

## 1. 2023 Nobel Prize on Behaviour of Nanoparticles'

### Introduction: Understanding Elemental Properties

Every element possesses distinct properties based on its atomic structure, with these properties remaining consistent regardless of an element's size.

### Nanoparticles' Anomalous Behavior

Over four decades ago, scientists discovered that nanoparticles exhibit behavior which is distinct from their larger counterparts. This phenomenon challenged the fundamental principles of chemistry.

### Pioneers of Nanoparticles' Behaviour Research

**Alexei Ekimov's Discovery (1980):** Ekimov, while in the USSR, first observed the deviant behavior in Copper Chloride nanoparticles and succeeded in manufacturing them. However, his findings remained relatively unknown globally.

**Louis Brus's Independent Findings:** Brus, an American scientist, independently discovered similar behavior in Cadmium Sulphide nanoparticles. He also created nanoparticles with altered properties.

**Moungi Bawendi's Contributions:** Working with Brus initially, Bawendi developed more efficient methods for producing nanoparticles with desired properties.

### Nobel Prize Recognition

In 2023, Ekimov, Brus, and Bawendi were awarded the Nobel Prize in Chemistry for their groundbreaking research, conducted several decades ago, which revolutionized the field of nanoparticles.

### Applications of Nanoparticles

The research conducted by these Nobel laureates has led to the integration of nanoparticles with unique properties into modern appliances, such as television screens, computer displays, and LED lamps, as well as various applications in biochemistry and medicine.

### Quantum Effects and Nanoparticles

**Understanding Quantum Effects:** Quantum effects govern the behavior of very small particles, including electrons, leading to emergence of unconventional properties not observed in everyday objects.

Nanoscale Confinement and Quantum Effects: When particle size is reduced to the nanoscale, electrons experience confinement in a limited space, which gives rise to quantum effects.

### **Quantum Dots: The Result of Quantum Effects**

Ekimov and Brus harnessed these quantum effects to create nanoparticles with unique properties, naming them "quantum dots."

### **Distinctive Properties of Quantum Dots**

One of the most notable properties of quantum dots becomes apparent when they interact with light. The size of quantum dots influences the wavelengths of light they absorb or reflect, affecting the color of the material.

### **Conclusion: Transformative Impact of Nanoparticle Research**

The pioneering work of Ekimov, Brus, and Bawendi on nanoparticles and quantum effects has not only expanded our understanding of particle behavior but has also paved the way for practical applications across various industries.

Relevance: GS Prelims & Mains Paper III; Science & Technology

Source: The Indian Express and The Hindu

## **2. Punjab's Decision to Ban PUSA-44 Paddy Variety**

### **Introduction: Ban on PUSA-44 Paddy Variety**

Punjab Chief Minister Bhagwant Singh Mann recently declared a ban on the cultivation of the PUSA-44 paddy variety starting from the next year. This decision raises questions about why the state is taking this action, especially when this variety was previously highly favored by Punjab's farmers.

### **Origin and Popularity of PUSA-44**

Development of PUSA-44: PUSA-44 was created in 1993 by the Indian Council of Agricultural Research (ICAR) in Delhi. Initially, Punjab's farmers adopted it in limited areas.

Widespread Adoption: Due to its impressive yield, Punjab's farmers expanded the cultivation of PUSA-44, making it dominant in paddy farming, covering 70 to 80% of the total paddy cultivation area in the state.

### **Yield Comparison**

High Yield of PUSA-44: Farmers reported a significantly higher yield with PUSA-44, producing nearly 85 to 100 quintals per acre, compared to 28 to 30 quintals per acre from other paddy varieties.

Impact on Income: The higher yield meant increased income for farmers, potentially adding Rs 15,000 to 22,000 per acre, considering the Minimum Support Price (MSP) for paddy.

### **Reasons for Punjab's Decision**

Long Duration Variety: PUSA-44 has an extended growth period, taking around 160 days to mature, which is significantly longer than other varieties. This requires more irrigation cycles, straining Punjab's already depleted groundwater.

Water Scarcity: Punjab faces severe groundwater depletion, with many areas declared 'dark zones' where groundwater levels have dropped substantially.

Stubble Burning: PUSA-44 exacerbates the issue of stubble burning. Its late harvest in October leaves farmers with limited time for proper stubble disposal before sowing winter crops, contributing to air pollution.

Stubble Quantity: PUSA varieties generate around 2% more stubble than shorter-duration varieties, compounding the stubble burning problem.

### **Conclusion: Balancing Agriculture and Environmental Concerns**

The ban on PUSA-44 paddy variety in Punjab stems from the need to address water scarcity, reduce stubble burning, and balance agricultural practices with environmental sustainability. While it may impact farmers' income, it aims to ensure a more responsible and sustainable approach to farming in the state.

Relevance: GS Prelims & Mains Paper III; Environment

Source: The Indian Express

## **3. Sarakka Tribal University in Telangana approved**

### **Introduction: Sarakka Central Tribal University**

The Union cabinet recently approved the establishment of the Sarakka Central Tribal University in Telangana, to be located in the Mulugu district with a budget of Rs 889 crore. This move fulfills a commitment made under the Andhra Pradesh Reorganisation Act, 2014, wherein both Andhra Pradesh and Telangana were to receive support for establishing tribal universities.

### **The Legend of Sammakka and Sarakka**

Historical Background: Sammakka was married to Pagididda Raju, a feudal chief of the Kakatiya dynasty ruling the Warangal region. She had two daughters and a son: Sarakka, Nagulamma, and Jampanna, respectively.

Sammakka Saralamma Jatara: The biennial Sammakka Saralamma Jatara festival in Mulugu commemorates the 13th-century mother-daughter duo's battle against local rulers over tax impositions on the Koya tribe. The event is among the world's largest tribal gatherings.

### **Evolution of the Festival**

Historical Footfall: Initially attended by around 2,000 Koya tribe members until 1955, the festival has grown exponentially.

A Hindu Religious Festival: The Sammakka Saralamma Jatara has transformed into a major Hindu religious festival, rivaling the Kumbh Mela in terms of devotee attendance. The festival now attracts around 1.5 crore devotees from diverse tribal and non-tribal communities, including neighboring states like Andhra Pradesh, Madhya Pradesh, Chhattisgarh, Odisha, Maharashtra, Karnataka, and Jharkhand.

Demographic Snapshot: Mulugu, a reserved Scheduled Tribes (ST) assembly seat, has a population of around 2.6 lakhs with a significant 75% ST population. Additionally, the UNESCO World Heritage Site of Ramappa Temple is located nearby.

### **Conclusion: Cultural Significance and Educational Investment**

The Sammakka-Sarakka festival in Telangana not only holds cultural and religious importance but also serves as a catalyst for socio-economic development in the region. The establishment of the Sarakka Central Tribal University adds another layer of significance to this historical and vibrant area.

Relevance: GS Prelims & Mains Paper I; Social Issues

Source: Indian Express

## **4. Narges Mohammadi: The 2023 Iranian Nobel Peace Prize Winner**

### **Introduction: Nobel Prize for Peace**

The Norwegian Nobel Committee recently honored Iranian activist Narges Mohammadi with the 2023 Nobel Prize for Peace. She was recognized for her unwavering dedication to fighting for women's rights in Iran and her tireless efforts to promote human rights and freedom for all.

### **Early Life and Activism**

Birth and Background: Born in 1972 in Iran, Narges Mohammadi's journey into activism began with the Iranian Revolution in 1979, which saw the transition of Iran to an Islamic republic.

**Early Influences:** Two childhood memories played a pivotal role in shaping her activism: her mother's prison visits to her brother and watching TV announcements of daily prisoner executions.

**Education and Family:** Mohammadi studied nuclear physics in Qazvin and met her future husband, Taghi Rahmani, who was also politically active. He was later imprisoned for 14 years in Iran and now resides in France with their two children.

### **Activism and Challenges**

**Advocacy Areas:** Mohammadi has been involved in various causes, including advocating for women's rights, opposing the death penalty, and protesting harsh sentences for political activists. She has also written about these issues in local newspapers.

**Professional Setbacks:** While working as an engineer in Tehran, she faced dismissal at the government's behest.

**Center for Human Rights Defenders:** In the 2000s, she joined the Center for Human Rights Defenders in Iran, founded by lawyer Shirin Ebadi, which aimed to abolish the death penalty.

### **Multiple Arrests and Sentences**

**Judicial Confrontations:** Mohammadi has had numerous encounters with the Iranian judiciary. She has been arrested 13 times, convicted five times, and sentenced to a total of 31 years in prison and 154 lashes.

**Prison Activism:** Even while incarcerated, she continued to organize protests against the government alongside fellow women prisoners.

**'White Torture':** In 2022, while briefly at home after a heart attack and surgery, she authored the book 'White Torture,' providing insights into life under solitary confinement and featuring interviews with other Iranian women who endured similar punishment.

### **Recognition and Awards**

**International Accolades:** Mohammadi's advocacy work has earned her recognition and awards in the West, including the 2023 PEN/Barbey Freedom to Write Award, the 2023 UNESCO/Guillermo Cano World Press Freedom Prize, and a spot in the BBC's list of 100 inspiring and influential women from around the world in 2022.

### **Comparison to Nobel Laureate Shirin Ebadi**

Shirin Ebadi's Nobel Prize: Narges Mohammadi follows in the footsteps of Shirin Ebadi, the first Iranian woman to win the Nobel Peace Prize. Ebadi received the honor for her efforts in promoting democracy and human rights.

Nobel Peace Prize Role: Ebadi's Nobel Peace Prize aimed to reduce tensions between the Islamic and Western worlds' following the September 11, 2001, terrorist attack on the United States.

**Conclusion: A Voice for Human Rights**

Narges Mohammadi's unwavering commitment to human rights, particularly women's rights, has earned her international recognition and the prestigious Nobel Peace Prize. Her activism in the face of adversity underscores the importance of individuals like her in advocating for a more just and equal world.

Relevance: GS Prelims; Miscellaneous

Source: Indian Express