



Decline of Saffron Production in Kashmir

For Prelims: [Saffron](#), [Geographical Indication \(GI\) Tag](#), North East Center for Technology Application and Reach.

For Mains: Government Policies & Interventions, Saffron Cultivation and its Importance.

Source: DTE

Why in News?

The [Saffron fields of Kashmir](#), known for producing the **world's costliest spice**, are facing a severe crisis due to the **encroachment of cement factories**.

- Despite ranking as the **second-largest saffron producer globally**, with an average annual production of 11-12 tonnes, after **Iran**, the region's saffron industry is weakening, presenting economic challenges for local farmers.

What Factors Contribute to the Decline in Saffron Production?

- **Proximity to Cement Factories:**
 - Cement factories in close proximity to saffron fields emit **large volumes of dust**, damaging both **quality and quantity** of saffron yield.
 - Saffron fields in Pulwama, have witnessed a **60% decline in cultivation in the last 20 years due to cement pollution**.
- **Impact of Cement Dust:**
 - Delicate **saffron flowers are adversely affected by cement dust** containing harmful gasses like [nitrogen oxides](#), [sulphur dioxide](#), and [carbon monoxide](#).
 - Large volumes of cement dust also results in **decreased chlorophyll**, clogged **stomata** (tiny pores in plant tissue that allow for gas exchange) in leaves, interrupted light absorption and gas diffusion, inducing **early leaf fall and resulting in stunted growth**.
 - Cement dust negatively impacts **crocin responsible for the color of saffron) content, affecting color, medicinal properties, and cosmetic benefits of Kashmiri saffron**.
- **Environmental Factors:**
 - **Climate change**, unexpected rainfall, and land diversion for housing and industries contribute to reduced saffron production.
 - Usage of machines for ploughing also affects saffron cultivation, which is highly dependent on a favorable climate.
- **Lack of Government Intervention:**
 - Farmers have **resisted the establishment of cement factories** near saffron fields since 2005, citing environmental concerns.
 - Despite protests and appeals, authorities have permitted cement industries to operate in close proximity to saffron cultivation.
- **Market Challenges:**
 - Saffron farmers face financial difficulties as the **spice's market becomes less lucrative**.

- Farmers express concern over declining prices, quantity, and quality, leading to a bleak future for the industry.

What are the Key Facts About the Kashmiri Saffron?



▪ Saffron Production and Price:

- Saffron production has long been restricted to a limited geographical area in the Union territory of Jammu & Kashmir.
 - **Pampore region**, in India, commonly known as **Saffron bowl of Kashmir**, is the main contributor to saffron production.
- The saffron spice, extracted from the **stigma (male reproductive part)** of the saffron flower (***Crocus sativus L.***), is known as kong in Kashmiri, zaffran in Urdu, and kesar in Hindi.
 - Kashmiri kesar is highly valued, selling at Rs 3 lakhs per kilogram.
 - A gram of kesar is obtained from approximately 160-180 flowers, requiring extensive labor.

▪ Season:

- In India, saffron Corms (seeds) are cultivated during the **months of June and July** and at some places in **August and September**.
- It starts flowering in October.

▪ Cultivation Conditions:

- **Altitude:** Saffron grows well at an **altitude of 2000 meters above sea level**. It needs a photoperiod (**sunlight**) of **12 hours**.
- **Soil:** It grows in many different soil types but thrives best in calcareous (soil that has calcium carbonate in abundance), **humus-rich and well-drained soil** with a pH between 6 and 8.
- **Climate:** For saffron cultivation, we need an explicit **climatological summer and winter** with temperatures ranging from no **more than 35 or 40°C** in summer to **about -15 or -20°C in winter**.
- **Rainfall:** It also requires adequate rainfall that is **1000-1500 mm per annum**.

▪ Crocin Content and Color:

- **Kashmiri kesar contains 8% of crocin**, while the rest of the varieties contain 5-6% of the element.

▪ Benefits of Kashmiri Saffron:

- It is known for **medicinal properties** such as lowering blood pressure, treating anemia, migraines, and aiding insomnia.
- Possesses **cosmetic benefits**, enhancing skin quality, reducing pigmentation, and minimizing spots.
- Integral part of **traditional dishes** and it is widely used in beverages, confectionery, dairy products, and food coloring.

▪ Recognition:

- In 2020, the central government granted a [Geographical Indication \(GI\) certification](#) to saffron grown in the Kashmir Valley.
- Saffron Heritage of Kashmir is one of the [Globally Important Agricultural Heritage systems \(GIAHS\)](#).
 - GIAHS are agroecosystems where communities maintain a close relationship with their territories. These resilient sites, marked by **agrobiodiversity, traditional knowledge, and sustainable management**, involve farmers, herders, fisherfolk, and forest people, contributing to livelihoods and food security.
 - The [Food and Agriculture Organization](#) of the [United Nations](#) has recognized over 60 such sites worldwide through its GIAHS Programme.

Initiatives in India to Promote Saffron Production

- **National Saffron Mission:**
 - The NSM was launched in 2010-11 to support the cultivation of saffron in Jammu and Kashmir. The mission was part of the [Rashtriya Krishi Vikas Yojana \(RKVY\)](#) and aimed to improve the socio-economic status of the people living in Kashmir.
- **North East Centre For Technology Application and Reach (NECTAR):**
 - It is an autonomous body under the **Department of Science & Technology**, Government of India supported a pilot project to explore the feasibility of **growing saffron in the North East region of India**, with the same quality and higher quantity.

Way Forward

- Implement and enforce **strict environmental regulations** to mitigate the impact of cement factories on saffron fields.
 - Ensure regular **monitoring and penalties for industries** contributing to pollution near saffron cultivation areas.
- Facilitate **collaboration between the government and saffron growers** to address concerns and find sustainable solutions.
- Support initiatives for **diversifying the livelihoods of saffron farmers**, offering alternative sources of income.
- Allocate funds for **research and development** in saffron cultivation, focusing on creating varieties resilient to environmental challenges.
 - Invest in **technology** that minimizes the impact of pollutants on saffron crops, ensuring sustainable growth and maintaining quality.

UPSC Civil Services Examination Previous Year Question (PYQ)

Q. The FAO accords the status of 'Globally Important Agricultural Heritage System (GIAHS)' to traditional agricultural systems. What is the overall goal of this initiative? (2016)

1. To provide modern technology, training in modern farming methods and financial support to local communities of identified GIAHS so as to greatly enhance their agricultural productivity.
2. To identify and safeguard eco-friendly traditional farm practices and their associated landscapes, agricultural biodiversity and knowledge systems of the local communities.
3. To provide Geographical Indication status to all the varieties of agricultural produce in such identified GIAHS.

Select the correct answer using the code given below:

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

ISRO Tests Polymer Electrolyte Membrane Fuel Cell

[Source: TH](#)

Why in News?

The [Indian Space Research Organisation \(ISRO\)](#) successfully tested a **100 W class Polymer Electrolyte Membrane Fuel Cell (PEMFC) based Power System** aboard the orbital platform, **POEM3**.

What are the Major Takaways from the Recent PEMFC Test?

- **Technology Tested:** ISRO tested a **100-watt class PEMFC**, which **converts hydrogen and oxygen into electricity, water, and heat**. This technology offers several advantages over traditional power sources in space, including:
 - **High Efficiency:** PEMFCs **convert fuel directly into electricity**, resulting in significantly higher efficiency compared to batteries.
 - **Clean Operation:** PEMFCs **produce only water as a byproduct**, eliminating the need for complex waste management systems.
 - The water produced by the PEMFC can be used for onboard consumption or for electrolysis to generate additional oxygen.
- **Test Platform:** The PEMFC was tested in orbital platform, **POEM3**, launched aboard **PSLV-C58** on 1st January, 2024.
 - POEM3 serves as a platform for testing new technologies in space under real-world conditions.
- **Implications for Future Missions:** The successful test of the PEMFC paves the way for several exciting possibilities for future space missions:
 - **Powering the Indian Space Station:** The high efficiency and water production capabilities of PEMFCs make them **ideal for powering the proposed Indian space station**.
 - **Deep Space Exploration:** PEMFCs can provide **a reliable and sustainable source of power** for long-duration missions to deep space destinations like Mars.

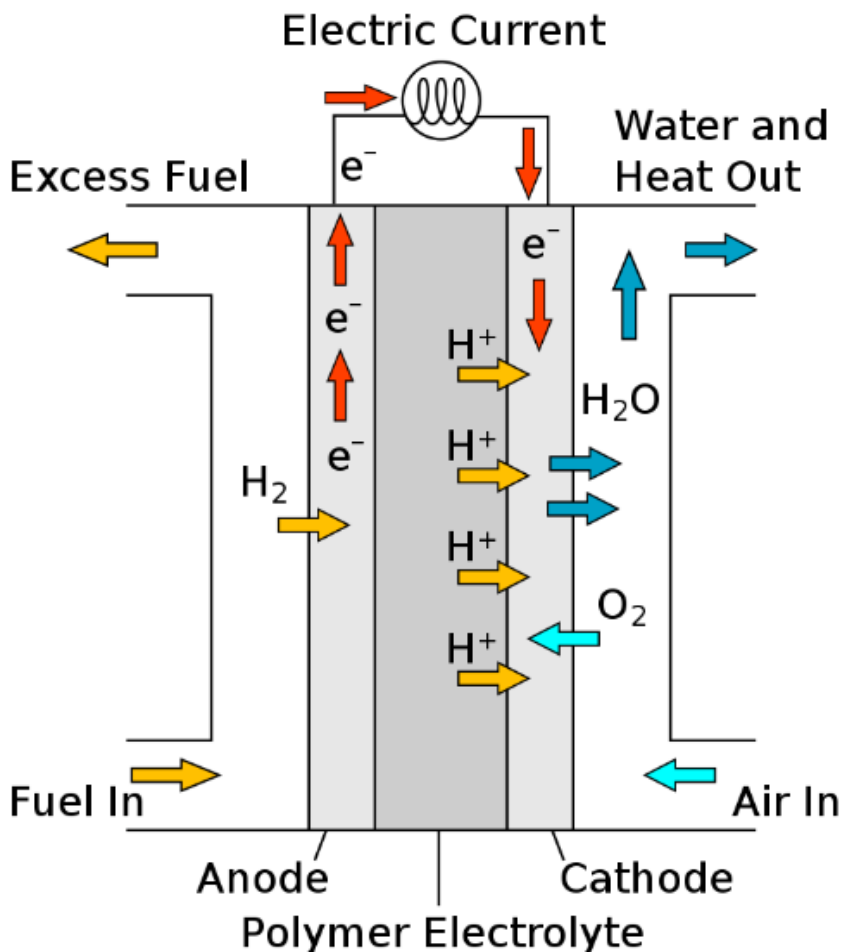
Note

ISRO also noted that it has qualified **10 Ah Silicon-Graphite anode based high energy density Li-ion cells** as a low weight and low cost alternative to present cells being used.

What is a Fuel Cell?

- **About:** A **fuel cell** is an **electrochemical device** that converts the chemical energy of a **fuel (like hydrogen) and an oxidant (like oxygen)** directly into electricity.
 - Unlike batteries, which store chemical energy that gets converted to electrical energy, fuel cells continuously **produce electricity as long as they are supplied with fuel and oxidant**.
- **Major Types of Fuel Cells:**
 - **Polymer Electrolyte Membrane Fuel Cells:** They use a **thin, solid polymer membrane as the electrolyte** and are well-suited for portable applications.

- **Solid Oxide Fuel Cells (SOFCs):** SOFCs use a **ceramic electrolyte** that can operate at high temperatures. They are highly efficient but are more expensive and complex than PEMFCs.
- **Alkaline Fuel Cells (AFCs):** AFCs use a **liquid electrolyte made of potassium hydroxide (KOH)**. They are less efficient than PEMFCs and SOFCs but are less expensive and can be more tolerant of impurities in the fuel.



▪ Applications of Fuel Cells:

- **Transportation:** Fuel cells can be used to power [electric vehicles](#), **boats**, and **even airplanes**.
 - Fuel cells can also power space missions, providing electrical power for spacecraft, and a dependable energy source for long-duration missions.
 - Highly efficient with [zero emissions](#), making them ideal for space missions
- **Portable Power:** Fuel cells can be used to power laptop computers, cell phones, and other portable devices.
- **Stationary Power:** Fuel cells can be used to power homes, businesses, and even entire cities.

UPSC Civil Services Examination Previous Year Question (PYQ)

Q. Hydrogen fuel cell vehicles produce one of the following as “exhaust” (2010)

- (a) NH₃
- (b) CH₄
- (c) H₂O
- (d) H₂O₂

Ans: (c)

US Religious Freedom Designations

[Source: TH](#)

Why in News?

The United States Secretary of State recently declared a **list of countries designated as "Countries of Particular Concern(CPCs)", 'Special Watch List (SWL)' countries and 'Entities of Particular Concern(EPCs)'** due to **violations of religious freedom.**

What are the US Religious Freedom Designations?

▪ About:

- The [United States Commission on International Religious Freedom \(USCIRF\)](#) recommends countries to the Secretary of State for designation as CPCs.
 - The US acknowledges ongoing religious freedom violations in countries not officially designated. Governments are urged to **halt abuses such as attacks on religious minorities**, communal violence, prolonged imprisonments for peaceful expression, transnational repression, and calls to violence against religious communities.

Note

- Earlier, the [USCIRF in its 2023 report](#), **designated India as a CPC, citing severe violations of religious freedom** against various religious minorities, **especially Muslims, Christians, and Dalits.**
 - The report also criticized some of the laws and policies of the Indian government, such as the [Citizenship \(Amendment\) Act, 2019](#), the [National Register of Citizens \(NRC\)](#), as well as the alleged harassment, violence, and discrimination faced by religious dissenters and activists.
- The **Indian government rejected the report** as 'biased and motivated'. The government also defended its commitment to protect and promote the rights and freedoms of all its citizens, regardless of their faith.
- **Criteria for the Designation:**
 - The US emphasizes that **promoting the freedom of religion or belief** has been a **fundamental goal of US foreign policy** since the enactment of the **International Religious Freedom Act (IRFA) in 1998.**
 - **Criteria for Designation of Countries in Different Categories**
 - **CPCs:** When the governments of the countries engage in or tolerate "systematic, ongoing, and egregious violations" of the right to freedom of religion or belief under IRFA 1998.
 - **SWL:** It is based on the governments' perpetration or toleration of severe religious freedom violations.
 - **EPCs:** For systematic, ongoing, and egregious religious freedom violations.
 - **Countries Designated for Religious Freedom Violations in 2024:**
 - **Countries of Particular Concern:**
 - The designated countries include China, North Korea, Pakistan, Cuba, Eritrea, Iran, Nicaragua, Russia, Saudi Arabia, Tajikistan, Turkmenistan, and Myanmar.
 - **Special Watch List Countries:**
 - Algeria, Azerbaijan, the Central African Republic, Comoros, and Vietnam are labeled as "Special Watch List countries".

- **Entities of Particular Concern:**

- Terrorist organizations such as al-Shabab, Boko Haram, Hayat Tahrir al-Sham, the Houthis, ISIS-Sahel, ISIS-West Africa, al-Qa'ida affiliate Jamaat Nasr al-Islam wal-Muslimin, and the Taliban are designated as "Entities of Particular Concern."

State of Freedom of Religion

- **India:**

- The **Indian Constitution's Articles 25-28 guarantee freedom of religion as a fundamental right.** The Constitution also states that India is a secular state and does not declare any religion as the country's official religion.
 - [Article 25](#) (**Freedom of conscience and free profession, practice and propagation of religion**).
 - [Article 26](#) (**Freedom to manage religious affairs**).
 - [Article 27](#) (**Freedom as to payment of taxes for promotion of any religion**).
 - [Article 28](#) (**Freedom as to attendance at religious instruction or religious worship in certain educational institutions**).
- Further, [Article 29 and 30 of the Constitution](#) deal with the protection of interests of minorities.

- **Globally:**

- **Article 18 of the Universal Declaration of Human Rights** affirms that, "Everyone has the right to **freedom of thought, conscience and religion**; this right includes freedom to change his religion or belief, and freedom, either alone or in community with others and in public or private, to manifest his religion or belief in teaching, practice, worship and observance."

Nanoplastic Contamination in Bottled Water

The latest United States study reveals an alarming reality about **bottled water**, uncovering the presence of hundreds of thousands of **nanoplastic particles** underscoring potential **health risks**.

- Each liter of bottled water contains **110,000 to 370,000 nanoplastic particles**. About **90% of these particles are nanosized, posing a higher risk to human health**.
- Nanoplastics are even smaller than [microplastics](#), ranging below 1 micrometer in size.
 - Unlike microplastics (ranging between 5 millimeters and 1 micrometer), nanoplastics can move from the intestines and lungs **directly into the bloodstream** before reaching the heart and brain.
- The study found that common [plastics](#) in bottled water such as polyamide, polypropylene, polyethylene, polyvinyl chloride, polyethylene terephthalate (PET) could play a significant role in micro-nano plastics exposure from bottled waters.
 - PET used in **disposable beverage bottles could leach into water** when exposed to heat or squeezed.

Read more: [Impact of Microplastics on Gut Microbiomes](#)

High Court Nod: Yakshagana Mela Reinstates All-Night Shows

The over-a-century old **Yakshagana mela**, the **Kateel Durgaparameshwari Prasadita Yakshagana Mandali**, in **Dakshina Kannada** will revert to all-night shows from 14th January, 2024 after the High Court of Karnataka gave the go-ahead, subject to adherence to **Noise Pollution (Regulation and Control) Rules, 2000**.

- Yakshagana is a dance-drama **performance unique to Karnataka**. It traditionally featured men portraying all roles. But, **women are now part of these troupes**.
- Key elements include episodic stories from Hindu epics like **Ramayana or Mahabharata**.
 - Musical instruments like **Chande, Harmonium, Maddale, Taala**, and flute accompany these performances.
- Various renowned troupes such as **Saligrama Mela, Dharmasthala Mela, and Mandarthi Mela** showcase Yakshagana throughout the year.



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