Technologies to Resolve Stubble Burning

Stubble burning, especially in northern India, contributes significantly to air pollution and haze during October and November. Despite government measures, the practice persists due to economic and operational challenges faced by farmers.

Stubble Burning

- Stubble burning is the deliberate setting of fire to crop residue after the harvest, predominantly in Punjab, Haryana, and Uttar Pradesh.
- Farmers burn paddy straw as a quick and economical way to prepare fields for the next crop cycle, especially for wheat sowing.

Reasons for Stubble Burning:

- **Short Crop Cycles:** Limited time between paddy harvest and wheat sowing.
- **Economic Constraints:** High cost of alternative residue management techniques.
- **Lack of Awareness:** Farmers lack knowledge about sustainable practices.
- **Inadequate Mechanization:** Limited availability of crop residue management machinery.
- **Policy Implementation Gaps:** Ineffective enforcement of regulations and insufficient incentives.

Consequences of Stubble Burning:

- **Air Pollution:** Emission of fine particulate matter (PM2.5, PM10), CO2, CO, and other pollutants.
- **Health Hazards:** Increased respiratory diseases and reduced visibility.
- **Soil Degradation:** Loss of essential nutrients and organic matter.
- **Climate Impact:** Contributes to greenhouse gas emissions.
- **Economic Costs:** Burden on public health systems and loss of soil fertility.

Technologies to Resolve Stubble Burning:

Large-Scale Technologies:

- **Direct Combustion:** Burns rice straw in controlled environments to generate heat for cooking and industrial purposes.
- **Pyrolysis and Gasification:** Converts rice straw into syngas or bio-oil with high heating value through controlled heating.
- **Biochar Production:** Produces biochar as a soil conditioner to enhance fertility and reduce greenhouse gas emissions.
- **Power Generation:** Uses biomass-based power plants to convert rice straw into electricity, supporting rural energy needs.
- **Pellet Production:** Compresses rice straw into compact, energy-dense pellets suitable for fuel and easy transportation.

- **Biofuels:** Processes rice straw into bioethanol, biogas, and other renewable fuels, reducing reliance on fossil fuels.
- **Paper Production:** Utilizes rice straw's high cellulose content as a sustainable raw material for pulp and paper production.

Small-Scale Technologies:

- **Composting:** Converts rice straw into nutrient-rich organic compost for agricultural use.
- **Mushroom Cultivation:** Uses rice straw as a substrate for cultivating edible mushrooms, offering a cost-effective farming option.
- **Silica Extraction:** Extracts silica particles from rice straw for use in industrial applications like construction and electronics.
- **Fodder for Ruminants:** Enhances the digestibility of rice straw for use as animal feed through physical or chemical treatments.
- **As an Adsorbent:** Applies rice straw to remove heavy metals and toxins from contaminated water, improving water quality.
- **Soil Incorporation:** Incorporates rice straw into the soil to improve fertility, moisture retention, and aeration.

Conclusion:

Stubble burning remains a significant environmental challenge in India. Sustainable technologies and alternative uses for crop residue, coupled with robust policies and farmer awareness, can mitigate its adverse effects. A multi-stakeholder approach involving farmers, industries, and governments is essential for long-term solutions.

China and Renewable Energy

China, the largest greenhouse gas emitter and a renewable energy leader, plays a pivotal role in global climate action. Reducing its emissions is vital but poses challenges for renewable energy supply chains and global transitions.

China's Status in Solar Power:

- **Global Leader:** China dominates over 80% of global solar panel manufacturing and 60% of wind turbine production.
- **Renewable Growth:** Added 300 GW of renewable energy capacity in 2023, nearly meeting its 1,200 GW renewable energy target six years ahead of schedule.
- **Cost Competitiveness:** Solar PV production costs in China are 10–35% lower than in India, the US, and Europe.

China Paradox:

- **Necessity of Emission Reductions:** Needs to reduce emissions by 66% by 2030 to comply with the Paris Agreement 1.5°C target.
- **Reliance on Fossil Fuels:** Despite renewables growth, coal still generates over half of China's electricity, supporting industries like solar and wind manufacturing.
- **Impact on Global Supply Chains:** Reducing emissions too rapidly could disrupt China's fossil fuel-dependent manufacturing processes, slowing renewable energy deployment globally.

Unique Advantages of China in Renewable Energy:

- **Cost Leadership:** Solar PV manufacturing costs are 10-35% lower than in India, the US, and Europe.
- **Manufacturing Dominance:** Controls over 80% of global solar panel and 60% of wind turbine production.
- **Integrated Supply Chain:** Monopoly across all steps of the solar PV supply chain, from raw materials to finished products.
- **Scale of Production:** Massive industrial scale enabling economies of scale and competitive pricing.
- **Government Support:** Proactive policies and subsidies driving renewable energy growth and exports.
- **Technological Edge:** Advanced manufacturing techniques and extensive R&D in clean energy technologies.

Impact of China's Emission Reductions and Transition to Renewables:

- **Impact on China:**
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    - **Industrial Slowdown:** Rapid fossil fuel phase-out could hinder manufacturing, including renewable energy equipment.

    - **Economic Challenges:** Strain on industries heavily dependent on coal and fossil fuels.

- **Impact on India:**
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    - **Supply Chain Vulnerability:** India's solar module imports (85% from China) could face disruptions, affecting its renewable energy goals.
    - **Rising Costs:** Dependence on Chinese imports makes it vulnerable to cost escalations in solar PV and wind equipment.
- **Impact on the World:**
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    - **Global Renewable Targets:** Reduced Chinese production might delay the global renewable energy tripling target by 2030.
    - **Dependency Risks:** Highlights the need for diversifying supply chains and reducing over-reliance on China for critical technologies.

India's Potential as a Competitor to China:

- **Ambitious Goals:** Aims to achieve 280 GW of solar energy out of 500 GW of renewable capacity by 2030.
- **Domestic Manufacturing Push:** Current annual solar module manufacturing capacity of 15 GW, with plans to scale up.
- **Government Support:** Policies and subsidies to promote renewable energy and reduce import dependence.
- **Geographical Advantage:** High solar insolation and vast land availability for renewable energy projects.

Conclusion:

While China's emission cuts are vital for global climate goals, they pose risks to renewable energy supply chains. Diversifying production and enhancing India's manufacturing capacity are critical to reducing global dependency on China and ensuring a balanced energy transition.

Green World Environment Award 2024

Coal India Limited (CIL), a leading state-owned coal mining corporation, has been conferred the 'Green World Environment Award 2024' in the CSR category.

About Green World Environment Award:

- **Award Significance:** Recognizes organizations for outstanding contributions to environmental sustainability and CSR initiatives globally.
- **Recipient:** Coal India Limited in 2024 for its **Thalassemia Bal Sewa Yojna**, which supports curative treatments for Thalassemia through Bone Marrow Transplants (BMT).
    - **Support:** Thalassemia Bal Sewa Yojna provide financial assistance of up to ₹10 lakh provided for BMT operations across 17 partner hospitals.
- **Presented by:** The Green Organisation at Kensington Palace, London.

About The Green Organisation:

- **Founded:** 1994.
- **Nature:** An independent, non-political, and non-profit group.
- **Objective:** Recognizing, rewarding, and promoting environmental and CSR best practices worldwide.
- **Initiatives:** Includes global awards like the Green World Awards to encourage sustainability and CSR excellence.

About Coal India Limited (CIL):

- **Establishment:** Formed in November 1975.
- **Largest Producer:** World's single largest coal producer and one of the largest corporate employers in India.
- CIL has **seven producing subsidiaries**.
- **Production status:**
    - Produces around 83% of India's overall coal production in India where approximately 57% of primary commercial energy is coal dependent, CIL alone meets to the tune of 40% of primary commercial energy requirement.

Biofloc Technology and Recirculating Aquaculture Systems

India's aquaculture sector has undergone a significant transformation, becoming a global leader in fish production. Innovations like Biofloc Technology (BFT) and Recirculating Aquaculture Systems (RAS) are at the forefront of modern aquaculture practices.

About Biofloc Technology (BFT):

- **What it is:**
  A closed-tank aquaculture method using beneficial bacteria to convert organic waste into microbial biomass for fish consumption.
- **How it works:**
  - Beneficial heterotrophic bacteria convert waste into biomass.
  - Aeration and microbial activity maintain water quality.
  - Reduces reliance on antibiotics and chemicals.

About Recirculating Aquaculture Systems (RAS):

- **What it is:**
  A tank-based farming system that recycles water through mechanical and biological filtration.
- **How it works:**
- Water is filtered to remove waste and pathogens.
  - Provides controlled conditions for temperature, oxygen, and water cleanliness.
  - Ensures biosecurity with reduced need for antibiotics.

Feature	BFT	RAS
	– Cost-effective feed through recycled waste.	– Controlled environment for optimal fish growth.
Advantages	– Reduces chemical and antibiotic use.	– High biosecurity with minimal disease risk.
	– Suitable for small farmers and backyard farming.	– Can be set up in areas without natural water sources.
	– Promotes freshwater conservation.	– Higher production rates compared to traditional systems.
	– High setup cost (~₹4-5 lakh).	– Expensive initial investment and operational costs.

Limitations	– Requires regular monitoring of water quality and microbial growth.	– Constant power supply needed; prone to power outages.
	– Limited success with species like Indian Major Carps in certain regions.	– Requires skilled management and maintenance of advanced systems.

Nigeria Nation

Prime Minister of India has been conferred with the **'Grand Commander of the Order of the Niger'** Award by Nigeria, signifying strong diplomatic ties between the two nations.

- **Also in news:** Nigeria's Borno state experienced severe flooding due to the collapse of the Alau Dam.

NOTE: "Grand Commander of the Order of Niger" is given by Nigeria nation not Niger nation.

About Nigeria:

- **Capital:** Abuja.
- **Location:** West Coast of Africa.
- **Border Nations:** Niger, Chad and Cameroon, Benin and Gulf of Guinea (Atlantic Ocean).
- **Major Plains:** Sokoto Plains (Northwest), Borno Plains (Northeast).
- **Highest Point:** Chappal Waddi.
- **Major Rivers:**
    - **Niger River:** Forms the Niger Delta and drains into the Gulf of Guinea.
    - **Sokoto River**: A significant tributary of the Niger.
- **Major Lake:** Lake Chad shared with Chad, Cameroon, and Niger, this freshwater lake is crucial for regional water resources.

About Alau Dam:

- **Location:** Situated on the **Ngadda River** in Borno State, Nigeria.
- **Purpose:** Built for irrigation, flood control, and water supply to Maiduguri.

El Cajas National Park

El Cajas National Park, located in the highlands of Ecuador near Cuenca, has been severely impacted by wildfires exacerbated by a prolonged and severe drought.

- The Ecuadorian government has **declared a 60-day national emergency to address the raging forest fires**, which threaten not only the park's ecological integrity but also its critical water resources.

About El Cajas National Park:

- **Location:** Highlands of Ecuador, 30 km west of Cuenca in Azuay province.
- **Area:** Spans **285.44 km²** with altitudes between **3100m and 4450m**.
- **Declared:** National Park status granted on **November 5, 1996**.
- **Topography:** Features **páramo vegetation**, jagged hills, valleys, and about **270 lakes and lagoons**, with **Luspa** as the largest lake.
- **Rivers:** The **Tomebamba** and **Yanuncay** rivers originate here, contributing to the **Amazon basin**. Western drainage connects to the **Pacific Ocean**.
- **Highest Point:** Cerro Arquitectos (4450m).