



NEWS ANALYSIS

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BAJIRAO IAS ACADEMY

Q)While poverty eradication is crucial for human development, it often comes at the cost of increased greenhouse gas emissions". Critically analyze this contrast and suggest strategies that can reconcile poverty reduction with climate mitigation efforts.

Poverty, trafficking in Bengal linked to climate change: experts

Shiv Sahay Singh
KOLKATA

Despite interventions by the government and efforts by NGOs, trafficking continues to be a major policy challenge in certain parts of West Bengal. With five tropical cyclones battering the State's coastline since May 2020, experts say climate change is one of the factors pushing people into poverty and driving human trafficking.

"Climate change has become a factor behind human trafficking, especially in vulnerable regions such as the Sundarbans. Back-to-back cyclones – Amphan and Yaas – destroyed livelihoods, forcing increased migration, and exposing women, girls, and others to greater risks," said Nihar Ranjan Raptan, founder secretary, Goran-

bose Gram Bikash Kendra, an NGO working to combat human trafficking.

Mr. Raptan said traffickers exploited socio-environmental vulnerabilities and limited access to essential services. "From our work across districts and parts of the Sundarbans, we see the need to create opportunities and facilitate access to support systems for those in need," he said.

Missing cases

According to the National Crime Records Bureau's latest report, 58,871 people were reported missing from West Bengal in 2022; 53,655 of them were women and 12,455 children. A total of 67 cases of human trafficking were reported with 78 victims in 2022.

Data for the same year show a conviction rate of 55% in human trafficking



Taking cover: Passengers at a railway station in north Kolkata amid heavy rain triggered by Cyclone Dana in October 2024. FILE PHOTO

cases in the State.

Several stakeholders from ILFAT (Integrated Leaders Forum Against Trafficking), one of the biggest federations of trafficking survivors comprising over 2,800 members across seven States, feel that the fight against trafficking should integrate climate

change as a factor for effective interventions.

ILFAT released a report on trafficking on July 30, 2024, World Anti-Human Trafficking Day, which points out that the number of human trafficking cases reported in West Bengal in 2020 was 59. This figure increased to 61 in 2021, and

67 in 2022. In 2022, 60 girls and 18 boys below 18 years were trafficked, it stated.

'Lured with jobs'

Ramadhar Sarthi, an ILFAT member, said climate change triggers disasters, forcing vulnerable communities to migrate and lose their livelihoods.

"This exposes impoverished populations to the risk of exploitation by traffickers as many are lured by promises of better wages. Women and children are particularly at risk during migration from villages to cities, where vulnerability to human trafficking increases," Mr. Sarthi said.

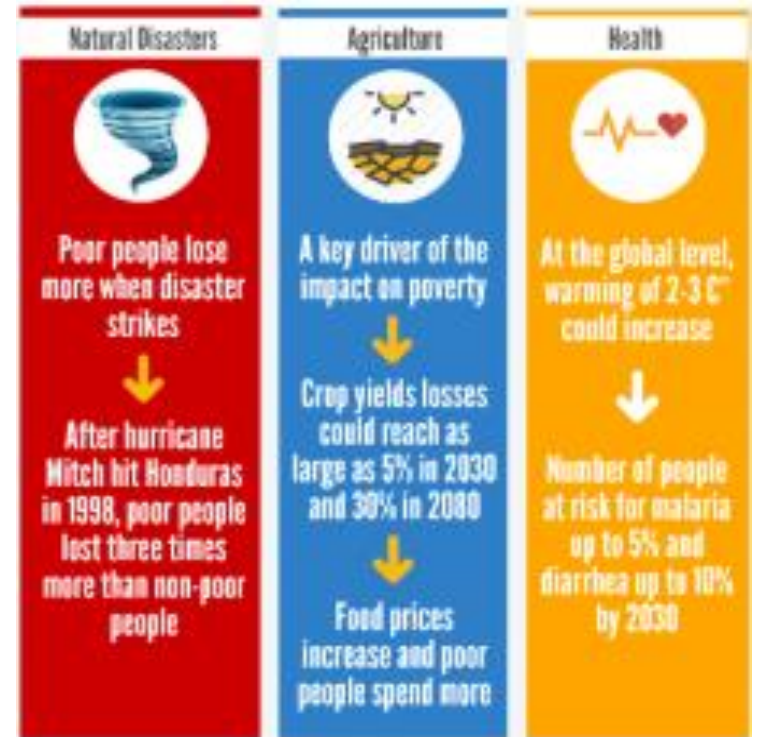
Shakila Khatun Katakhal, director, Katakhal Empowerment Youth Association, said poverty induced by climate change drives human trafficking. "In our collective, Bijoyini, we

have 28 female trafficking survivors from Hasnabad and Hingalganj areas of the Sundarbans. A large number of them were pushed into poverty by climate change," she said.

Neha (name changed), an ILFAT member and trafficking survivor, narrated the turn her life took after Cyclone Amphan in May 2020 ravaged her village in the Sundarbans, and she left with a person who promised her employment in other States.

"When I left, I thought I was going to work. Little did I know I was being sold to another person. The cyclone changed everything for me. It destroyed my future," Ms. Neha said.

She was rescued and now actively works with ILFAT, spreading awareness against trafficking in the Sundarbans.



The paradox of modern development lies in the tension between economic growth for poverty alleviation and the environmental degradation it causes. Balancing poverty eradication with climate goals is the challenge of our century

Poverty eradication and greenhouse gas emissions

1. **Economic growth, vital for poverty reduction**, often involves industrialization, urbanization, and energy-intensive activities that increase GHG emissions.
2. **Consumption patterns**: As poverty declines, increased consumption of energy-intensive products **(like electronics, transport) leads to higher emissions**.
3. **Agricultural dependency**: Many of the global poor rely on climate-sensitive and emission-intensive agricultural practices.
4. **Urbanization and infrastructure development**: Poverty eradication involves building infrastructure, which often leads to emissions due to high use of cement, steel, and transportation

Challenges in aligning poverty reduction with climate mitigation

1. **Industrial dependency:** Poverty alleviation often hinges on emission-heavy industries like manufacturing and construction.
2. **Energy poverty:** Many developing nations rely on fossil fuels to provide affordable energy for the poor, increasing emissions.
 - o E.g.: **India's coal-based power plants** provide roughly 50% of electricity crucial for development but high in emissions.
3. **Short-term development focus:** Countries prioritizing immediate poverty alleviation often overlook long-term environmental impacts, prioritizing quick economic gains over sustainability.
4. **Carbon-intensive development models:** Current models of development, especially in emerging economies, are heavily dependent on fossil fuels for economic growth.
 - o E.g.: **Indonesia's rapid industrialization has reduced poverty** but made it the largest coal exporter, leading to a high carbon footprint.

Strategies to reconcile poverty reduction and climate mitigation

1. **Shifting towards low-carbon economic activities**, such as renewable energy production, can promote both development and sustainability.
2. **Sustainable agriculture**: Promoting climate-resilient agricultural practices (e.g., agroforestry, organic farming) can improve livelihoods without increasing emissions.
3. **Energy transition for the poor**: Expanding access to renewable energy like solar or wind power for low-income communities can improve living standards and reduce emissions.
4. **Climate finance**: Increasing global climate finance to help developing countries implement green infrastructure and clean technology can support both development and emission reductions.
5. **Inclusive global policies**: International cooperation on equitable carbon budgets can ensure that poverty reduction does not hinder climate targets.

GM crop panels

Experts on GM crop panels to declare conflict of interest

Ministry of Environment amends rules governing selection of experts to the Genetic Engineering Appraisal Committee; it calls for details of professional affiliations in past 10 years to be declared

Jacob Koshy
NEW DELHI

The Union Ministry of Environment, Forest and Climate Change has amended the rules governing the selection of experts to the Genetic Engineering Appraisal Committee (GEAC), the apex technical body regulating genetically modified (GM) seeds in India.

Under the new rules, an “expert member” ought to disclose their “interest” that could conflict with their duties. The expert is also expected to take all steps necessary to ensure that any conflict of interest does not affect any decision of the GEAC.

An expert member with any direct or indirect association with a matter being discussed in a meeting of the committee is obliged to disclose this prior to the meeting. Unless specifically requested by the com-



Two judges had ruled differently on whether the Centre was right in according approval to genetically modified mustard. AFP

mittee, the expert is expected to recuse their selves from the meeting. All selected members would also have to fill out a form detailing their professional affiliations to a decade prior to joining the committee.

Split verdict

These rules come on the back of a Supreme Court

order in July 2023 requiring that the Centre form a national policy on GM crops.

In that order of July 2023, the SC delivered a split verdict on the validity of the Centre's 2022 decision granting conditional approval for environmental release of GM mustard crops, thus leaving a final resolution on the release of

the crop to a future Bench.

Two judges ruled differently on whether the Centre was right in according approval to GM mustard.

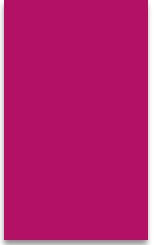
Among the directives that they concurred on was establishing a process for resolving issues around conflict of interest.

As far as the GM case is concerned, the question of such conflict arose following an allegation by an activist group, the Coalition for GM-Free India, in 2013, that one of the members of a Technical Expert Committee appointed by the court, ran an organisation that was funded by Monsanto, a multinational biotech and agricultural pesticides company, and affiliated Indian organisations.

Monsanto has since been bought over by Bayer CropScience Limited, a company with similar interests.

CONTEXT

- ❖ The Union Ministry of Environment, Forest and Climate Change has amended the rules governing the selection of experts to the Genetic Engineering Appraisal Committee (GEAC), the apex technical body regulating genetically modified (GM) seeds in India.

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- ❑ The new rules require that expert members disclose any potential conflicts of interest that may arise due to their professional affiliations, associations, or interests.
 - ❑ This includes both direct and indirect associations with matters discussed during GEAC meetings.
 - ❑ Experts must take necessary actions to ensure that these interests do not affect the committee's decisions.
 - ❑ If an expert has any direct or indirect connection to a matter being discussed, they are obliged to disclose it before the meeting. Unless the committee specifically requests their participation, the expert is expected to recuse themselves from the meeting.
 - ❑ All selected members are required to complete a form detailing their professional affiliations, covering a period of 10 years prior to joining the committee.
 - ❑ This measure is aimed at ensuring transparency and accountability in the selection process.

- ❑ The amendments align with a **July 2023 Supreme Court order**, which required the Centre to formulate a national policy on GM crops.

What are GM Crops?

- ❑ Genetically-modified (GM) crops are plants whose DNA has been altered using genetic engineering techniques to introduce desirable traits that do not naturally occur.
- ❑ These traits can enhance resistance to pests, diseases, or herbicides, and improve crop yields.

GM Crops in India:

- ❑ India permits the import of GM soybean and canola oil.
- ❑ **Bacillus thuringiensis cotton (Bt cotton)** is the only GM crop approved for cultivation in India.
- ❑ For other GM seeds, India had maintained stringent regulations until recent developments.

Understanding DMH-11

Genetically modified mustard, after the GEAC approval seems set to be India's first transgenic food crop

Dhara Mustard Hybrid-11 (DMH-11)

DMH-11 works on the principle of removing male fertility in one parent and restoring it in the offspring

WHO DEVELOPED IT?

Scientist, ex-DU vice-chancellor Deepak Pental developed it in 2007. It had been stuck in the regulatory process after initial approval in 2017

₹70cr cost of the partially govt-funded project

ITS ADVANTAGES: It would bring "better yields, lower costs for farmers", Pental said. It allows for hybridisation of a plant that otherwise self-pollinates (making hybrids next to impossible), leading to high-output hybrids

AND CONCERNS: GM technologies are fiercely resisted, amid fears they may compromise food security, lead to seed monopolies, biosafety hazards. Coalition for a GM-free India called the clearance "shocking", alleging that the "regulator colluded with the developer"



Advantages

- ❖ Genetic Modification is one of the best methods to develop **pest-resistant crops such as Bt crops**.
- ❖ It is **faster to introduce the required traits** than by the conventional breeding process.
- ❖ **Virus-resistant traits** can be introduced into vulnerable plants that lack natural resistance.
- ❖ Plants can be modified to **express tolerance to drought** hence, it reduces the use of groundwater.
- ❖ Genetically modified crops enable farmers to use **more sustainable agricultural practices**, such as no-till farming, which keeps the carbon within the soil rather than in the atmosphere.

Disadvantages

- ❖ **Horizontal gene transfer of pesticide, herbicide, or antibiotic resistance** to other organisms would put not only humans at risk but also cause ecological imbalances by causing the spread of disease among both plants as well as in animals.
- ❖ Pests may acquire resistance to pest-resistant traits such as **Bt toxins produced by the Genetically Modified crop**, which can overcome the efficacy of these crops.
- ❖ Concerns have been raised about the possibility of **GM crops reducing the genetic diversity of neighbouring crops**, close relatives, and weeds.

Develop injectable hydrogel- cancer treatment

Indian researchers develop injectable hydrogel for targeted cancer treatment

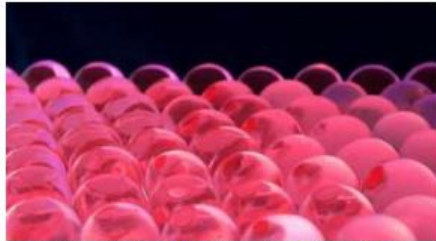
The Hindu Bureau
GUWAHATI

Researchers from the Indian Institute of Technology-Guwahati (IIT-G) and the Bose Institute, Kolkata have developed an advanced injectable hydrogel for localised cancer treatment. A statement issued by the IIT-G said this hydrogel serves as a stable reservoir for anti-cancer drugs, releasing it in a controlled manner while sparing healthy cells from harm.

The findings of the research, expected to be revolutionary for breast cancer therapy, have been published in *Materials Horizons*, a journal of the Royal Society of Chemistry.

The paper is co-authored by Debapratim Das, along with his research scholars Tanushree Das and Ritvika Kushwaha from IIT-G's Department of Chemistry, and Kuldeep Jana, Satyajit Halder, and Anup Kumar Misra from Bose Institute, Kolkata.

"Current treatments,



The hydrogel triggers a controlled drug release directly into the tumour, thus reducing systemic side effects. GETTY IMAGES

such as chemotherapy and surgical interventions, often have several limitations. Chemotherapy's systemic delivery often results in harmful side effects by affecting both cancerous and healthy cells," the researchers said in the statement.

Localised treatment

The team addressed these challenges by designing a hydrogel that delivers drugs precisely to the tumour site, ensuring localised action. Hydrogels are water-based, polymer networks capable of absorbing and retaining fluids. Their unique structure

mimics living tissues, making them suitable for biomedical applications.

The hydrogel, composed of ultra-short peptides is designed to remain insoluble in biological fluids, ensuring it stays localised at the injection site. It responds to elevated levels of glutathione (GSH), a molecule abundant in tumour cells.


"This work exemplifies how scientific innovation can address the pressing needs of cancer treatment. The hydrogel's properties allow it to work harmoniously with the biological environment, offering precision," Prof. Das said.

Context

In a significant breakthrough in cancer therapy, researchers from the **Indian Institute of Technology-Guwahati (IIT-G)** and the **Bose Institute, Kolkata** have developed a **revolutionary injectable hydrogel** designed to deliver anti-cancer drugs directly to tumour sites, offering a safer and more effective alternative to traditional chemotherapy and surgery.

Key Features of the Hydrogel

- ❑ The hydrogel acts as a **stable reservoir for anti-cancer drugs**, releasing the medication in a controlled manner while minimizing damage to healthy cells.
- ❑ This **localized drug delivery system** addresses significant limitations of conventional cancer treatments, such as **chemotherapy** and **surgical interventions**, which often harm healthy tissues or may not be feasible for certain tumours.
- ❑ Hydrogels are **water-based, three-dimensional polymer networks** that can absorb and retain fluids. Their unique structure mimics living tissues, making them ideal for **biomedical applications**.
- ❑ The hydrogel developed by the researchers is composed of **ultra-short peptides**, which are **biocompatible** and **biodegradable**.

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- ❑ **Mechanism of Action:** What sets this hydrogel apart is its ability to **respond to elevated levels of glutathione (GSH)**, a molecule typically abundant in tumour cells.
 - ❑ When the hydrogel encounters these high GSH levels, it triggers a **controlled release of the anti-cancer drug** directly into the tumour.
 - ❑ This mechanism significantly **reduces side effects associated with chemotherapy**, which can impact healthy tissues throughout the body.

Poor state of infrastructure in Indian schools

Govt. report reveals stark infrastructure gap in Indian schools

Maitri Porecha
NEW DELHI

Of the over 14.71 lakh schools in India, up to 1.52 lakh schools have no functional electricity, according to the latest data released by the Unified District Information System for Education (UDISE+) maintained by the Ministry of Education. Of the 14.71 lakh schools, 10.17 lakh schools are government-run, of which 9.12 lakh schools have functional electricity, while 1.52 lakh schools do not.

Apart from the government-run schools, there are 4.54 lakh schools that are government-aided, private and unaided, and others, of which 4.07 lakh have functional electricity.

Of the total schools, 14.47 lakh schools have drinking water facilities, but in only 14.11 lakh schools is the drinking water facility functional.

Of the 10.17 lakh government schools, functional drinking water facility is available in 9.78 lakh schools. Of the 4.46 lakh



67,000 schools operate without functional toilets, of which a majority are government-run.

government-aided, private and other schools, 4.33 lakh have functional drinking water.

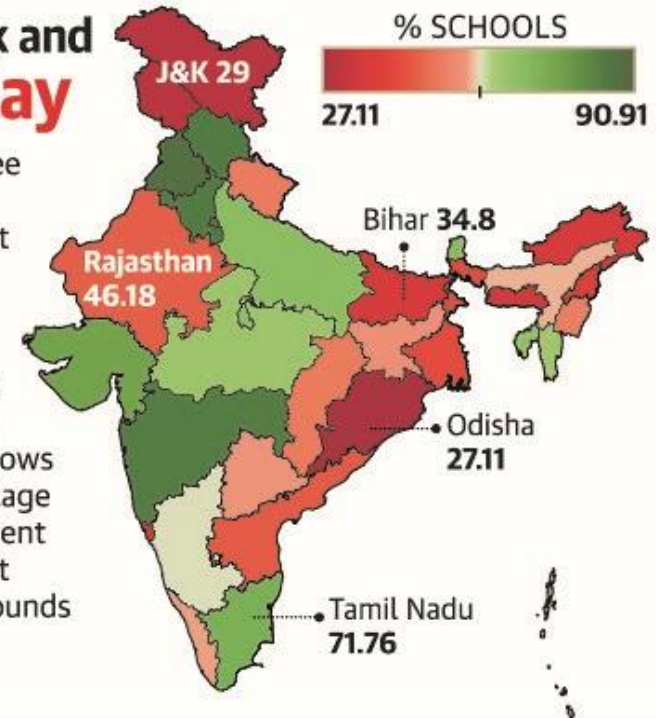
With regard to toilets, of the 14.71 lakh schools, 14.50 lakh schools have toilet facilities, but only 14.04 lakh toilets are functional.

The report says 67,000 schools operate without functional toilets, of which a majority (46,000) are government schools.

The condition is much worse when it comes to providing disabled-friendly facilities. Of the 10.17 lakh government schools, only 3.37 lakh schools have disabled-friendly toilets.


All work and no play


Almost three out of four government schools in Odisha did not have a playground as of 2018. The map shows the percentage of government schools that had playgrounds as of 2018



Context

The **Union Education Ministry's** data reveals that many schools in India still lack important infrastructure and facilities, affecting education quality.

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- ❑ **Access to Technology:** Only 57.2% of schools have functional computers. 53.9% have access to the internet, indicating that many schools still lack digital tools for modern education.
 - ❑ Over 90% of schools have basic amenities like electricity and gender-specific toilets.
 - ❑ **Student Enrollment:** The total student enrollment decreased by 37 lakh, from 25.17 crore in 2022-23 to 24.8 crore in 2023-24.
 - ❑ The **Gross Enrolment Ratio (GER)**, which shows the percentage of students enrolled at each education level, highlights disparities:
 - ❑ **Preparatory level (early education):** 5% GER, showing good enrollment.
 - Dropout Rates:** The dropout rates have risen sharply:
 - ❑ 2% dropout rate in middle school.
 - ❑ 9% dropout rate in secondary school.

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- ❑ The **National Education Policy (NEP) 2020** aims to improve access, equity, and quality of education, but infrastructure gaps like the lack of digital tools and accessibility features remain major challenges.
 - ❑ The education ministry officials highlight that optimizing resources and addressing these infrastructure gaps is crucial to meet the education targets for 2030.
 - ❑ **Government Initiatives for Digital Education:** PM E-Vidhya, DIKSHA, National E-library, Swayam Prabha, Swayam, Vidya Daan, E Pathshala, SMART India Hackathon.
 - ❑ **Government Initiatives for Girls:** Beti Bachao, Beti Padhao, Kasturba Gandhi Balika Vidyalaya, National Programme for Education of Girls at Elementary Level (NPEGEL), National Scheme of Incentives to Girls for Secondary Education (NSIGSE), PRAGATI.



Thank you

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