

**ONLY COMPETITION IAS**

**DAILY**  
**CURRENT**  
**AFFAIRS**



**Only Competition**

**23 March 2026**



# ONLY COMPETITION IAS

Compete, Learn, Grow

**CSE Prep Only Competition Pvt Ltd.**

## ONLY COMPETITION TEAM MEMBERS

**Editor:** Imtiyaz Khan

**Managing Editor:** Ritika Sharma

**Academic Advisors:** Raj Shekhar, Haroon, Banjit Hujuri, Manas Garg, Puneet Talukdar,

**Academic Research Team:** Only Competition IAS Research Cell

**Creative Media Team:**, Sunil Kansal, Shivam Sharma, Imaduddin Gaani, Anirban Saikia

**Digital Publishing:** Abhijeet Sahu & Media Unit

**Marketing & Outreach:** Akanshya Dutta & Team

**Support Staff:** Ankit Kumar, Manab Kalita

### ABOUT ONLY COMPETITION IAS

Only Competition IAS is a premier academic platform dedicated to Civil Services and Competitive Exam preparation. Our mission is to provide high-quality, research-based, exam-oriented content to students across India through digital platforms, classrooms, and publications.

📍 New Delhi | Guwahati | Online Edition Available

✉ Contact: [onlycompetitionofficial@gmail.com](mailto:onlycompetitionofficial@gmail.com) Mob-: +91 9990-1260-23/24

### COPYRIGHT & LEGAL NOTICE

© 2026 Only Competition IAS. All Rights Reserved.

No part of this magazine may be reproduced, stored in a retrieval system, or transmitted in any form or by any means—electronic, mechanical, photocopying, recording, or otherwise—without prior written permission from the publisher, except for brief quotations for academic and educational purposes.

The opinions expressed in this magazine are those of the authors and do not necessarily reflect the views of Only Competition IAS. While every effort has been made to ensure accuracy, the publisher does not take responsibility for errors or omissions.

**Jurisdiction Clause:** Any dispute arising out of or in connection with this publication shall be subject to the exclusive jurisdiction of the Hon'ble High Court of Delhi, India.

Head. Office: 201, Ansal Building No. A-12-13, Commercial Complex, Dr. Mukherjee Nagar, Delhi-110009.  
Assam Center: House No. 12, 3rd Floor, Bylane -6 Hriday Ranjan Path, Guwahati 781003.  
Ph.: 011-460-448-9312, 999012-6023, 999012-60-24/ Web: [www.onlycompetition.com](http://www.onlycompetition.com)

23 March, 2026

[www.onlycompetition.com](http://www.onlycompetition.com) DAILY CURRENT AFFAIRS



# ONLY COMPETITION IAS

Compete, Learn, Grow

## CONTENT

ICAR-IVRI Achieves Breakthrough.....	4
UPSC CSE & State PCS Relevance.....	6
MCQs.....	7
Mains Questions.....	8
New Marine Crab Species Chhapgarus ngankeeae Discovered.....	8
UPSC CSE & State PCS Relevance.....	11
MCQs.....	11
Mains Questions.....	13
Israeli Airstrikes Destroy Qasmiyeh Bridge over Litani River in Southern Lebanon.....	13
UPSC CSE & State PCS Relevance.....	16
MCQs.....	16
Mains Questions.....	18
Delhi Govt & IIT Madras Collaborate to Test “Smog-Eating” Photocatalytic Coatings on Roads...18	18
UPSC CSE & State PCS Relevance.....	20
MCQs.....	21
Mains Questions.....	22
Kolleru Lake: Environmental Activists Highlight 50-Year Decline in Ecological Health.....	23
UPSC CSE & State PCS Relevance.....	25
MCQs.....	25
Mains Questions.....	27
Assam Government Proposes New Reserved Forest Adjacent to Bura Chapori Wildlife Sanctuary.....	27
UPSC CSE & State PCS Relevance.....	29
MCQs.....	30

Head. Office: 201, Ansal Building No. A-12-13, Commercial Complex, Dr. Mukherjee Nagar, Delhi-110009.  
Assam Center: House No. 12, 3rd Floor, Bylane -6 Hriday Ranjan Path, Guwahati 781003.  
Ph.: 011-460-448-9312, 999012-6023, 999012-60-24/ Web: www.onlycompetition.com

23 March, 2026

www.onlycompetition.com DAILY CURRENT AFFAIRS



# ONLY COMPETITION IAS

Compete, Learn, Grow

Mains Questions.....	31
Subarnarekha River: MoEFCC Directs Action Against Illegal Sand Mining and Smuggling in Odisha .....	32
UPSC CSE & State PCS Relevance.....	34
MCQs.....	34
Mains Questions.....	36
Children and Social Media in India: Regulatory Patchwork, Rising Risks, and the Need for Stronger Safeguards.....	36
UPSC CSE & State PCS Relevance.....	39
MCQs.....	40
Mains Questions.....	41
Investment Facilitation for Development (IFD) Agreement at WTO MC14 .....	42
UPSC CSE & State PCS Relevance.....	45
MCQs.....	45
Mains Questions.....	47
Agri-Photovoltaics (AgriPV): Dual-Use Land Model for Energy & Food Security.....	47
UPSC CSE & State PCS Relevance.....	51
MCQs.....	52
Mains Questions.....	53

Head. Office: 201, Ansal Building No. A-12-13, Commercial Complex, Dr. Mukherjee Nagar, Delhi-110009.  
Assam Center: House No. 12, 3rd Floor, Bylane -6 Hriday Ranjan Path, Guwahati 781003.  
Ph.: 011-460-448-9312, 999012-6023, 999012-60-24/ Web: [www.onlycompetition.com](http://www.onlycompetition.com)

23 March, 2026

[www.onlycompetition.com](http://www.onlycompetition.com) DAILY CURRENT AFFAIRS



## ICAR-IVRI Achieves Breakthrough

### Why in News?

- The Indian Council of Agricultural Research-Indian Veterinary Research Institute (ICAR-IVRI), Izatnagar, Bareilly, has successfully produced indigenous **Sahiwal cattle calves** using the advanced reproductive biotechnology technique of **Ultrasound-guided Ovum Pick-Up, In Vitro Fertilization, and Embryo Transfer (OPU-IVF-ET)**.
- This is the first time Sahiwal calves have been produced indigenously through this technology in India. The breakthrough is expected to accelerate genetic improvement, conservation, and multiplication of this high-yielding milch breed, which is prized for its heat tolerance, disease resistance, and milk quality.

### Key Details of the Achievement

- **Technology Used**
  - **Ovum Pick-Up (OPU):** Oocytes (immature eggs) are collected from live superior Sahiwal cows using ultrasound guidance.
  - **In Vitro Fertilization (IVF):** Collected oocytes are matured and fertilised in the laboratory.
  - **Embryo Transfer (ET):** Resulting embryos are transferred into suitably synchronised recipient cows.
- **Advantages of OPU-IVF-ET**
  - Allows production of multiple calves from elite females in a short time.
  - Can be performed on pregnant animals (less than 100 days gestation).
  - Reduces the generation interval and enables rapid multiplication of superior genetics.
  - Helps in conservation of indigenous breeds without stressing donor animals.

### About Sahiwal Cattle

Head. Office: 201, Ansal Building No. A-12-13, Commercial Complex, Dr. Mukherjee Nagar, Delhi-110009.  
Assam Center: House No. 12, 3rd Floor, Bylane -6 Hriday Ranjan Path, Guwahati 781003.  
Ph.: 011-460-448-9312, 999012-6023, 999012-60-24/ Web: [www.onlycompetition.com](http://www.onlycompetition.com)



- **Origin & Distribution**

- Named after the Sahiwal area in Montgomery district (now in Pakistan).
- One of the best indigenous milch breeds of India.
- Other names: Lambi Bar, Lola, Montgomery, Multani, Teli.

- **Physical Characteristics**

- Reddish-brown to mahogany colour; bulls have darker extremities.
- Occasional white patches.
- Muscular body, well-developed udder in cows.

- **Performance**

- Average lactation yield: **2,325 kg** (ranges from 1,600 to 2,750 kg).
- Notable for **tick resistance**, **heat tolerance**, and high resistance to internal and external parasites.
- Exported to several Asian countries, Africa, and the Caribbean for its adaptability and productivity.

- **Economic & Ecological Importance**

- Thrives in hot and humid climates where exotic breeds struggle.
- Supports small and marginal farmers with low-input, high-resilience dairying.

## Implications

- **For Animal Husbandry**

- Faster multiplication of superior Sahiwal germplasm.
- Conservation of indigenous breeds amid threat from cross-breeding.

- **For Farmers**

- Access to high-yielding, disease-resistant Sahiwal animals.



- Reduced dependence on imported exotic semen.

- **For Science & Technology**

- Demonstrates India's growing capability in advanced reproductive biotechnology.
- Opens avenues for similar programmes in other indigenous breeds (e.g., Gir, Tharparkar, Red Sindhi).

- **Policy Alignment**

- Supports National Livestock Mission, Rashtriya Gokul Mission, and breed conservation efforts.

---

## UPSC CSE & State PCS Relevance

---

### Prelims

- Key terms: Sahiwal Cattle, OPU-IVF-ET, ICAR-IVRI, Indigenous Milch Breed
- Data: Average lactation yield (2,325 kg), Heat & tick resistant breed
- Related: Rashtriya Gokul Mission, National Livestock Mission, Reproductive Biotechnology

### GS-3 (Agriculture & Animal Husbandry)

- Indigenous breed conservation and genetic improvement
- Application of biotechnology in livestock sector

### GS-3 (Science & Technology)

- Reproductive technologies (OPU, IVF, Embryo Transfer)

### Essay / Interview

- "Indigenous Livestock Breeds and Technological Interventions: Balancing Conservation with Productivity"
- "From Traditional Dairying to Biotech-Driven Breeding: The Future of India's Livestock Sector"



## MCQs

1. With reference to the recent achievement at ICAR-IVRI, consider the following statements:
2. Sahiwal cattle calves were produced using OPU-IVF-ET technology.
3. Sahiwal is an indigenous milch breed known for heat tolerance and tick resistance.
4. The average lactation yield of Sahiwal cows is around 2,325 kg.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 1 and 2 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

**Answer: (d)**

2. Sahiwal cattle derive their name from a region that is now part of:

- (a) Rajasthan
- (b) Pakistan
- (c) Haryana
- (d) Uttar Pradesh

**Answer: (b)**

3. Which of the following technologies was used for the first time in India to produce Sahiwal calves?

- (a) Artificial Insemination
- (b) Ovum Pick-Up In Vitro Fertilization Embryo Transfer (OPU-IVF-ET)
- (c) Somatic Cell Nuclear Transfer



(d) Traditional natural service

**Answer: (b)**

4. Which of the following is NOT a characteristic feature of Sahiwal cattle?

(a) High milk yield

(b) Heat tolerance

(c) Tick resistance

(d) High susceptibility to parasites

**Answer: (d)**

---

## Mains Questions

---

1. "The successful production of Sahiwal calves using OPU-IVF-ET technology marks a significant advancement in India's livestock biotechnology." Discuss its importance for conservation of indigenous breeds and sustainable dairying. (15 marks / 250 words)
2. Examine the challenges and opportunities in conserving and improving indigenous cattle breeds like Sahiwal in the context of climate change and increasing demand for milk. (10 marks / 150 words)
3. "Application of advanced reproductive technologies can accelerate genetic improvement while preserving indigenous germplasm." Analyse this statement with reference to the recent ICAR-IVRI achievement. (15 marks / 250 words)
4. **Essay (250 marks)** "Indigenous Livestock Breeds and Modern Biotechnology: Synergy for Sustainable Agriculture and Farmers' Prosperity in India."

---

## New Marine Crab Species *Chhpagarus ngankeae* Discovered

---

### Why in News?

- Researchers from the **Zoological Survey of India (ZSI)** have discovered and described a new species of marine crab from the mangrove forests of Goa. The species has been



named **Chhapparus ngankeae** in honour of the late Dr. Ngan Kee Ng, a renowned marine biologist from the National University of Singapore. The discovery highlights the rich but under-explored biodiversity of India's mangrove ecosystems and adds to the growing list of new species documented from the west coast.

## Key Features of **Chhapparus ngankeae**

- **Physical Characteristics**

- Small crab measuring only about **1.6 cm** across its squarish, brown, hairy shell.
- Narrower abdomen (male pleon) with second and third abdominal segments of equal width.
- Telson (tailpiece) as broad as it is long.
- Most distinctive feature: The **first gonopod** (male reproductive organ) has a hard, chitinous tip with two conspicuously unequal lobes forming a deep V-shaped constriction.

- **Habitat**

- Found in **muddy intertidal mangrove forests** along the west coast of India, specifically in Goa.
- Thrives in the ecologically sensitive transition zone between land and sea.

- **Taxonomic Placement**

- Belongs to the genus **Chhapparus** within the family Varunidae.

## Ecological Significance of Mangrove Crabs

- **Role in Ecosystem**

- Act as **ecosystem engineers** by burrowing and recycling nutrients.
- Play a vital role in the mangrove food chain as both predators and prey.
- Help in aeration of soil and decomposition of organic matter.

- **Conservation Context**

Head. Office: 201, Ansal Building No. A-12-13, Commercial Complex, Dr. Mukherjee Nagar, Delhi-110009.  
Assam Center: House No. 12, 3rd Floor, Bylane -6 Hriday Ranjan Path, Guwahati 781003.  
Ph.: 011-460-448-9312, 999012-6023, 999012-60-24/ Web: [www.onlycompetition.com](http://www.onlycompetition.com)



- Mangroves in India are under threat from urbanisation, aquaculture, and climate change.
- Discovery of new species like Chhapparus ngankeeae underscores the urgency of protecting these fragile coastal habitats.

## Background: Zoological Survey of India & Biodiversity Documentation

- **Zoological Survey of India (ZSI)**
  - Premier institution under the Ministry of Environment, Forest and Climate Change for faunal surveys and taxonomy.
  - Responsible for discovering and documenting hundreds of new species from India's diverse ecosystems.
- **India's Mangrove Biodiversity**
  - India has approximately 4,992 sq km of mangrove cover (as per recent ISFR).
  - West coast mangroves (especially in Goa, Maharashtra, and Karnataka) host unique intertidal fauna.
  - Goa's mangroves are particularly rich due to their location in the Western Ghats-coastal transition zone.

## Implications

- **Scientific**
  - Increases documented crab diversity in Indian waters.
  - Provides baseline data for future ecological and taxonomic studies.
- **Conservation**
  - Reinforces the need for strict protection of mangrove ecosystems.
  - Highlights the importance of continued faunal surveys in under-explored areas.
- **Policy**



- Supports India's commitments under the Convention on Biological Diversity and Ramsar Convention on Wetlands.

## UPSC CSE & State PCS Relevance

### Prelims

- Key terms: Chhapgarus ngankeeae, Zoological Survey of India (ZSI), Mangrove Ecosystem, Intertidal Zone
- Data: Size (~1.6 cm), Location (Goan mangroves), Named after Dr. Ngan Kee Ng
- Related: Biodiversity Hotspots, Western Ghats, Coastal Ecosystem Services

### GS-3 (Environment & Biodiversity)

- Discovery of new species and mangrove conservation
- Role of faunal surveys in biodiversity documentation

### GS-1 (Geography)

- Coastal and mangrove ecosystems of India

### Essay / Interview

- "Mangroves as Cradles of Biodiversity: New Discoveries and Conservation Imperatives"
- "Documenting India's Faunal Wealth: The Critical Role of Institutions like ZSI"

## MCQs

1. With reference to the newly discovered crab species Chhapgarus ngankeeae, consider the following statements:
2. It was discovered from the mangrove forests of Goa.
3. The species has been named in honour of Dr. Ngan Kee Ng.
4. It is a small crab with a squarish, brown, hairy shell measuring about 1.6 cm.

Which of the statements given above is/are correct?

Head. Office: 201, Ansal Building No. A-12-13, Commercial Complex, Dr. Mukherjee Nagar, Delhi-110009.  
Assam Center: House No. 12, 3rd Floor, Bylane -6 Hriday Ranjan Path, Guwahati 781003.  
Ph.: 011-460-448-9312, 999012-6023, 999012-60-24/ Web: www.onlycompetition.com



- (a) 1 only
- (b) 1 and 2 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

**Answer: (d)**

2. The Zoological Survey of India functions under which ministry?

- (a) Ministry of Science and Technology
- (b) Ministry of Environment, Forest and Climate Change
- (c) Ministry of Earth Sciences
- (d) Ministry of Agriculture

**Answer: (b)**

3. Mangrove crabs play a crucial ecological role by:

- (a) Pollinating mangrove flowers
- (b) Recycling nutrients and aerating soil
- (c) Predating on large fish
- (d) Serving as primary producers

**Answer: (b)**

4. Which of the following is NOT a characteristic of *Chhapgarus ngankeeeae*?

- (a) Hairy shell
- (b) Narrower male abdomen
- (c) Bright red colour
- (d) Distinctive gonopod structure



Answer: (c)

## Mains Questions

1. “The discovery of new species like *Chhapparus ngankeeae* from Goan mangroves highlights both the richness and vulnerability of India’s coastal ecosystems.” Discuss the ecological importance of mangroves and the need for their conservation. (15 marks / 250 words)
2. Examine the role of institutions like the Zoological Survey of India in documenting and conserving India’s faunal diversity. (10 marks / 150 words)
3. “Coastal urbanisation and climate change pose serious threats to mangrove ecosystems and the unique biodiversity they harbour.” Analyse this statement with reference to recent faunal discoveries. (15 marks / 250 words)
4. **Essay (250 marks)** “Hidden Treasures of the Coast: New Species Discoveries and the Imperative of Mangrove Conservation in India.”

## Israeli Airstrikes Destroy Qasmiyeh Bridge over Litani River in Southern Lebanon

### Why in News?

- Israeli airstrikes have destroyed the **Qasmiyeh Bridge**, a vital crossing over the **Litani River** on Lebanon’s southern coastal highway.
- The strike is part of the ongoing escalation in the Israel-Hezbollah conflict and has severely disrupted connectivity and logistics in southern Lebanon. The Litani River, a strategically and economically important waterway, has once again come into focus amid the widening West Asia conflict.

### Key Details of the Incident

- **Target**
  - Qasmiyeh Bridge on the Litani River along the southern coastal highway.
  - The bridge was a critical link for movement of people and goods in southern Lebanon.

Head. Office: 201, Ansal Building No. A-12-13, Commercial Complex, Dr. Mukherjee Nagar, Delhi-110009.  
Assam Center: House No. 12, 3rd Floor, Bylane -6 Hriday Ranjan Path, Guwahati 781003.  
Ph.: 011-460-448-9312, 999012-6023, 999012-60-24/ Web: [www.onlycompetition.com](http://www.onlycompetition.com)



- **Context**

- Part of intensified Israeli operations against Hezbollah infrastructure in southern Lebanon.
- The strike has raised concerns about damage to civilian infrastructure and potential humanitarian impact in the region.

## About the Litani River

- **Geographical Profile**

- Major river entirely within Lebanon.
- Originates in the Bekaa Valley, west of Baalbek.
- Flows southwest through the Bekaa Valley between the Lebanon and Anti-Lebanon mountains.
- Near Marjayoun, it bends sharply west, carving a spectacular gorge up to **900 feet (275 metres)** deep through the Lebanon Mountains.
- Empties into the **Mediterranean Sea** south of Sidon (Saida).

- **Tributaries**

- Berdawni River, Chtoura River, Qib Elias River, among others.

- **Dams & Infrastructure**

- Important dams: **El Wauroun Dam, Qaraoun Dam** (also known as Albert Naqash Dam).

- **Economic & Strategic Importance**

- Primary source of water for **irrigation, drinking water supply, and hydroelectricity** in southern Lebanon and the Bekaa Valley.
- Supports agriculture in one of Lebanon's most fertile regions.

## Significance of the Bekaa Valley

Head. Office: 201, Ansal Building No. A-12-13, Commercial Complex, Dr. Mukherjee Nagar, Delhi-110009.  
Assam Center: House No. 12, 3rd Floor, Bylane -6 Hriday Ranjan Path, Guwahati 781003.  
Ph.: 011-460-448-9312, 999012-6023, 999012-60-24/ Web: [www.onlycompetition.com](http://www.onlycompetition.com)



- **Location**

- Broad valley in east-central Lebanon running northeast-southwest along the Litani and Orontes rivers.

- **Agricultural Importance**

- Contains nearly **half of Lebanon's arable land**.
- Less intensively farmed than the coastal plain due to lower rainfall and greater temperature variation.

- **Strategic Value**

- Vital for Lebanon's food security and water resources.
- Historically significant as a corridor and agricultural heartland.

## Implications of the Strike

- **Humanitarian**

- Disruption of movement and supply lines in southern Lebanon.
- Potential impact on water infrastructure and agricultural activities.

- **Regional Security**

- Further escalation of the Israel-Hezbollah conflict.
- Risk of damage to critical civilian infrastructure along the Litani River.

- **For India**

- India maintains a large peacekeeping contingent in southern Lebanon under **UNIFIL (United Nations Interim Force in Lebanon)**.
- Any widening of the conflict affects the safety of Indian troops and India's broader West Asia policy.
- Indirect implications for regional stability and energy/security interests in the Mediterranean-West Asia corridor.



## UPSC CSE & State PCS Relevance

### Prelims

- Key terms: Litani River, Qasmiyeh Bridge, Bekaa Valley, UNIFIL
- Data: Origin (west of Baalbek), Empties into Mediterranean south of Sidon, Gorge depth (up to 275 m)
- Related: Israel-Hezbollah Conflict 2026, West Asia Geopolitics

### GS-2 (IR)

- India's role in UN peacekeeping (UNIFIL)
- Geopolitics of West Asia and its impact on regional stability

### GS-1 (Geography)

- Physical geography of Lebanon and major river systems
- Strategic importance of river valleys

### Essay / Interview

- "Water as a Strategic Resource: The Litani River in the Context of West Asia Conflicts"
- "Infrastructure as a Target: Civilian Costs of Escalating Conflicts in West Asia"

### MCQs

1. With reference to the Litani River, consider the following statements:
2. It is the major river entirely within Lebanon.
3. It originates near Baalbek in the Bekaa Valley.
4. It flows into the Mediterranean Sea south of Sidon.

Which of the statements given above is/are correct?

- (a) 1 only



- (b) 1 and 2 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

**Answer: (d)**

2. The Qasmiyeh Bridge, recently destroyed in Israeli strikes, is located over which river?

- (a) Orontes River
- (b) Litani River
- (c) Jordan River
- (d) Euphrates River

**Answer: (b)**

3. Which of the following is NOT a major use of the Litani River?

- (a) Irrigation
- (b) Hydroelectricity
- (c) Drinking water supply
- (d) International navigation

**Answer: (d)**

4. The Bekaa Valley in Lebanon is known for:

- (a) Being the driest region
- (b) Containing nearly half of Lebanon's arable land
- (c) Having no river systems
- (d) Being a desert plateau

**Answer: (b)**



## Mains Questions

1. “Rivers like the Litani often become strategic targets in regional conflicts.” Discuss the geographical and economic importance of the Litani River and the humanitarian implications of damage to its infrastructure. (15 marks / 250 words)
2. Analyse the role of the Bekaa Valley in Lebanon’s agriculture and water security. How do ongoing conflicts in southern Lebanon affect the region’s stability? (10 marks / 150 words)
3. “Critical civilian infrastructure is increasingly becoming collateral damage in modern conflicts.” Examine this statement in the context of the recent destruction of the Qasmiyeh Bridge over the Litani River. (15 marks / 250 words)
4. **Essay (250 marks)** “Water Wars and Infrastructure Vulnerability: Lessons from the Litani River in West Asia.”

## Delhi Govt & IIT Madras Collaborate to Test “Smog-Eating” Photocatalytic Coatings on Roads

### Why in News?

- The **Delhi Government** and **Indian Institute of Technology (IIT) Madras** have launched a joint study to evaluate the effectiveness of “**smog-eating**” **photocatalytic coatings** on road surfaces.
- The initiative aims to combat Delhi’s severe air pollution by deploying coatings that use light energy to break down harmful pollutants such as nitrogen dioxide (NO<sub>2</sub>) and volatile organic compounds (VOCs). This is one of the first large-scale practical trials of photocatalytic technology on roads in India and could become a scalable solution for urban air quality management.

### Key Details of Smog-Eating Photocatalytic Coating

- **Core Technology**
  - Uses **Titanium Dioxide (TiO<sub>2</sub>)** as the active photocatalytic compound.



- $\text{TiO}_2$  is low-cost, chemically stable, and highly compatible with conventional construction materials like concrete and asphalt.

- **Working Mechanism**

- When exposed to sunlight (UV light),  $\text{TiO}_2$  acts as a photocatalyst.
- It breaks down harmful pollutants ( $\text{NO}_2$ , VOCs, particulate precursors) into less toxic or harmless substances (e.g., nitrates, carbon dioxide, water).
- The process helps reduce ground-level ozone formation and overall smog concentration.

- **Advantages**

- Passive pollution control – works continuously during daylight hours.
- No additional energy requirement beyond sunlight.
- Can be applied as a coating on existing roads, buildings, and infrastructure.

## About Smog

- **Definition**

- A type of air pollution formed by a mixture of smoke, pollutants, and fog.

- **Two Main Types**

- **Sulfurous Smog** (Classical Smog): Caused by high concentrations of sulphur oxides from burning coal; common in industrial areas.
- **Photochemical Smog**: Formed in urban areas with heavy vehicular traffic; results from chemical reactions between sunlight, nitrogen oxides ( $\text{NO}_x$ ), and volatile organic compounds (VOCs). Delhi primarily suffers from photochemical smog.

## Significance of the Initiative

- **For Delhi**

- Delhi-NCR remains one of the most polluted regions globally, especially during winter.



- Photocatalytic coatings offer a complementary, low-maintenance solution alongside existing measures like odd-even, GRAP, and stubble management.
- **Broader Environmental Impact**
  - Scalable technology for other polluted Indian cities.
  - Supports India's commitments under the National Clean Air Programme (NCAP) and Paris Agreement.
- **Scientific & Policy Value**
  - Provides field data on real-world performance of  $\text{TiO}_2$  coatings under Indian climatic conditions.
  - Could influence future urban infrastructure guidelines and green building norms.

---

## UPSC CSE & State PCS Relevance

---

### Prelims

- Key terms: Photocatalytic Coating, Titanium Dioxide ( $\text{TiO}_2$ ), Photochemical Smog, Sulfurous Smog
- Data: Collaboration between Delhi Govt & IIT Madras; Pollutant targeted ( $\text{NO}_2$ , VOCs)
- Related: National Clean Air Programme (NCAP), Air Quality Index (AQI), Environmental Technologies

### GS-3 (Environment)

- Air pollution control technologies and urban environmental management
- Innovative solutions for smog mitigation

### GS-3 (Science & Technology)

- Application of nanotechnology and photocatalysis in environmental remediation

### Essay / Interview

Head. Office: 201, Ansal Building No. A-12-13, Commercial Complex, Dr. Mukherjee Nagar, Delhi-110009.  
Assam Center: House No. 12, 3rd Floor, Bylane -6 Hriday Ranjan Path, Guwahati 781003.  
Ph.: 011-460-448-9312, 999012-6023, 999012-60-24/ Web: [www.onlycompetition.com](http://www.onlycompetition.com)



- “Technological Innovations for Combating Urban Air Pollution: Scope and Limitations of Photocatalytic Coatings”
- “From Policy to Practice: Can Science and Technology Deliver Clean Air for Indian Cities?”

## MCQs

1. With reference to “smog-eating” photocatalytic coatings, consider the following statements:
2. They primarily use Titanium Dioxide ( $\text{TiO}_2$ ) as the active compound.
3. The technology works by using sunlight to break down pollutants into harmless substances.
4. The recent pilot in Delhi targets both nitrogen dioxide and volatile organic compounds.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 1 and 2 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

**Answer: (d)**

2. Which type of smog is most commonly associated with vehicular emissions and sunlight in urban areas like Delhi?
  - (a) Sulfurous smog
  - (b) Photochemical smog
  - (c) Industrial smog
  - (d) London-type smog

**Answer: (b)**



3. Photocatalytic coatings are most effective under which condition?

- (a) Complete darkness
- (b) Exposure to ultraviolet light from sunlight
- (c) High humidity only
- (d) Low temperature conditions

**Answer: (b)**

4. The collaboration for testing smog-eating coatings in Delhi involves:

- (a) IIT Delhi and Central Pollution Control Board
- (b) Delhi Government and IIT Madras
- (c) NITI Aayog and TERI
- (d) Ministry of Environment and NEERI

**Answer: (b)**

---

## Mains Questions

---

1. "Innovative technologies like photocatalytic coatings can play a supplementary role in tackling urban air pollution." Discuss the working principle, potential, and limitations of such solutions in the Indian context. (15 marks / 250 words)
2. Analyse the causes and types of smog in Indian cities and evaluate the effectiveness of conventional versus technological interventions. (10 marks / 150 words)
3. "Air pollution control requires a multi-pronged strategy combining policy, behavioural change, and technological innovation." Examine this statement with reference to Delhi's air quality challenges and recent initiatives. (15 marks / 250 words)
4. **Essay (250 marks)** "Breathing Easier: Science, Technology and Governance in the Fight Against Urban Smog in India."



## Kolleru Lake: Environmental Activists Highlight 50-Year Decline in Ecological Health

### Why in News?

- Environmental activists have raised serious concerns over the **sustained and measurable decline** in the ecological health of **Kolleru Lake** in Andhra Pradesh over the last 50 years. Once celebrated as one of India's largest freshwater lakes and a "Peerless Fisherman's Paradise and Bird Heaven", Kolleru is facing severe threats from encroachment, pollution, siltation, and unregulated aquaculture.
- The lake, which serves as a natural flood-balancing reservoir between the Krishna and Godavari deltas, continues to lose its depth, biodiversity, and ability to support local livelihoods and migratory birds.

### Key Details of Kolleru Lake

- **Location & Geography**
  - Shallow freshwater lake located in the **inter-deltaic plain** between the Krishna and Godavari rivers.
  - Situated near the city of **Eluru** in Andhra Pradesh.
- **Hydrology**
  - Receives water from four major streams: **Budameru, Ramileru, Tammileru, and Errakalva**.
  - Drains into the **Bay of Bengal** through an outlet called '**Upputeru**'.
  - Functions as a natural flood buffer for the two major river deltas.
- **Legal & International Status**
  - Declared a **Wildlife Sanctuary** in November 1999.
  - Designated as a **Ramsar Site** (Wetland of International Importance) in November 2002.
- **Biodiversity**

Head. Office: 201, Ansal Building No. A-12-13, Commercial Complex, Dr. Mukherjee Nagar, Delhi-110009.  
Assam Center: House No. 12, 3rd Floor, Bylane -6 Hriday Ranjan Path, Guwahati 781003.  
Ph.: 011-460-448-9312, 999012-6023, 999012-60-24/ Web: [www.onlycompetition.com](http://www.onlycompetition.com)



- Supports over 20 million migratory birds annually.
- Key species: Grey pelicans, painted storks, open-billed storks.
- Important wintering ground for birds migrating from Siberia, Central Asia, and the Himalayas.
- Rich in fish diversity, supporting local fisheries and duck farming.

## Major Threats & Decline

- **Encroachment & Aquaculture**
  - Large-scale conversion of lake area into fish ponds and agricultural fields.
  - Illegal constructions and shrimp farming have reduced the lake's open water spread.
- **Pollution & Siltation**
  - Inflow of agricultural runoff, industrial effluents, and sewage.
  - Heavy siltation has drastically reduced the lake's depth and storage capacity.
- **Impact on Livelihoods**
  - Thousands of local families dependent on fishing, duck farming, and paddy cultivation are affected.
  - Decline in fish catch and bird population threatens traditional economies.

## Significance

- **Ecological**
  - One of the largest shallow freshwater lakes in India.
  - Critical habitat for migratory birds and aquatic biodiversity.
  - Natural flood regulator for the Krishna-Godavari delta region.
- **Socio-Economic**
  - Supports local communities through fisheries and agriculture.



- Holds cultural and tourism importance.

- **Conservation Challenges**

- Despite Ramsar and sanctuary status, enforcement of protection measures remains weak.
- Requires coordinated action among state government, local bodies, and central ministries.

---

## UPSC CSE & State PCS Relevance

---

### Prelims

- Key terms: Kolleru Lake, Ramsar Site, Inter-deltaic Plain, Upputeru, Wildlife Sanctuary
- Data: Declared sanctuary (1999), Ramsar designation (2002), Supports >20 million migratory birds
- Related: Krishna-Godavari Delta, Wetlands Conservation, Ramsar Convention

### GS-3 (Environment)

- Wetland conservation and Ramsar sites
- Human impact on lake ecosystems and biodiversity loss

### GS-1 (Geography)

- Drainage patterns and deltaic regions of Peninsular India

### Essay / Interview

- “Kolleru Lake: A Ramsar Site in Peril - Balancing Development and Wetland Conservation”
- “The Vanishing Wetlands of India: Lessons from Kolleru and the Imperative of Ecological Restoration”

---

## MCQs

---

1. With reference to Kolleru Lake, consider the following statements:

Head. Office: 201, Ansal Building No. A-12-13, Commercial Complex, Dr. Mukherjee Nagar, Delhi-110009.  
Assam Center: House No. 12, 3rd Floor, Bylane -6 Hriday Ranjan Path, Guwahati 781003.  
Ph.: 011-460-448-9312, 999012-6023, 999012-60-24/ Web: [www.onlycompetition.com](http://www.onlycompetition.com)



2. It is located in the inter-deltaic plain between the Krishna and Godavari rivers.
3. It was designated as a Ramsar site in 2002.
4. It drains into the Bay of Bengal through the Upputeru outlet.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 1 and 2 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

**Answer: (d)**

2. Kolleru Lake was declared a Wildlife Sanctuary in which year?

- (a) 1999
- (b) 2002
- (c) 2010
- (d) 2015

**Answer: (a)**

3. Which of the following is NOT a major threat to Kolleru Lake?

- (a) Encroachment for aquaculture
- (b) Siltation
- (c) Industrial pollution
- (d) Glacial melting

**Answer: (d)**

4. Kolleru Lake is famous for supporting a large population of:



- (a) Siberian cranes only
- (b) Migratory water birds including pelicans and storks
- (c) Marine turtles
- (d) Coral reef species

**Answer: (b)**

---

## Mains Questions

---

1. "Kolleru Lake, a Ramsar site, is facing serious ecological degradation despite its protected status." Discuss the causes of decline and suggest measures for its restoration and sustainable management. (15 marks / 250 words)
2. Examine the ecological and economic significance of Kolleru Lake for the Krishna-Godavari delta region. (10 marks / 150 words)
3. "Wetlands in India are under increasing pressure from development activities." Analyse this statement with special reference to the challenges faced by Kolleru Lake. (15 marks / 250 words)
4. **Essay (250 marks)** "Saving India's Vanishing Wetlands: The Case of Kolleru Lake and the Need for Integrated Conservation."

---

## Assam Government Proposes New Reserved Forest Adjacent to Bura Chapori Wildlife Sanctuary

---

### Why in News?

- The Assam Government has initiated steps to notify a new **Reserved Forest** adjacent to the **Bura Chapori Wildlife Sanctuary** in Sonitpur district.
- The move aims to strengthen the buffer zone, reduce human-wildlife conflict, and enhance habitat connectivity in the Laokhowa-Burachapori ecosystem.



- Bura Chapori, located on the south bank of the Brahmaputra, is an important component of the greater Kaziranga landscape and is known for its rich grassland habitat and biodiversity.

## Key Details of Bura Chapori Wildlife Sanctuary

- **Location & Geography**
  - Situated on the **south bank of the Brahmaputra River** in Sonitpur district, Assam.
  - Part of the **Laokhowa-Burachapori ecosystem**.
  - Lies between **Kaziranga National Park** (east), **Orang National Park** (west), and **Laokhowa Wildlife Sanctuary** (south).
- **Climate & Vegetation**
  - Falls under the **sub-tropical monsoon** climatic regime.
  - Features a mosaic of **wet alluvial grasslands**, riparian forests, semi-evergreen forests, wetlands, and river systems.
  - Grasslands are rich in medicinal herbs and plants.
  - Important tree species: Hollang, Mekai, Dhuna, Udiyam, Nahar, Samkothal, Bheer.
- **Fauna**
  - Home to the **Great Indian One-Horned Rhinoceros**, tiger, leopard, wild buffalo, hog deer, wild pig, and elephants.
  - Rich avian diversity including the highly endangered **Bengal Florican**, Black-necked Stork, Mallard, Open-billed Stork, Teal, and Whistling Duck.
- **Legal Status**
  - Declared a Wildlife Sanctuary to protect its unique grassland-riverine ecosystem.

## Significance of the Sanctuary

- **Ecological Role**

Head. Office: 201, Ansal Building No. A-12-13, Commercial Complex, Dr. Mukherjee Nagar, Delhi-110009.  
Assam Center: House No. 12, 3rd Floor, Bylane -6 Hriday Ranjan Path, Guwahati 781003.  
Ph.: 011-460-448-9312, 999012-6023, 999012-60-24/ Web: [www.onlycompetition.com](http://www.onlycompetition.com)



- Forms a critical corridor and buffer in the greater Kaziranga-Orang landscape.
- Supports high biodiversity and serves as a refuge for rhinoceros and grassland-dependent species.
- **Conservation Challenges**
  - Encroachment, habitat fragmentation, and human-wildlife conflict.
  - Annual flooding of the Brahmaputra affects the sanctuary's grassland ecosystem.
- **New Reserved Forest Proposal**
  - The proposed Reserved Forest will act as an additional buffer zone.
  - Expected to reduce pressure on the sanctuary, improve habitat connectivity, and support long-term conservation of rhinos and other species.

---

## UPSC CSE & State PCS Relevance

---

### Prelims

- Key terms: Bura Chapori Wildlife Sanctuary, Laokhowa-Burachapori Ecosystem, Bengal Florican, Brahmaputra South Bank
- Data: Location (Sonitpur district, Assam), Key species (One-horned Rhino, Bengal Florican)
- Related: Kaziranga National Park, Orang National Park, Wildlife Sanctuaries in Assam

### GS-3 (Environment & Biodiversity)

- Protected area management and habitat connectivity
- Conservation of grassland ecosystems and endangered species

### GS-1 (Geography)

- Riverine ecosystems of the Brahmaputra valley

### Essay / Interview

Head. Office: 201, Ansal Building No. A-12-13, Commercial Complex, Dr. Mukherjee Nagar, Delhi-110009.  
Assam Center: House No. 12, 3rd Floor, Bylane -6 Hriday Ranjan Path, Guwahati 781003.  
Ph.: 011-460-448-9312, 999012-6023, 999012-60-24/ Web: [www.onlycompetition.com](http://www.onlycompetition.com)



- “Habitat Connectivity and Buffer Zones: Strengthening Conservation in Assam’s Protected Areas”
- “Grassland Ecosystems in Northeast India: Challenges and Conservation Strategies”

## MCQs

1. With reference to Bura Chapori Wildlife Sanctuary, consider the following statements:
2. It is located on the south bank of the Brahmaputra River in Sonitpur district.
3. It forms part of the Laokhowa-Burachapori ecosystem.
4. It is home to the highly endangered Bengal Florican.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 1 and 2 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

**Answer: (d)**

2. Bura Chapori Wildlife Sanctuary lies between which two national parks?
  - (a) Manas and Nameri
  - (b) Kaziranga and Orang
  - (c) Dibru-Saikhowa and Dehing Patkai
  - (d) Pobitora and Barnadi

**Answer: (b)**

3. Which of the following is NOT a major vegetation type found in Bura Chapori Wildlife Sanctuary?



- (a) Wet alluvial grassland
- (b) Riparian forest
- (c) Semi-evergreen forest
- (d) Mangrove forest

**Answer: (d)**

4. The Assam Government's recent proposal regarding Bura Chapori aims to:

- (a) Demolish the sanctuary
- (b) Create a new Reserved Forest adjacent to it
- (c) Merge it with Kaziranga National Park
- (d) Declare it a Tiger Reserve

**Answer: (b)**

---

## Mains Questions

---

1. "Creation of buffer zones and reserved forests around existing protected areas is crucial for long-term wildlife conservation." Discuss with special reference to the proposal for Bura Chapori Wildlife Sanctuary. (15 marks / 250 words)
2. Examine the ecological significance of the Laokhowa-Burachapori ecosystem in the Brahmaputra valley and the challenges it faces. (10 marks / 150 words)
3. "Grassland habitats in Assam are vital for the survival of the Great Indian One-Horned Rhinoceros and Bengal Florican." Analyse the threats to these habitats and suggest conservation measures. (15 marks / 250 words)
4. **Essay (250 marks)** "Connecting the Dots: Habitat Connectivity and Buffer Zone Management in Northeast India's Protected Area Network."



## Subarnarekha River: MoEFCC Directs Action Against Illegal Sand Mining and Smuggling in Odisha

### Why in News?

- The **Ministry of Environment, Forest and Climate Change (MoEFCC)** has issued strict instructions to state government agencies in Odisha to immediately curb **illegal sand mining and smuggling** from the **Subarnarekha River**.
- The directive comes amid growing concerns over environmental degradation, riverbed degradation, and loss of biodiversity due to unchecked extraction of sand from this important east-flowing river. Illegal mining has intensified in recent years, affecting the river's flow, ecology, and the livelihoods of local communities dependent on it.

### Key Details of Subarnarekha River

- **Origin & Course**
  - Originates near **Nagri village** in Ranchi district of Jharkhand at an elevation of **600 metres**.
  - Total length: **395 km**.
  - Flows eastward through the Chota Nagpur Plateau and eventually drains into the **Bay of Bengal**.
  - Known as "**Streak of Gold**" due to historical gold deposits in its bed.
- **Tributaries**
  - Major right-bank tributaries: **Kanchi, Karkari, and Kharkai**.
- **Basin**
  - Spreads across **Jharkhand, Odisha**, and a smaller part of **West Bengal**.
  - Bounded by Chhotanagpur plateau (north & west), Baitarani basin ridges (south), Bay of Bengal (south-east), and Kasai Valley of Kangsabati River (east).
- **Climate & Flow**

Head. Office: 201, Ansal Building No. A-12-13, Commercial Complex, Dr. Mukherjee Nagar, Delhi-110009.  
Assam Center: House No. 12, 3rd Floor, Bylane -6 Hriday Ranjan Path, Guwahati 781003.  
Ph.: 011-460-448-9312, 999012-6023, 999012-60-24/ Web: [www.onlycompetition.com](http://www.onlycompetition.com)



- Influenced by the **South-West Monsoon** (June to October).
- Experiences seasonal flow variation typical of peninsular rivers.
- **Important Structures**
  - **Getalsud Reservoir, Chandil Dam, Galudih Barrage, and Icha Dam.**

## Significance of the River

- **Ecological**
  - Supports rich aquatic biodiversity and riparian ecosystems.
  - Provides habitat for various fish species and supports local wetlands.
- **Economic & Social**
  - Vital for irrigation, drinking water, and sand resources for construction.
  - Sustains livelihoods of fishing communities and farmers in the basin.
- **Environmental Concerns**
  - Illegal sand mining leads to riverbed deepening, bank erosion, reduced groundwater recharge, and loss of biodiversity.
  - Affects downstream flow and increases flood vulnerability in some stretches.

## Implications of MoEFCC Directive

- **For Conservation**
  - Aims to restore ecological balance and prevent further degradation of the river.
  - Signals stronger enforcement of environmental laws (Environment Protection Act, River Conservation guidelines).
- **For States**
  - Odisha and Jharkhand must strengthen monitoring, patrolling, and legal action against illegal miners and smugglers.



- For Sustainable Development
  - Promotes regulated sand mining practices and alternative construction materials.
  - Aligns with national policies on river rejuvenation and sustainable resource use.

---

## UPSC CSE & State PCS Relevance

---

### Prelims

- Key terms: Subarnarekha River, “Streak of Gold”, Getalsud Reservoir, Chandil Dam
- Data: Origin (Ranchi district, Jharkhand, 600 m), Length (395 km), Basin states (Jharkhand, Odisha, West Bengal)
- Related: East-flowing Peninsular Rivers, Illegal Sand Mining, Environmental Clearance

### GS-3 (Environment)

- River conservation and illegal mining
- Environmental impact assessment and enforcement

### GS-1 (Geography)

- Drainage system of Peninsular India and east-flowing rivers

### Essay / Interview

- “Illegal Sand Mining: A Threat to River Ecosystems and Sustainable Development”
- “Balancing Development and Conservation: Challenges in Managing Peninsular Rivers like Subarnarekha”

---

## MCQs

---

1. With reference to the Subarnarekha River, consider the following statements:
2. It originates in Ranchi district of Jharkhand.
3. It is also known as the “Streak of Gold”.



4. It flows through Jharkhand, Odisha, and West Bengal before draining into the Bay of Bengal.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 1 and 2 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

**Answer: (d)**

2. Which of the following is NOT a tributary of the Subarnarekha River?

- (a) Kanchi
- (b) Kharkai
- (c) Karkari
- (d) Mahanadi

**Answer: (d)**

3. The recent directive from MoEFCC regarding Subarnarekha River pertains to:

- (a) Construction of new dams
- (b) Curbing illegal sand mining and smuggling
- (c) Declaring it a National River
- (d) Promoting river tourism

**Answer: (b)**

4. The Subarnarekha River basin is primarily influenced by:

- (a) North-East Monsoon



- (b) South-West Monsoon
- (c) Western Disturbances
- (d) Retreating Monsoon

**Answer: (b)**

---

## Mains Questions

---

1. "Illegal sand mining poses a serious threat to river ecosystems and sustainable development." Discuss with special reference to the Subarnarekha River and recent government directives. (15 marks / 250 words)
2. Examine the geographical and economic importance of the Subarnarekha River basin and the challenges it faces. (10 marks / 150 words)
3. "Effective enforcement of environmental laws is critical for the conservation of peninsular rivers." Analyse this statement in the context of illegal mining in rivers like Subarnarekha. (15 marks / 250 words)
4. **Essay (250 marks)** "Rivers at Risk: Illegal Mining, Ecological Degradation and the Need for Sustainable River Management in India."

---

## Children and Social Media in India: Regulatory Patchwork, Rising Risks, and the Need for Stronger Safeguards

---

### Why in News?

- India continues to rely on a combination of legislation, platform-led measures, and guidelines to protect children on social media amid growing concerns over harmful content, online grooming, cybercrime, and excessive screen time.
- A recent analysis highlights that despite the **Digital Personal Data Protection Act, 2023**, IT Rules 2021, and POCSO Act provisions, enforcement gaps, age misrepresentation, and technological loopholes persist.



- NCRB data shows a **32% rise** in cybercrimes against children between 2021 and 2022, while a NITI Aayog report reveals sharply increasing daily screen time with age – from 1.5 hours (up to 5 years) to 6 hours (16-18 years). The government is exploring a **graded regulatory approach**, but experts stress the need for stronger age verification, parental controls, and digital literacy.

## Key Risks for Children on Social Media

- **Exposure to Harmful Content**
  - Increased screen time leads to anxiety, stress, depression, and social isolation.
  - Exposure to violence, misinformation, body-image issues, and explicit material.
- **Online Grooming & Exploitation**
  - Predators use fake profiles to build trust and exploit children.
  - Serious threat of sexual abuse, blackmail, and trafficking.
- **Cybercrime Trends**
  - NCRB data: **32% increase** in cybercrimes against children (2021-2022).
  - Common offences include cyberbullying, sextortion, and identity theft.

## India's Regulatory Framework

- **Digital Personal Data Protection Act, 2023**
  - Requires **parental/guardian consent** for processing data of children under 18.
  - Prohibits tracking, behavioural monitoring, and targeted advertising for minors.
  - Limitation: Easy age falsification by children.
- **IT Act, 2000 & IT (Intermediary Guidelines) Rules, 2021**
  - Criminalises creation and circulation of child sexual abuse material (CSAM).
  - Mandates age-based content classification for OTT platforms (U, U/A 7+, U/A 13+, U/A 16+, A).



- Requires parental locks and age verification for adult content.
- **POCSO Act, 2012 & Bharatiya Nyaya Sanhita, 2023**
  - Penalises online grooming, sexual exploitation, and harassment of children.
  - Extends liability to digital offences.
- **Juvenile Justice Act, 2015**
  - Addresses online facilitation of child exploitation.
- **Educational Guidelines**
  - **PRAGYATA Guidelines (2020)** by Ministry of Education recommend age-appropriate screen time for students.

## Platform-Led Measures

- **Google Family Link**
  - Minimum age for Google account in India: **13 years**.
  - Parents can monitor activity, block content, and approve downloads for children under 13.
- **Instagram Teen Accounts**
  - Built-in safety features; users under 16 need parental approval to relax restrictions.
- **YouTube Kids**
  - Controlled environment with age-based content filtering.
- **Limitations**
  - Many tools can be bypassed through age misrepresentation.
  - Enforcement and effectiveness remain debated.

## Implications & Challenges

- **For Children & Families**

Head. Office: 201, Ansal Building No. A-12-13, Commercial Complex, Dr. Mukherjee Nagar, Delhi-110009.  
Assam Center: House No. 12, 3rd Floor, Bylane -6 Hriday Ranjan Path, Guwahati 781003.  
Ph.: 011-460-448-9312, 999012-6023, 999012-60-24/ Web: [www.onlycompetition.com](http://www.onlycompetition.com)



- Rising mental health issues, addiction, and safety risks.
- Need for greater digital literacy among parents and children.
- **For Governance**
  - Enforcement gaps in law and weak digital forensic capacity.
  - Uneven functioning of Special POCSO Courts.
- **For Platforms**
  - Pressure to improve age verification and proactive detection without violating privacy.
- **Way Forward for India**
  - Stronger age-verification mechanisms and graded access rules.
  - Mandatory digital literacy in school curriculum.
  - Enhanced coordination between MEITY, NCPCR, and law enforcement.
  - Promotion of responsible platform design and parental controls.

---

## UPSC CSE & State PCS Relevance

---

### Prelims

- Key terms: Digital Personal Data Protection Act 2023, POCSO Act 2012, IT Rules 2021, PRAGYATA Guidelines, Online Grooming
- Data: 32% rise in cybercrimes against children (2021-22); Screen time (NITI Aayog 2023)
- Related: Child Rights, Cyber Security, Digital India

### GS-2 (Governance & Social Justice)

- Child protection and digital rights
- Implementation of data protection and IT laws

### GS-3 (Security)

Head. Office: 201, Ansal Building No. A-12-13, Commercial Complex, Dr. Mukherjee Nagar, Delhi-110009.  
Assam Center: House No. 12, 3rd Floor, Bylane -6 Hriday Ranjan Path, Guwahati 781003.  
Ph.: 011-460-448-9312, 999012-6023, 999012-60-24/ Web: [www.onlycompetition.com](http://www.onlycompetition.com)



- Cyber threats to children and internal security challenges

## Essay / Interview

- “Children in the Digital Age: Balancing Opportunity, Risk, and Regulation in India”
- “From Data Protection to Digital Wellness: Crafting a Safe Online Ecosystem for Indian Children”

---

## MCQs

---

1. With reference to child safety on social media in India, consider the following statements:
2. The Digital Personal Data Protection Act, 2023 requires parental consent for processing children’s data.
3. NCRB data shows a 32% increase in cybercrimes against children between 2021 and 2022.
4. PRAGYATA Guidelines recommend age-appropriate screen time for students.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 1 and 2 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

**Answer: (d)**

2. Under the IT (Intermediary Guidelines) Rules, 2021, OTT platforms must classify content into how many age-based categories?
  - (a) 3
  - (b) 4
  - (c) 5



(d) 6

**Answer: (c)**

3. Which of the following is NOT a key risk for children on social media?

- (a) Online grooming
- (b) Exposure to harmful content
- (c) Improved academic performance
- (d) Cyberbullying

**Answer: (c)**

4. The minimum age to create a Google account in India without parental supervision is:

- (a) 10 years
- (b) 13 years
- (c) 16 years
- (d) 18 years

**Answer: (b)**

---

## Mains Questions

---

1. "Protecting children in the digital ecosystem requires a fine balance between regulation, technology, and education." Discuss the challenges and suggest a comprehensive strategy for India. (15 marks / 250 words)
2. Analyse the provisions of the Digital Personal Data Protection Act, 2023 and IT Rules 2021 with respect to child safety on social media. What are their major limitations? (10 marks / 150 words)
3. "Rising screen time and cybercrimes against children pose serious threats to their mental health and safety." Examine the statement and evaluate the effectiveness of existing safeguards. (15 marks / 250 words)



4. **Essay (250 marks)** “Children in the Digital Age: Navigating Risks, Rights and Responsibilities in India’s Online Ecosystem.”

## Investment Facilitation for Development (IFD) Agreement at WTO MC14

### Why in News?

- The **14th Ministerial Conference (MC14)** of the World Trade Organization (WTO), scheduled in Cameroon, is set to deliberate on incorporating the **Investment Facilitation for Development (IFD) Agreement** into the Marrakesh Agreement (1995).
- With **128 out of 166 WTO members** (including many developing countries) supporting the IFD, **India** (along with South Africa) risks diplomatic isolation.
- The issue has intensified debate on the future of multilateralism versus plurilateralism in global trade governance, especially as the WTO grapples with a paralysed dispute settlement mechanism and rising unilateral tariffs.

### What is the Investment Facilitation for Development (IFD) Agreement?

- **Objective**
  - Focuses on **facilitating** Foreign Direct Investment (FDI) rather than liberalising or protecting it.
  - Aims to improve the investment climate through greater transparency, predictability, and reduced bureaucratic hurdles (“red tape”).
  - Emphasises sustainable development, particularly for developing countries and Least Developed Countries (LDCs).
- **Key Features**
  - Streamlining administrative procedures and faster approvals.
  - Better coordination among government agencies.
  - Special and Differential Treatment (SDT) – implementation timelines linked to capacity-building needs of developing countries.



- Explicitly **excludes** market access commitments, investment protection, Investor-State Dispute Settlement (ISDS), government procurement, and subsidies.

- **Nature**

- Plurilateral agreement – binding only on participating members, but open for others to join later.

## Global Support and WTO Context

- **Growing Backing**

- Support has grown from ~70 members in 2017 to **128 members** currently.
- Strongly backed by WTO Director-General Ngozi Okonjo-Iweala and many developing nations seeking FDI inflows.

- **WTO's Institutional Challenges**

- Paralysis of the Appellate Body and rising unilateralism (e.g., US tariffs) have weakened multilateral rule-making.
- IFD is viewed by supporters as a practical way to revive WTO's relevance through flexible plurilateral initiatives.

## India's Opposition and Strategic Concerns

- **Core Objections**

- **Threat to Multilateralism:** WTO decisions are based on consensus. India argues that plurilateral agreements create a fragmented, two-tier system and marginalise non-participants.
- **Negotiation Imbalance:** Focus on IFD may divert attention from unresolved issues like agricultural subsidies and permanent solution on public stockholding for food security.

- **Strategic/China Angle**



- Around **98 of the 128 IFD supporters** are also part of China's **Belt and Road Initiative (BRI)**.
- India fears that standardised investment rules could indirectly strengthen China's geo-economic influence, especially in infrastructure and neighbourhood projects.

## • Tactical Position

- India is using its opposition to IFD as a **bargaining chip** to secure a permanent solution on public stockholding (linked to schemes like PMGKAY) and progress on agricultural reforms.
- The Peace Clause (from Bali Ministerial 2013) currently shields India from legal challenges on subsidies beyond the 10% limit.

## Implications

### • For Global Trade Governance

- Accelerates the shift from consensus-based multilateralism to flexible plurilateralism.
- Risks further erosion of trust in the WTO if developing countries feel sidelined.

### • For India

- Risk of diplomatic isolation at MC14 and reduced influence in future negotiations.
- Need to balance strategic autonomy with the benefits of FDI inflows.
- Domestic reforms (ease of doing business, PLI schemes) become even more critical.

### • Way Forward for India

- Engage constructively to shape IFD provisions rather than outright rejection.
- Strengthen alliances with Global South countries (e.g., South Africa).
- Push for safeguards protecting developing country interests and consensus principles.



- Continue demanding a permanent solution on public stockholding.

## UPSC CSE & State PCS Relevance

### Prelims

- Key terms: Investment Facilitation for Development (IFD), Plurilateral Agreement, Special and Differential Treatment (SDT), Marrakesh Agreement 1995, Public Stockholding
- Data: 128 out of 166 WTO members support IFD
- Related: WTO MC14, Belt and Road Initiative (BRI), Peace Clause (Bali 2013)

### GS-2 (IR)

- India's role in WTO and Global South diplomacy
- Multilateralism vs Plurilateralism in global economic governance

### GS-3 (Economy)

- FDI policy, trade negotiations, and their impact on domestic reforms

### Essay / Interview

- "Plurilateralism at the WTO: Opportunity or Threat to Multilateral Trade Governance?"
- "India's Strategic Dilemma at WTO MC14: Balancing Investment Facilitation with Development Priorities and Sovereignty"

## MCQs

1. With reference to the Investment Facilitation for Development (IFD) Agreement, consider the following statements:
2. It is a plurilateral agreement that focuses on facilitating rather than liberalising FDI.
3. It includes Investor-State Dispute Settlement (ISDS) provisions.
4. It provides Special and Differential Treatment (SDT) for developing countries.

Which of the statements given above is/are correct?

Head. Office: 201, Ansal Building No. A-12-13, Commercial Complex, Dr. Mukherjee Nagar, Delhi-110009.  
Assam Center: House No. 12, 3rd Floor, Bylane -6 Hriday Ranjan Path, Guwahati 781003.  
Ph.: 011-460-448-9312, 999012-6023, 999012-60-24/ Web: www.onlycompetition.com



- (a) 1 only
- (b) 1 and 3 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

**Answer: (b)**

2. As per recent developments, how many WTO members currently support the IFD Agreement?

- (a) 70
- (b) 98
- (c) 128
- (d) 166

**Answer: (c)**

3. India's primary concern regarding the IFD Agreement is related to:

- (a) Loss of agricultural subsidies
- (b) Undermining consensus-based decision-making at WTO
- (c) Reduction in FDI inflows
- (d) Increase in tariffs

**Answer: (b)**

4. The Peace Clause in WTO negotiations provides protection to India on:

- (a) Services trade
- (b) Public stockholding for food security subsidies
- (c) Intellectual Property Rights



(d) E-commerce moratorium

Answer: (b)

## Mains Questions

1. “The push for the Investment Facilitation for Development (IFD) Agreement at WTO MC14 reflects the growing tension between plurilateralism and multilateralism.” Discuss the key features of IFD and India’s concerns. (15 marks / 250 words)
2. Analyse how the IFD Agreement could impact developing countries, particularly in the context of China’s Belt and Road Initiative. What should be India’s negotiating strategy? (10 marks / 150 words)
3. “India must safeguard its development priorities while engaging constructively at the WTO.” Examine this statement with reference to the ongoing debate on the IFD Agreement and public stockholding. (15 marks / 250 words)
4. **Essay (250 marks)** “From Consensus to Clubs: The Future of Multilateral Trade Governance in a Fragmenting World.”

## Agri-Photovoltaics (AgriPV): Dual-Use Land Model for Energy & Food Security

### Why in News?

- The Union Cabinet, in its meeting on **18 March 2026**, approved the launch of a **dedicated National AgriPV Mission** with an initial outlay of **₹15,000 crore** for the period 2026-31.
- The mission aims to promote **Agri-Photovoltaics (AgriPV)** – the simultaneous use of land for solar power generation and crop cultivation – by setting up **10 GW of AgriPV capacity** across the country, with special focus on water-stressed, drought-prone, and small-landholding regions.
- This decision builds on pilot projects (around 50 MW already tested) and addresses the growing challenge of **land-use conflict** between expanding solar capacity (India’s 300 GW solar target by 2030) and shrinking agricultural land.



- The move is expected to generate dual income for farmers, enhance climate resilience, and support the net-zero goal by 2070.

## Concept & Working of Agri-Photovoltaics

- **Definition**
  - AgriPV integrates solar photovoltaic panels with agriculture on the **same land parcel**, allowing dual revenue streams (electricity + crops).
- **Key Design Features**
  - Elevated solar panels (2-5 metres height) mounted on structures
  - Sufficient gap between panels/rows for sunlight, machinery movement, and crop growth
  - Use of semi-transparent or bifacial panels to optimise light for crops while maximising power generation
- **Types of AgriPV Systems**
  - Elevated fixed-tilt systems
  - Inter-row ground-mounted systems
  - Vertical bifacial panels
  - Greenhouse-integrated AgriPV

## Why AgriPV is Critical for India

- **Land-Use Conflict Resolution**
  - Solar parks require vast land; AgriPV allows continued farming on the same plot.
- **Energy Transition Needs**
  - India targets **500 GW non-fossil capacity by 2030** (solar forms the bulk).
  - AgriPV helps achieve this without sacrificing agricultural land.
- **Agricultural Challenges Addressed**

Head. Office: 201, Ansal Building No. A-12-13, Commercial Complex, Dr. Mukherjee Nagar, Delhi-110009.  
Assam Center: House No. 12, 3rd Floor, Bylane -6 Hriday Ranjan Path, Guwahati 781003.  
Ph.: 011-460-448-9312, 999012-6023, 999012-60-24/ Web: [www.onlycompetition.com](http://www.onlycompetition.com)



- Shrinking landholdings (average <1 hectare)
- Climate variability (heat stress, erratic rainfall)
- Low and unstable farmer incomes

## • Climate Resilience

- Partial shading reduces soil temperature and evapotranspiration → water saving (up to 20-30%).
- Protection from extreme weather events.

## Benefits of AgriPV

### • Economic

- Dual income: Crop revenue + solar power sale to grid
- Higher return on land (estimated 1.5-2.5 times traditional farming)
- Income diversification reduces monsoon dependency

### • Agronomic

- Improved microclimate for shade-tolerant crops (tomato, brinjal, leafy vegetables, pulses)
- Higher water-use efficiency
- Potential yield increase in certain crops under partial shade

### • Environmental

- Run-of-the-river style solar (no large dams)
- Reduced carbon footprint
- Soil conservation and biodiversity support

### • Social

- Employment in installation, maintenance, and agro-processing

Head. Office: 201, Ansal Building No. A-12-13, Commercial Complex, Dr. Mukherjee Nagar, Delhi-110009.  
Assam Center: House No. 12, 3rd Floor, Bylane -6 Hriday Ranjan Path, Guwahati 781003.  
Ph.: 011-460-448-9312, 999012-6023, 999012-60-24/ Web: [www.onlycompetition.com](http://www.onlycompetition.com)



- Empowerment of small and marginal farmers

## Government Initiatives & Policy Push

- **Existing Schemes**
  - PM-KUSUM (solar pumps & grid-connected plants)
  - PM Surya Ghar Muft Bijli Yojana (rooftop solar)
- **New National AgriPV Mission (2026)**
  - Target: 10 GW capacity by 2031
  - Financial support: Capital subsidy, viability gap funding
  - Focus on NE, hilly, and drought-prone states
  - Integration with PM-KUSUM 2.0 and state solar policies
- **Regulatory Support**
  - MNRE guidelines on design standards and grid connectivity
  - Emphasis on domestic manufacturing of elevated structures and bifacial panels

## Challenges in Scaling AgriPV

- **High Capital Cost**
  - Elevated structures increase project cost by 30-50%
- **Technical Issues**
  - Optimising panel height, spacing, and tilt for crop-specific light requirements
- **Policy & Implementation Gaps**
  - Lack of uniform national guidelines
  - Coordination issues between agriculture and energy departments
- **Awareness & Capacity**
  - Limited farmer knowledge and extension services

Head. Office: 201, Ansal Building No. A-12-13, Commercial Complex, Dr. Mukherjee Nagar, Delhi-110009.  
Assam Center: House No. 12, 3rd Floor, Bylane -6 Hriday Ranjan Path, Guwahati 781003.  
Ph.: 011-460-448-9312, 999012-6023, 999012-60-24/ Web: [www.onlycompetition.com](http://www.onlycompetition.com)



- Financing barriers for smallholders

## Global Experience

- **Leaders:** Germany, Japan, China, USA, France
- **Key Lessons:**
  - Strong policy support and subsidies
  - Crop-specific system design
  - Public-private partnerships for R&D

## Way Forward for India

- Develop region-specific AgriPV models (e.g., shade-tolerant crops in south, horticulture in north)
- Provide targeted subsidies and low-interest loans for small farmers
- Integrate with FPOs and cooperatives for collective implementation
- Strengthen R&D on agronomic performance and panel technology
- Ensure single-window clearances and grid connectivity

---

## UPSC CSE & State PCS Relevance

---

### Prelims

- Key terms: Agri-Photovoltaics (AgriPV), Run-of-the-River Solar, PM-KUSUM, National AgriPV Mission
- Data: Target 10 GW by 2031, Capital subsidy structure, Dual land use model
- Related: National Solar Mission, Net-Zero 2070, Land Use Conflict

### GS-3 (Economy & Agriculture)

- Sustainable agriculture & renewable energy integration
- Farmer income diversification

Head. Office: 201, Ansal Building No. A-12-13, Commercial Complex, Dr. Mukherjee Nagar, Delhi-110009.  
Assam Center: House No. 12, 3rd Floor, Bylane -6 Hriday Ranjan Path, Guwahati 781003.  
Ph.: 011-460-448-9312, 999012-6023, 999012-60-24/ Web: [www.onlycompetition.com](http://www.onlycompetition.com)



## GS-3 (Environment)

- Climate-resilient farming and clean energy transition

## GS-2 (Governance)

- Centrally sponsored schemes and inter-ministerial coordination

## Essay / Interview

- “AgriPV: Resolving the Food-Energy-Water Nexus in a Climate-Constrained World”
- “Dual-Use Land Models: A Game-Changer for India’s Sustainable Development Goals”

---

## MCQs

---

1. With reference to Agri-Photovoltaics (AgriPV), consider the following statements:
2. It allows simultaneous electricity generation and crop cultivation on the same land.
3. The National AgriPV Mission targets 10 GW capacity by 2031.
4. Elevated panel systems are the only design used in AgriPV.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 1 and 2 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

**Answer: (b)**

2. Which ministry is the nodal agency for the National AgriPV Mission?
  - (a) Ministry of Agriculture & Farmers Welfare
  - (b) Ministry of New and Renewable Energy
  - (c) Ministry of Power



(d) NITI Aayog

**Answer: (b)**

3. AgriPV systems are particularly beneficial for:

- (a) Reducing water consumption through microclimate regulation
- (b) Increasing fossil fuel dependency
- (c) Promoting large-scale monoculture
- (d) Eliminating the need for subsidies

**Answer: (a)**

4. The primary advantage of run-of-the-river style AgriPV systems is:

- (a) Large reservoir creation
- (b) Minimal land submergence and ecological disruption
- (c) Higher power generation than thermal plants
- (d) Complete elimination of grid dependency

**Answer: (b)**

---

## Mains Questions

---

1. "Agri-Photovoltaics offers a sustainable solution to the competing demands of food security and clean energy in land-scarce India." Discuss the concept, benefits, and challenges of scaling AgriPV in the country. (15 marks / 250 words)
2. Analyse how the National AgriPV Mission can contribute to India's 500 GW non-fossil energy target while supporting farmer incomes and climate resilience. (10 marks / 150 words)
3. "Dual-use land models like AgriPV can resolve the food-energy-water nexus." Critically examine this statement and suggest measures for effective implementation in India. (15 marks / 250 words)

Head. Office: 201, Ansal Building No. A-12-13, Commercial Complex, Dr. Mukherjee Nagar, Delhi-110009.  
Assam Center: House No. 12, 3rd Floor, Bylane -6 Hriday Ranjan Path, Guwahati 781003.  
Ph.: 011-460-448-9312, 999012-6023, 999012-60-24/ Web: [www.onlycompetition.com](http://www.onlycompetition.com)



4. **Essay (250 marks)** “Harvesting Sun and Soil Together: AgriPV as a Pathway to Sustainable Rural Development in India.”



Head. Office: 201, Ansal Building No. A-12-13, Commercial Complex, Dr. Mukherjee Nagar, Delhi-110009.  
Assam Center: House No. 12, 3rd Floor, Bylane -6 Hriday Ranjan Path, Guwahati 781003.  
Ph.: 011-460-448-9312, 999012-6023, 999012-60-24/ Web: [www.onlycompetition.com](http://www.onlycompetition.com)