process and safety, efficacy and quality aspects for similar biologics.
- **Features** - A 'similar biologic' can only be developed against an authorized reference biological that has been approved using a complete data package in India.
- If the reference biological is not authorized in India, it should have been approved/licensed and marketed in an ICH (International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use) country.
- The Draft Guidelines document the eligibility criteria for conducting clinical trials on biosimilars.
- Phase III trials on biosimilars should include minimum 100 patients for evaluation, whereas Phase IV trials need at least 200 evaluable patients.
- As other drugs and formulations, the biosimilars are allowed to be manufactured and marketed after the patent of the original drug or product expires.
- **Regulations and Guidelines**
  - The Similar Biologics are regulated as per the
    - Drugs and cosmetics Act, 1940,
    - Drugs and cosmetics Rules, 1945 and
    - Rules for the manufacture, use, import, export and storage of hazardous microorganisms/ genetically engineered organisms or cells, 1989.
- **Competent Authorities**
  - Institutional BioSafety Committee (IBSC)
  - Review Committee on Genetic Manipulation (RCGM)
  - Genetic Engineering Appraisal Committee (GEAC)
  - Central Drugs Standard Control Organization (CDSCO)
- **Data Requirements for Preclinical Studies**
  - The applicant has to comply with the RCGM requirements like demonstration of consistency of the process and product, product characterization and product specifications.
- **Data Requirements for Clinical Trial Application**
  - Besides the information submitted in the preclinical application, the applicant has to submit application for conduct of clinical trial as per the CDSCO guidance for industry, 2008.
- **Archiving of Data / Retention of Samples**
  - The applicant should archive all the data (quality, preclinical and clinical documentation) for a period of at least 5 years after marketing approval by competent authority in India.

## **References**

[The Hindu | Revision of Biosimilar Guideline \(2016\) needed](#)

