



DATE: 9 OCTOBER 2026

1 Stubble Burning (Source: The Hindu)

Stubble burning, also known as parali burning, is the practice of setting fire to leftover crop residue in fields after harvest. This is a prevalent practice in North-West India, particularly in states like Punjab, Haryana, and Uttar Pradesh.

Reasons for Stubble Burning:

- **Quick and Inexpensive Method:** Farmers find it to be a quick and cheap way to clear their fields for sowing the next crop.
- **Lack of Alternatives:** Limited access to or awareness of alternative methods for crop residue management.

Impacts of Stubble Burning:

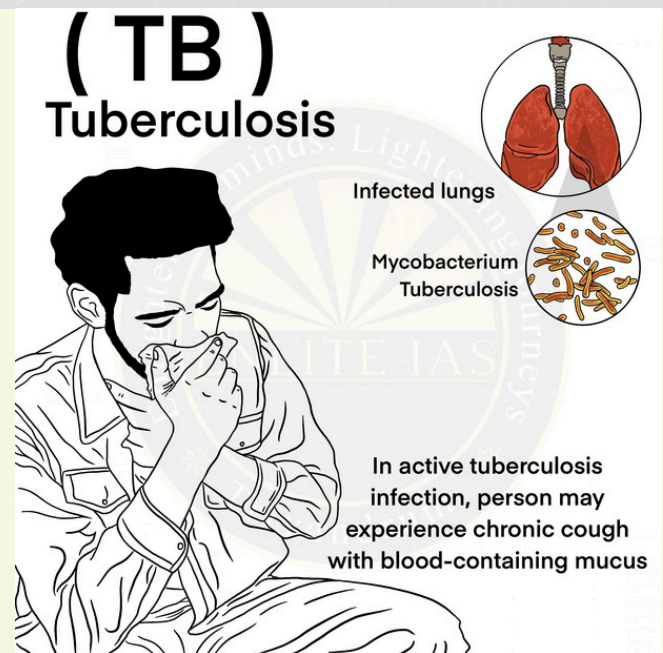
- **Air Pollution:** Stubble burning is a major contributor to air pollution, particularly PM2.5 particles, leading to respiratory problems and health issues.
- **Soil Degradation:** Burning destroys essential nutrients and microbes in the soil, reducing fertility and long-term productivity.
- **Climate Change:** Releases greenhouse gases like carbon dioxide, contributing to climate change.

Government Initiatives:

- **National Policy on Sustainable Agriculture (2015):** Promotes crop residue management practices.
- **Sub-Mission on Agricultural Mechanization (SMAM):** Provides subsidies for machinery like Happy Seeder that can sow seeds directly into the stubble.
- **Financial Incentives:** Schemes to encourage farmers to adopt alternative practices like composting or baling.
- **National Green Tribunal (NGT) Bans:** Imposed bans on stubble burning with penalties for violations.

2 Tuberculosis (Source: The Hindu)

- **Cause:** Bacterium called *Mycobacterium tuberculosis*
- **Affects:** TB most commonly affects the lungs.
- **Transmission:** TB is spread from person to person through the air.
- **Symptoms:** Fever, fatigue, weight loss, persistent cough, blood in cough and night sweats.
- **Treatment:** TB is a treatable and curable disease. It is treated with a standard 6-month course of 4 antimicrobial drugs.



3

Quantum Computing (Source: The Hindu)

Quantum Computing

What is Quantum Computing?

- A next-generation computing paradigm that uses the principles of quantum mechanics to process information.
- Unlike classical computers that use bits (0 or 1), quantum computers use **qubits** which can be in **multiple states** simultaneously.
- Enables solving certain complex problems much faster than classical computers.

Qubits vs Classical Bits

Classical Bit	Qubit
0 or 1	
Can be in one state at a time (0 or 1)	Can be in a superposition of 0 and 1 simultaneously

Key Quantum Principles

- Superposition**
Qubit can be in multiple states at the same time.
- Entanglement**
Qubits can be correlated instantaneously, even over long distances.
- Quantum Interference**
Probabilities of outcomes can be amplified or cancelled to obtain correct solutions.

How Does It Work?

Types of Quantum Computers

- Superconducting qubits**
Most developed; used by IBM, Google.
- Trapped ion qubits**
High stability and long coherence time.
- Photonic quantum computers**
Use photons as qubits; useful for communication.
- Topological qubits**
Experimental; potentially more stable.

Advantages

- Solves certain complex problems much faster (quantum speedup).
- Can handle large, complex datasets.
- Transformative potential in multiple sectors.
- Can solve problems infeasible for classical computers.

Limitations / Challenges

- Highly sensitive to environmental noise (need ultra-cold temperatures).
- High error rates and short coherence time.
- Expensive infrastructure.
- Scaling to large number of qubits is difficult.
- Security risks (can break current encryption methods).

Applications

- Drug and vaccine discovery** (simulating molecules).
- Material science** (new materials, superconductors, batteries).
- Optimisation problems** (logistics, traffic, supply chains).
- Financial modelling** (risk analysis, portfolio management).
- Cryptography** (also a threat to existing encryption).
- Artificial Intelligence and machine learning** (faster training).
- Climate and weather modelling** (more accurate simulations).

Global Initiatives

- United States** – National Quantum Initiative Act (2018).
- European Union** – Quantum Flagship Programme.
- China** – Large investment, quantum communication and computing.
- Japan, UK, Canada, Australia** – National quantum strategies.
- Private players** – IBM, Google, Microsoft, Amazon (AWS Braket), Intel, startups.

India's Initiatives

- National Quantum Mission (NQM)** – 2023–2031 (outlay ₹6,003 crore).
- Aim:** build quantum computers, quantum communication network, sensors, and develop quantum manufacturing ecosystem.
- Focus on R&D, human resource development, start-ups and international collaboration.

Way Forward

Increase R&D investment.

Develop skilled manpower.

Public-private partnerships.

Develop indigenous technologies.

Strengthen cybersecurity preparedness (post-quantum cryptography).

International collaboration and standard setting.

Support start-ups and innovation ecosystem.