

Credit - Drishti Ias

## AWS Outage and the Risks of Cloud Centralisation



**For Prelims: Amazon Web Services , Cloud Computing, MeghRaj , National Informatics Centre , National Knowledge Network**

For Mains: Significance of cloud computing for digital governance in India, Risks of centralization in cloud services and systemic vulnerabilities

Source: IE

### Why in News?

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A recent outage at **Amazon Web Services (AWS)** disrupted over 1,000 global online services, including messaging apps and **government portals** , highlighting the risks of **centralised cloud providers**.

### What is Amazon Web Services (AWS)?

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- **About: Amazon Web Services (AWS)** is the **cloud computing division of Amazon** , launched in **2006** . It provides **on-demand IT infrastructure** such as computing power, data storage, databases, analytics, and networking tools.
  - Instead of maintaining their own physical servers, companies **rent computing resources** from AWS data centres located across the world.
  - It follows a **“pay-as-you-go” model** , offering scalability and cost efficiency.
- **Significance of AWS:** AWS is the world’s **largest cloud provider** , ahead of Microsoft Azure and Google Cloud.
  - Many critical applications, financial systems, and digital services rely on AWS for hosting and data management, **any failure in AWS can lead to widespread service disruptions** , affecting communication, finance, governance, and entertainment sectors simultaneously.
- **Causes of AWS Outage:** AWS identified a **Domain Name System(DNS)** resolution failure in its **DynamoDB service endpoints** hosted in its North Virginia data center as the primary cause.
  - The **DNS** acts like the Internet’s address book, converting website names into IP addresses that computers use to find and connect to servers.
    - If this system fails, browsers can’t locate the right server, leading to websites or apps becoming

slow, inaccessible, or showing error messages.

- **DynamoDB service endpoints** are connection points to AWS's **database** .
  - The DNS issue blocked access to these endpoints, disrupting many apps and services globally.

## What is Cloud Computing?

- **Definition:** Cloud computing is a model for delivering **information technology services** where computing resources such as storage, processing power, databases, and applications are provided **over the Internet** instead of being hosted on local servers.
  - Users can access these resources **on-demand** , without owning or managing the physical infrastructure.
- **Cloud Computing Models:**

Model	Definition	Example
<b>SaaS (Software as a Service)</b>	Software delivered over the Internet; no installation or maintenance required.	Google Docs, Hotmail, Microsoft Office 365
<b>PaaS (Platform as a Service)</b>	Platform for developers to build, deploy, and manage apps without managing underlying hardware or OS.	Google App Engine
<b>IaaS (Infrastructure as a Service)</b>	Virtualized computing resources (servers, storage, networking) provided on-demand.	Amazon Web Services, Microsoft Azure
<b>XaaS (Anything/Everything as a Service)</b>	Comprehensive model combining multiple cloud services, including software, platforms, and infrastructure.	Cloud service bundles from major providers
<b>FaaS (Function as a Service)</b>	Event-driven serverless computing; runs code only when triggered, no server management required.	Google Cloud Functions

## What is the Significance of Cloud Computing for India?

- **Robust Digital Infrastructure** : Cloud computing strengthens India's IT backbone through **National Data Centres (NDCs)** and regional centres, supporting large-scale storage, disaster recovery, and high-performance computing.
- **Boosting E-Governance** : Platforms like **MeghRaj** and **National Informatics Centre (NIC) Cloud Services** enable fast deployment and management of **government applications**, making services

efficient, scalable, and reliable.

- Cloud platforms like **GovDrive** and **e-Office** under the **National E-Governance Plan** ensure coordinated workflows, data security, and enable paperless administration.
- **Financial and Social Inclusion** : Digital identity (**Aadhaar**), payment systems ( **Unified Payments Interface (UPI)** ), and platforms like **DigiLocker** improve accessibility, transparency, and inclusion across socio-economic groups through Cloud services.
  - **Common Services Centres (CSCs)** leverage cloud to provide 800+ government services to rural populations, bridging the digital divide.
- **Accessible Public Services** : Citizen-centric platforms such as **UMANG**, **e-Hastakshar**, and **DIKSHA** facilitate seamless delivery of education, health, and administrative services across India.
- **Economic Growth and Innovation** : Reduces infrastructure costs, supports startups and SMEs, and accelerates **India's digital economy by providing scalable and on-demand IT resources**.
- **Global Leadership** : India's cloud-enabled initiatives, including **National Knowledge Network (NKN)** and **India Stack**, showcase digital solutions that can be adopted by other nations, especially in the **Global South**, positioning India as a leader in **scalable digital services**.

## How does Cloud Centralisation Risk Digital Sovereignty and Resilience?

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- **Systemic Risk to Critical Infrastructure:** Centralised clouds host essential services like banking, healthcare, and government portals. Any failure **can disrupt national operations and public services**
- **Digital Sovereignty Concerns:** Over-reliance on **foreign cloud providers** risks control over sensitive national data, affecting policy autonomy and strategic decision-making.
- **Barrier to Innovation for Smaller Players:** Dominance of a few providers can stifle **local tech ecosystems and reduce opportunities for startup** s or domestic cloud alternatives.
- **Geopolitical Vulnerabilities:** Outages or policy changes by global providers can impact countries differently, making them susceptible to external pressures or sanctions.
- **Hidden Economic Dependencies:** Cloud providers' pricing power and market control can increase operational costs for businesses and governments, creating indirect economic risks.

## What Measures India can Take to Build Resilient Cloud Infrastructure?

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- **Multi-Cloud Adoption** : Government agencies should expand implementation of multi-cloud strategies to avoid over-dependence on a single provider, reducing systemic risks.
  - Mandate replication, backup, and failover mechanisms for all government cloud workloads to ensure continuity during outages.
- **Domestic Data Centres** : Promote the expansion of Tier-II and Tier-III domestic data centres to ensure regional redundancy and local control.
- **Data Localisation & Sovereignty** : Enforce data localisation norms for sensitive government and citizen data to prevent exposure to foreign jurisdiction risks.
- **Strengthening MeghRaj & NIC Cloud** : Expand National Cloud capacity to support critical public services and e-governance platforms like DigiLocker, e-Office, and GovDrive.

- **Skill Development & Capacity Building** : Train cloud administrators in resilient architecture, threat mitigation, and disaster recovery planning.

## Conclusion

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Cloud computing powers India's digital services, but outages like AWS show the risks of centralization. Multi-cloud strategies, domestic data centres, and skilled workforce are key for resilient infrastructure.

### ***Drishti Mains Question:***

Q. Evaluate the challenges and risks associated with centralised cloud providers for critical national infrastructure.

## Frequently Asked Questions (FAQs)

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### **1. What is cloud computing?**

Delivery of IT resources (storage, computing, apps) over the internet without managing physical servers.

### **2. What is MeghRaj and its significance in India?**

MeghRaj is India's national cloud initiative providing scalable Information and Communication Technology services to government departments, enhancing e-governance and efficient service delivery.

### **3. How does cloud computing contribute to financial and social inclusion in India?**

Platforms like Aadhaar, UPI, and DigiLocker leverage cloud services to provide accessible, transparent, and scalable services across socio-economic groups.

# UPSC Civil Services Examination, Previous Year Questions (PYQs)

*Prelims*

**Q.** With reference to "Software as a Service (SaaS)", consider the following statements: **(2022)**

1. SaaS buyers can customise the user interface and can change data fields.
2. SaaS users can access their data through their mobile devices.
3. Outlook, Hotmail and Yahoo! Mail are forms of SaaS.

Which of the statements given above are correct?

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

**Ans: D**

## Strengthening India-Germany Partnership



**For Prelims:** Germany , Semiconductors , AI , Quantum Tech , Digital Public Infrastructure , International Solar Alliance , Global Biodiversity Framework , G4 , TARANG SHAKTI , Intellectual Property Rights , GDPR , Green Hydrogen .

**For Mains :** An analysis of the Indo-German strategic partnership, focusing on key collaborative domains, existing challenges, and a prospective roadmap for enhanced engagement.

**Source: PIB**

## Why in News?

India's **Union Commerce and Industry Minister** met the **German Federal Minister for Economy and Energy** to commemorate **25 years of the India-Germany Strategic Partnership** and enhance cooperation in **trade, investment, technology, green energy, and skilling**.

# What Makes the 25<sup>th</sup> year of India-Germany Strategic Partnership Significant?

- **25 Years of Strategic Partnership: Institutionalised in 2000** , the Indo-German partnership spans **economic** , **technological** , **environmental** , and **educational domains** , reflecting the strength and resilience of bilateral ties.
  - It focuses on enhancing **economic cooperation** , **industrial collaboration** , and **investment in technology** , **manufacturing** , and **sustainability** .
- **Economic & Commercial Relations:** In 2023–24, **Germany** ranked **12<sup>th</sup>** among India's trading partners ( **2.37%** to India's foreign trade), with the **trade balance favouring Germany** and total trade hitting a record **USD 33.33 billion** .
  - **Germany ranks 9<sup>th</sup>** among foreign investors in India, with a cumulative **FDI of USD 14.5 billion** from **April 2000 to December 2023** .
- **Strategic Cooperation:** Both countries support **UNSC reforms** under the **G4 framework** , emphasize the **Indo-Pacific** and **ASEAN centrality** , and maintain diplomatic alignment via **Track 1.5 dialogues** .
- **Technology, Digitalization, and Innovation:** It covers **emerging technologies** like **semiconductors** , **AI** , and **quantum tech** , with **digital cooperation** through **Digital Public Infrastructure (DPI)** knowledge sharing and the **Indo-German Digital Dialogue (IGDD)** .
- **Green and Sustainable Development Partnership(GSDP):** Cooperation includes the **International Solar Alliance (ISA)** , biodiversity ( **Global Biodiversity Framework** ) , **waste management** , and the **circular economy** , including **solar waste recycling** .
- **Defence and Security Collaboration:** **Military ties** include **joint exercises ( TARANG SHAKTI )** , **port calls** , **negotiations for a mutual logistics support** , and **counter-terrorism cooperation** via the **Delhi Declaration on Countering the use of New and Emerging Technologies for Terrorism Purposes 2022** .
- **Skilled Migration and Mobility:** Cooperation is structured around the full implementation of the **Migration and Mobility Partnership Agreement (MMPA)** , aiming to **facilitate legal labor migration** , **curb irregular migration** , and **promote skilled and green workforce development** , including through Germany's new strategy for Indian migrants.



# What are the Key Challenges in India-Germany Bilateral Partnership?

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- **Geopolitical Divergence:** Russia's invasion of Ukraine caused a **deterioration of Germany-Russia relations** and shifted Germany toward **energy independence**, while **India remained neutral** and increased **energy imports**.
  - It creates a **persistent fault line**, hindering **deep strategic trust**, as their **core threat assessments and regional priorities** are not fully aligned.
  - **Germany** favors **"de-risking"** while continuing trade with China; **India**, facing direct threats, views China as a **strategic rival** and seeks **containment** through alliances like the **Quad**.
- **Economic and Trade Barriers:** The long-pending **EU-India FTA** continues to be **stalled** over disagreements regarding **market access, tariffs, intellectual property rights**, and **data protection**.
  - Tension exists between **India's Atmanirbhar Bharat** policy promoting domestic manufacturing and **Germany's preference for open markets**.
- **Regulatory Misalignment:** India's **data localization** and digital laws may conflict with the **EU's GDPR**, posing **compliance challenges** for German tech firms and complicating **digital trade negotiations**.
  - **GDPR** ensures **secure, free flow of personal data** within the EU, while **India's data localization** mandates keeping **critical or sensitive data** within its borders for **sovereignty, law enforcement, taxation, and security**.
- **Perception Gaps:** Germany's **values-based foreign policy** on democracy and human rights can clash with India's focus on **strategic autonomy**, leading to discreet disagreements on **citizenship laws** and **India's relations with Russia**.
  - Germany's remarks on India's democratic practices, including comments on **political arrests**, have caused friction and resentment in New Delhi.

## What Steps can be Taken to Strengthen India-Germany Bilateral Partnership?

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- **Foreign Policy Alignment:** Establish a **dedicated, regular strategic dialogue** involving **diplomats, defense, and intelligence officials** to share **threat assessments** regarding **regional security challenges**.
  - **Diversify India's defense supplies** by accelerating **co-development projects** to reduce reliance on Russian hardware.
- **Deepening Economic & Trade Ties:** Both countries should treat the **EU-India FTA** as a **strategic priority, not just a trade one**, requiring **high-level political will** to resolve disputes on **GIs, data rules, and market access**.
  - Identify **3-5 critical sectors** (e.g., **pharmaceuticals, automotive semiconductors**) and establish **targeted partnerships and incentives** to build **complementary, resilient supply chains**.
- **Accelerating Technological & Green Collaboration:** Include a **commercialization track** in the **Innovation and Technology Partnership Roadmap** and **operationalize the Green Hydrogen Roadmap** with **time-bound targets** for **pilot projects, electrolyzer joint ventures, and common trade standards**.
- **Enhancing Defence & Security Cooperation:** Finalize the **mutual logistics support agreement**



- for a sustained **Indian ocean presence** and **operationalize the Joint Working Group on Counter-Terrorism** for **real-time intelligence sharing** on **cyber-terrorism**, and **terror financing**.
- **Building Trust:** Support and expand **Track 1.5 dialogues** to include **journalists, young politicians, and civil society** for a **broader, resilient understanding**.
    - Germany should see **India's strategic autonomy** as a **shared multipolar goal**, helping manage disagreements on Russia.

## Conclusion

India-Germany relations are a **robust strategic partnership** driven by shared **democratic values** and converging interests in **trade**, **green technology**, and **security**. To realize its full potential, both nations must pragmatically navigate **geopolitical divergences** on **Russia** and **China**, conclude the long-pending **EU-India FTA**, and translate ambitious **roadmaps** into **concrete, actionable projects**.

### ***Drishti Mains Question:***

**Q.** Discuss the key areas of cooperation between India and Germany and their significance for India's strategic autonomy.

### Frequently Asked Questions (FAQs)

#### **1. What is the current status of India-Germany trade relations?**

In 2023-24, India-Germany trade reached a record USD 33.33 billion, accounting for 2.37% of India's foreign trade, with the balance of trade favoring Germany.

#### **2. What is the Migration and Mobility Partnership Agreement (MMPA)?**

Signed in 2022, it facilitates legal skilled migration, promotes fair recruitment, and curbs irregular migration, especially for green and digital sectors.

#### **3. What is the cumulative Foreign Direct Investment (FDI) from Germany to India?**

Germany ranks 9<sup>th</sup> among foreign investors in India, with a cumulative FDI of USD 14.5 billion from April 2000 to December 2023.

[Watch Video on YouTube: [▶ https://www.youtube.com/embed/j2F1lEXYVEs](https://www.youtube.com/embed/j2F1lEXYVEs) ]



# UPSC Civil Services Examination, Previous Year Question (PYQ)

## Prelims

**Q** . 'Broad-based Trade and Investment Agreement (BTIA)' is sometimes seen in the news in the context of negotiations held between India and **(2017)**

- ( **a** ) European Union  
( **b** ) Gulf Cooperation Council  
( **c** ) Organization for Economic Cooperation and Development  
( **d** ) Shanghai Cooperation Organization

**Ans: (a)**

## Mains

**Q** . "Africa was chopped into states artificially created by accident of European competition". Analyze. **(2013)**

**Q** . To what extent can Germany be held responsible for causing the two World Wars? Discuss critically **(2015)**

## India to Host Commonwealth Games 2030



**Source: IE**

### Why in News?

India is set to host the **centenary edition** of the **Commonwealth Games (CWG) in 2030** , with **Ahmedabad** chosen as the proposed venue, marking a key step in its bid for the **2036 Olympics** .

- India last hosted the CWG in **2010 (Delhi)** .
- India has a **strong CWG record** , finishing **4<sup>th</sup> at Birmingham 2022** .
- The **2026 CWG** will take place in **Glasgow, Scotland** .

### What are Commonwealth Games?

- **About:** CWG is the **world's 2<sup>nd</sup> largest multi-sports event (after Olympic Games )** , bringing together athletes from **71 nations and territories** and celebrating the diversity and unity of the Commonwealth.
- **Evolution:** It was first held in **1930 in Hamilton, Canada** as the **British Empire Games** .
  - The event was known as the **British Empire and Commonwealth Games in 1954** , before being renamed the **Commonwealth Games** from **1978 onwards**.
- **Governing Body:** **Commonwealth Games Federation (CGF)** is responsible for the **direction and control** of the Games.
- **Purpose and Values:** It is held **once every 4 years** and is often referred to as the **Friendly Games**, reflecting the core values of **Humanity, Equality, and Destiny** .
  - It promotes **sports, education, and recreation** while celebrating the Commonwealth's **cultural and linguistic diversity** .

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## ‘Commonwealth’

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- **About:** It is a **voluntary association of 56 independent and equal countries** , representing a population of **2.7 billion people** , with shared goals of **development, democracy, and peace** .
- **Historical Genesis:**
  - **Imperial Conference (1926):** UK and Dominions agreed to be **equal members within the British Empire** , owing allegiance to the monarch but retaining autonomy.
  - **London Declaration (1949):** Established the **Modern Commonwealth of Nations** , allowing republics and non-British monarchies to join.
- **Membership:** Composed of **56 independent countries** , most formerly British colonies. Membership is **voluntary** , and any country can join; **Gabon and Togo** joined in **2022** .
- **Values and Governance:** It is guided by the **Commonwealth Charter** , promoting **development, democracy, and peace** , with the **Commonwealth Secretariat** in London supporting member states in achieving these goals.
- **India and the Commonwealth:** India is the **largest Commonwealth member by population** and the **4<sup>th</sup> largest financial contributor** .
  - It has hosted the **Commonwealth Summit (1983)** and the **Commonwealth Games (2010)** in New Delhi.

# Frequently Asked Questions (FAQs)

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## 1. What are the Commonwealth Games?

The Commonwealth Games are a quadrennial multi-sport event for athletes from 71 Commonwealth nations and territories, promoting sports, cultural diversity, and unity.

## 2. When and where were the first Commonwealth Games held?

The inaugural Games took place in 1930, Hamilton, Canada, as the British Empire Games.

## 3. What is the Commonwealth of Nations?

The Commonwealth is a voluntary association of 56 independent countries, mostly former British colonies, promoting development, democracy, and peace through cooperation.

[Watch Video on YouTube:

▶ <https://www.youtube.com/embed/qk7ltADjbs>

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# UPSC Civil Services Examination, Previous Year Question (PYQ)

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**Q.** Consider the following statements in respect of the Laureus World Sports Award which was instituted in the year 2000: **(2021)**

1. American golfer Tiger Woods was the first winner of this award.
2. The award was received mostly by 'Formula One' players so far.
3. Roger Federer received this award maximum number of times compared to others.

Which of the above statements are correct?

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

Ans: (c)

# International Snow Leopard Day



## Source: PIB

India marked **International Snow Leopard Day** with the **'#23for23'** campaign to raise awareness about **snow leopard conservation**.

- In 2024, the **United Nations** designated **23 rd October as International Snow Leopard Day** to promote cooperation for snow leopard conservation and ecosystem protection.
- **#23for23:** The campaign, initiated by the **Global Snow Leopard and Ecosystem Protection Program (GSLEP)** and the **Snow Leopard Trust worldwide**, to dedicate 23 minutes of physical activity for honouring the snow leopard.
- **Snow Leopard:** The **snow leopard (*Panthera uncia*)**, often called the **'ghost of the mountains'**, is an elusive big cat found across high mountain regions of Asia, including India, Nepal, Bhutan, China, and several Central Asian countries.
  - It is **ecologically significant** and listed under **Appendix I of CITES**, and **Convention on the Conservation of Migratory Species of Wild Animals**.
  - It is classified as **Vulnerable by IUCN (2017)**, the species faces major threats from **habitat loss, prey depletion, poaching, illegal trade, and climate change**.
  - They are **solitary animals**, prefer elevations between **3,000 to 4,500 meters**. They breed seasonally, with a **gestation period of 90-100 days**.
- Despite being called the snow 'leopard', they're **genetically more closely related to tigers** than they are leopards.
- **India's Conservation Measures:** The **Snow Leopard Population Assessment (SPA)** reports **718 snow leopards in India, with 477 in Ladakh**, marking the first scientific population survey in the Indian Himalayas.
  - It is listed as **Schedule I species as per Wildlife (Protection) Act, 1972**.



[Read more: Snow Leopard](#)

## International Convention Against Doping in Sport



**Source: PIB**

At the **10<sup>th</sup> Session of the Conference of Parties (COP10)** to the **International Convention against Doping in Sport**, held at **UNESCO Headquarters, Paris**, India was **re-elected as Vice-Chairperson** of the **Bureau for the Asia-Pacific** for the **2025-2027 term**.

## International Convention Against Doping in Sport

- **About:** It is a **UNESCO multilateral treaty** adopted on **19<sup>th</sup> October 2005** to prevent and eliminate

**doping in sport** , entering into force on **1<sup>st</sup> February 2007** .

- It has been **ratified by 192 States Parties** (including India), making it UNESCO's **2<sup>nd</sup> most ratified treaty (Most ratified : World Heritage Convention, 196 States Parties)** .
- **Objective:** It is the only **legally binding international instrument** designed to **harmonize and strengthen national and global measures** to prevent and eliminate **doping in sport** , ensuring a **level and safe playing field** .
- **Governance:** **COP** is the **sovereign body** , meeting **biennially** . It is responsible for the **Convention's implementation, evolution, and monitoring compliance** by **States Parties** .
- **Financial Mechanism:** The **Fund for the Elimination of Doping in Sport** provides **financial support** , having invested over **USD 5 million** in more than **200 projects** across **120+ countries** since 2008 for **education, awareness, and capacity building**
- **Educational Role:** The **Convention** promotes the **Values Education through Sport (VETS) programme** , which uses **sport** as a tool for **active learning** and to teach **cross-curricular values** , reinforcing the **ethical foundation** of the **anti-doping effort** .

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## National Anti-Doping Agency

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- **NADA** , established in 2005 as a **registered society under the Societies Registration Act of 1860** , is tasked with promoting **dope-free sports in India** .
  - NADA **plans, implements, and coordinates** the country's **anti-doping activities** in accordance with the **World Anti-Doping Agency (WADA) code and regulations** .
- The **National Anti-Doping Act, 2022** provides **legal authority** to NADA for **regulating anti-doping activities in sports** and implementing the **UNESCO International Convention against Doping in Sport** .
  - The **National Anti-Doping (Amendment) Act, 2025** has further strengthened this framework by enhancing enforcement mechanisms, ensuring greater accountability, and aligning India's anti-doping regime with evolving global standards.

**Read More: Doping**

# Kashmir's First Chrysanthemum Garden



Source: IE

**Jammu and Kashmir (J&K)** has launched its first **chrysanthemum garden** as part of efforts to **extend the Valley's tourist season beyond spring** , transitioning from **tulips (Gul-e-Lala)** to **chrysanthemums (Gul-e-Dawood)** .

- It is situated at **Cheshma Shahi** , between **Zabarwan mountains** and **Dal Lake** , adjacent to Srinagar's **Tulip Garden** .

## Chrysanthemum (Dendranthema Grandiflora)

- **About:** It is a **perennial herbaceous plant** belonging to the **Asteraceae family** , popularly known as the " **Queen of the East** ". It is **native to East Asia and Europe** and is the **national flower of Japan** .
- **Commercial Importance:** It is a major **ornamental crop** cultivated primarily for **cut flowers, loose flowers, and pot plants** .
- **Climate & Soil Requirements:**
  - **Climate:** Thrives in **tropical and subtropical climates** . The optimal **temperature range** is **20-28°C during the day** and **15-20°C at night** .
  - **Soil:** Prefers a **well-drained red loamy soil** .



Read More: [Revival of Lotus in Wular Lake](#)