



Topics



- **Agroforestry**
- **Frogs**
- **Heat waves**
- **Taiwan strait**
- **Great indian buster**
- **Green credit**
- **Mains**



By saurabh pandey sir

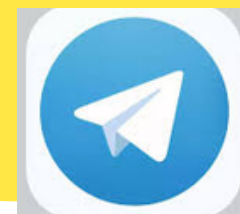


Target Mains 2024/25- Essay



Q“ Agroforestry brings social ,economic and environment benefits “ Elaborate
प्रश्न" कृषि वानिकी सामाजिक, आर्थिक और पर्यावरणीय लाभ लाती है" विस्तार से बताएं

send your answer - Saurabh pandey
upsc telegram channel



Answer review



7th answer

17th April, 2024

Page No. 15

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Time taken \Rightarrow 45 min

Vyom KUMAR

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Ques \Rightarrow Democracy depends on trust on democratic procedure. Does application of technology bring mistrust? Explain in the context of controversy around EVM.

\Rightarrow Democracy is the system of government in which state power is vested in the people or general population of the state.

Trust in the democratic procedure is fundamental component of a healthy democracy.

(Democratic Procedures) \rightarrow Free and fair election
 \rightarrow Independent Judiciary
 \rightarrow Free Press

When citizen's trust democratic procedure they are more likely to -

- i). Participate in election and civic activities
- ii). Respect rule of law and institutions
- iii). Engage in social activities and social upliftment while considering everyone.
- iv). Work with full efficiency for growth of country and increases GDP of country.
- v). With citizen's trust there is a development of positive global trust positive approach towards you, increase in FDI (foreign direct investment), and trade relation strengthen.

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\rightarrow Application of Technology in democracy

As, whole globe is developing and moving towards development, day by day acquiring new technology and its application can be seen in democratic procedures also.

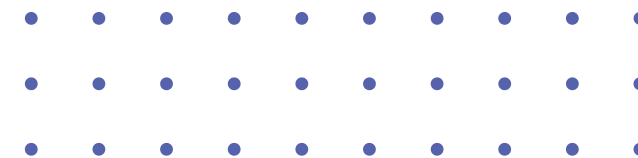
- i). Application of technology in Judiciary.
(With case of translation procedure done by AI (Artificial Intelligence) Judgement of Supreme Court is translated in required language).
- ii). Application of technology in media
(Now, a day's media does not mean only the print media which was earlier popular media. In today's globe a important news can be transmitted within a second.).
Social media is become more popular.
- iii). Application of technology in election
Election process with time has evolved, and have seen many changes (from ballot paper with different ballot boxes to same boxes) and then, arrival of EVM (Electronic Voting machine), which has made another important change in the process of election. It has ~~been~~ made process simple for Election Commission of India, but (E.V)



Answer review



Candidates must not write on this margin	Page No. 17 Candidates must not write on this margin
<p><u>Controversy around EVM</u></p> <p>EVM has always been remain in controversies which potentially leads to mistrust in democratic procedure processes.</p> <p>Controversies basically revolve around</p> <ol style="list-style-type: none">i). <u>Security and Jamming Risks</u> → They are being criticized for being vulnerable to hacking, which compromise the integrity of voters.ii). <u>Technical glitches</u> → Malfunction and errors has been reported in many cases.iii). <u>Lack of transparency</u> → The use of EVM make it difficult to verify the voting process. <p>→ Recently (VVPAT) (<u>Voter Verifiable paper audit trail</u>) has gained controversies with respect to EVM. As of now 5 polling station VVPAT slips are machet with EVM, and demanding for all, which is not possible said by the apex court.</p> <p>So, the apex court in 2013, <u>Subramanian Swamy vs ECI</u>, "the election process should have fullest transparency in the system and to restore the confidence of the voters."</p>	
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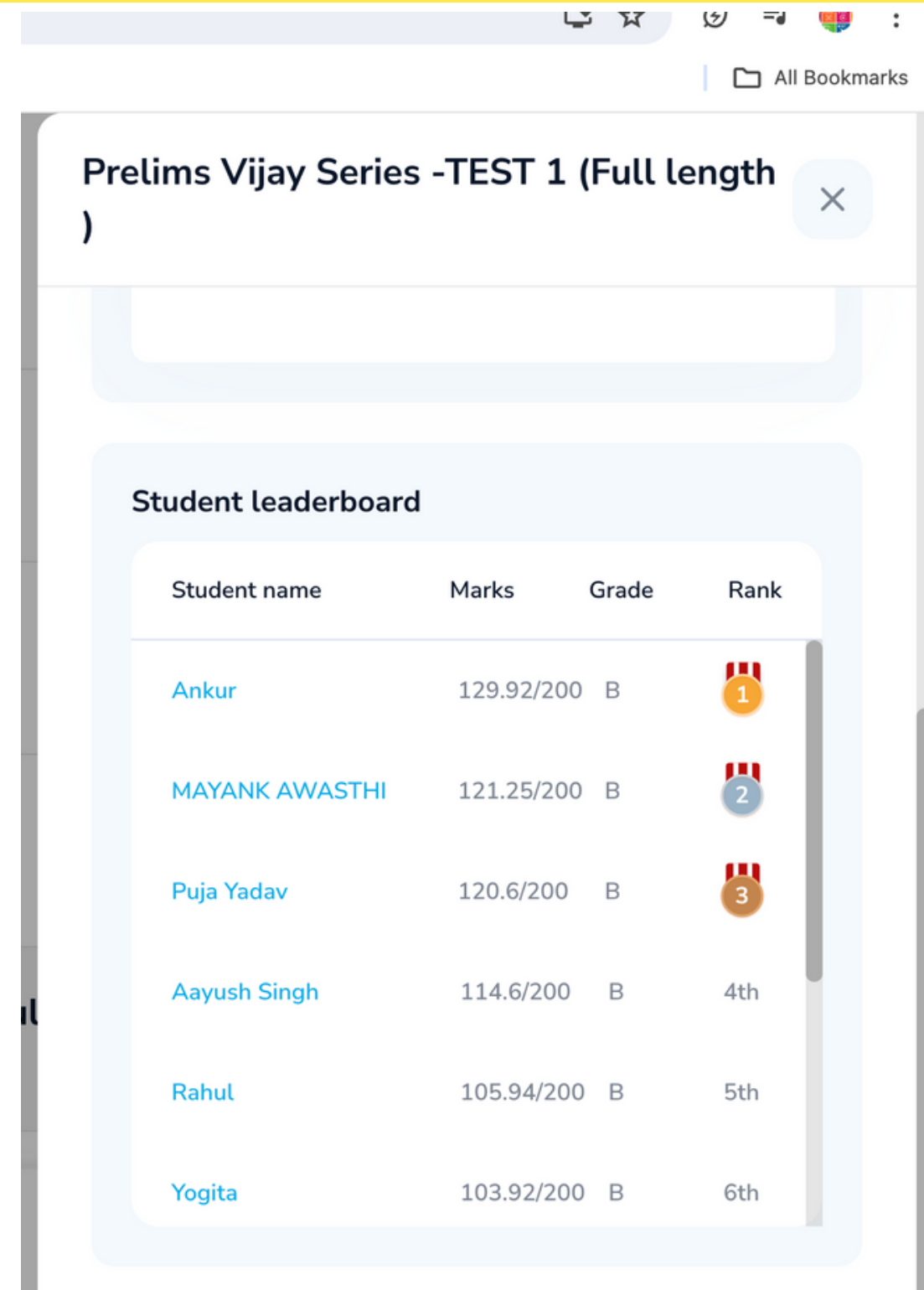


TOPERS FIRST FULL LENGTH TEST (PRELIMS VIJAY SERIES)

Ankur -129.92

Mayank - 121.26

Puja Yadav-120



Prelims Vijay Series -TEST 1 (Full length)

Student leaderboard

Student name	Marks	Grade	Rank
Ankur	129.92/200	B	1
MAYANK AWASTHI	121.25/200	B	2
Puja Yadav	120.6/200	B	3
Aayush Singh	114.6/200	B	4th
Rahul	105.94/200	B	5th
Yogita	103.92/200	B	6th

How can small-scale farmers benefit from trees on farms?

The Ministry of Agriculture recognised water availability as a challenge when it drafted the National Agroforestry Policy in 2014. Yet the problem remains relevant and is especially acute for smallholders, who need additional funding to secure water and/or who incur additional debt in doing so

Deepthi R. Shastry
Milind Bunyan
Ravikanth G.

Agriculture in India has historically been a diversified land-use practice, integrating crops, trees, and livestock. This technique, broadly called agroforestry, can enhance farmer livelihoods and the environment and is slowly gaining in popularity after decades of the *modus operandus* of monocropping inspired by the Green Revolution.

"The Gaja cyclone nearly razed all coconut trees and made the soils saline; we did not know what to plant after," said Chitra, a medium-scale farmer in Pudukkottai district of Tamil Nadu, during one of our recent field visits. "We pooled our money and started planting jackfruit and mangoes. It has been six years and we are seeing some good profits."

This change resulted from India's pioneering efforts to promote agroforestry. These efforts received an impetus nearly 10 years ago with the establishment of the National Agroforestry Policy (2014) but which also built on significant investments in research over a longer 40-year span. Yet the uptake of agroforestry remains restricted to farmers with medium or large landholdings.

This pattern is unsurprising since smallholder farmers seldom grow trees because of their long gestation, a lack of incentive or investment-based capital, and weak market linkages. Then again, Chitra's experience demonstrates agroforestry's potential and presents a case for creating an enabling environment to enhance trees on farms.

A recurrent water problem

The five-year 'Trees Outside of Forests India' (TOFI) initiative is one such attempt to assess comprehensive ways to stimulate a change in the status quo. It's a joint initiative of the U.S. Agency for International Development (USAID) and India's Ministry of Environment, Forest and Climate Change. TOFI seeks to enhance tree cover in seven Indian states by identifying promising expansion opportunities and engaging the right levers.

Through our research and stakeholder consultations, we have identified key impediments to enhancing trees-outside-forests (TOF) cover through agroforestry in seven states: Andhra Pradesh, Assam, Haryana, Odisha, Rajasthan, Tamil Nadu, and Uttar Pradesh.

In particular, we discovered that water availability and transition finance have been recurrent concerns for smallholders across these states. Still, solutions to these barriers are within reasonable reach.

Finding the right native species

The Ministry of Agriculture recognised water availability as a challenge when it drafted the National Agroforestry Policy in 2014. Yet the problem remains relevant and is especially acute for smallholders who need additional funding to secure water and/or who incur additional debt in doing so. Moreover, water availability is critical during the sapling stage but remains a constant concern if the trees compete with crops for water in



Teak and turmeric grown together in an agroforestry farm in Coimbatore. THE HINDU

water-constrained environments (e.g. hard rock aquifers and low-rainfall regions).

One way to overcome this constraint is to grow trees that don't compete with the crops for water. We worked with Bengaluru-based WELL Labs to adapt an open-source water-accounting tool called 'Jalrol' to assess instances when these trade-offs occur. The tool provided valuable insights. For example, mango plantations don't compete with kharif crops in the central Karnataka plateau whereas coconut trees in Tamil Nadu's uplands demand more water than crops throughout the year.

Such tools enable restoration practitioners and civil society organisations to select appropriate tree-crop combinations for agroforestry in water-stressed regions.

In fact, choosing the right species for the right place and the right reason is elemental for agroforestry to enhance the sustainability of livelihoods. Farmers, however, are drawn to tree species that are fast-growing and repel herbivores, but such species are also generally non-native and threaten soil health and human well-being.

For example, casuarina and eucalyptus trees – both non-native timber species – are known to tolerate saline soils and grow fast with very low labour inputs. But both species are also primarily grown as large mono-crop block plantations rather than as an intercrop or a tree-crop combination, which would be essential for small landholdings.

Finding native species that fit multiple criteria is admittedly challenging but necessary to arrest or reverse land degradation while diversifying livelihood opportunities. Decision support tools that leverage extensive plant functional trait databases for hundreds of tree species to identify appropriate species may be helpful in such cases.



Farmers are drawn to tree species that are fast-growing and repel herbivores, but such species are also generally non-native and threaten soil health and human well-being

'Diversity for Restoration' is an example of such a tool. It provides a tailored list of climate-resilient species while aligning with the restoration objectives. Its makers will soon launch it with recommendations for the Western Ghats, followed by other geographies.

Payment for ecosystem services

Several other studies have assessed the impediments and solutions to agroforestry as a sustainable land-use practice. However, its on-ground implementation still suffers from a lack of systemic support for financing this transition and lucrative market linkages. Additionally, new and existing government policies and schemes that can facilitate this transition are standardised, accounting neither for land-holding size nor, importantly, regional biophysical variabilities. As a result, these schemes inherently exclude smallholders.

For example, the Indian Forest and Wood Certification Scheme 2023, which certifies agroforestry and wood-based products as sustainable, has an exhaustive list of eligibility criteria for farmers and industries.

But it remains to be seen if its array of socio-economic and environmental parameters will place certification costs beyond the reach of smallholders. Policymakers also need to consider the viability of existing Central and State policies and schemes as a transition finance pathway for agroforestry.

The emerging concept of ecosystem credits or existing approaches such as 'payment for ecosystem services' (PES) are potential incentive mechanisms. (In PES, an ecosystem service user, e.g. a food processing company, volunteers to pay a service provider, such as a small farmer, for trees promoting a service like pollination). These instruments strengthen the ideology of nature-centred economics.

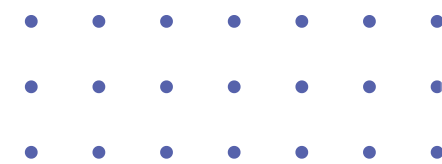
However, identifying buyers and sellers of ecosystem services must be preceded by a detailed assessment of the services unique to a predefined biophysical region, not an administrative boundary. In doing so, these instruments can incentivise farmers to embrace practices that improve soil and groundwater health and enhance biodiversity. These are essential components of healthy agroecosystems.

A modus vivendi

The adoption of agroforestry at scale in India must include smallholders, who hold most of India's agricultural land. Yet this is currently stymied by both ecological and socio-economic factors. Although secure land tenure is a prerequisite for agroforestry uptake, ensuring economic viability through market linkages while meeting the criteria of sustainable agroforestry is crucial to empower these farmers.

Agroforestry could be the *modus vivendi* among conservationists, agro-economists, and policymakers to foster healthy ecosystems and resilient livelihoods, creating an enabling environment for rapid uptake by smallholders.

(Deepthi R. Shastry, Milind Bunyan, G. Ravikanth are using research to determine context-specific ways to increase tree cover on farms through the TOFI initiative at the Ashoka Trust for Research in Ecology and Environment (ATREE), Bengaluru.)



Agroforestry

Agroforestry is a method of planting diverse fruit trees and other trees in blighted lands in the Amazon based on the mechanism of the forest.



[Agroforestry]

Building Forests through Agriculture

"Agroforestry" is a term coined in the mid 1970s by combining agriculture and forestry.

In Japanese, it is also called "農林複合経営," "混農林業" and "森林農業."

By cultivating crops in a condition similar to nature, it is possible to bring diversity back to fields and achieve sustainable production of crops that were previously monocultural.

The forest is regenerated while farming. This truly is "Building Forests through Agriculture".

Many such examples can be found worldwide in regions such as Southeast Asia, Latin America and Africa, but the Agroforestry in Brazil's Tomé-açu is gaining particular attention as sustainable agriculture.

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Agroforestry and its attributes



It is a combination of practicing agriculture and forestry together on same land

What are the components of agroforestry?

There are three main components of agroforestry — crops, trees and livestock.

What are the major agroforestry systems based on the type of component?

Agroforestry systems are classified into three categories based on the types of components: Agrisilviculture (crops + trees), silvopastoral (pasture/livestock + trees); and Agrosilvopastoral (crops + pasture + trees).

What are the major attributes that agroforestry systems should possess?

There are three attributes of agroforestry systems:

Productivity: Production of preferred goods and increasing productivity of land

Sustainability: Conserving the production potential

Adoptability: Acceptance of the prescribed practice

What are the trees suitable for rainfed areas?

Neem, Pongamia, Sandalwood and Anjan tree among others

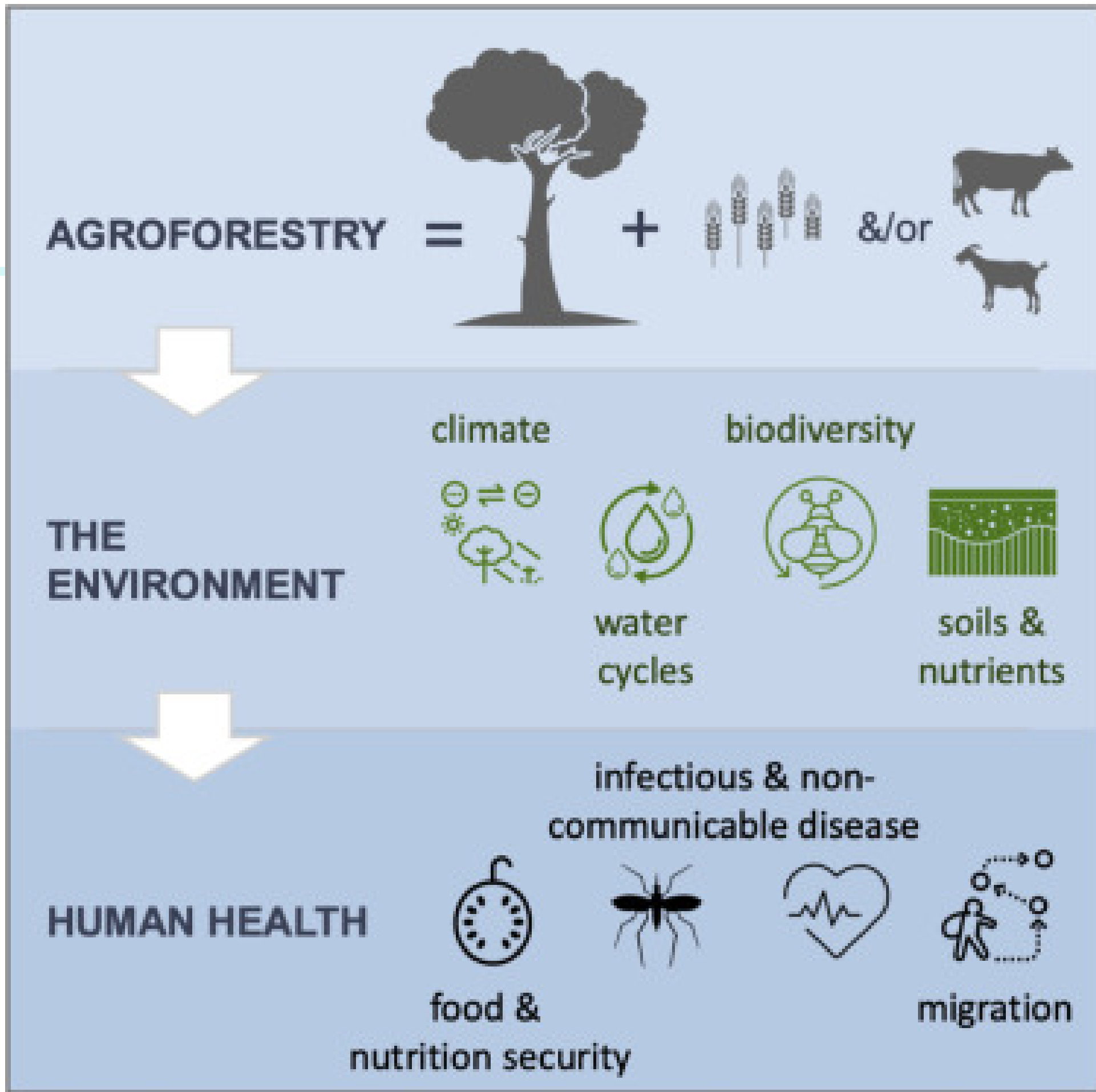
What are the tree crops suited for saline / sodic lands?

Eucalyptus, Casuarina, Pongamia, Neem and Flame of Forest among others



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BENEFITS OF AGROFORESTRY



Soil Health



Biodiversity



**Increase in
productivity**



**Farmer
Revenues**

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Agroforestry related issues

- The Gaja cyclone nearly razed all coconut trees and made the soils saline; we did not know what to plant after.
- The five-year 'Trees Outside of Forests India' (TOFI) initiative is one such attempt to assess comprehensive ways to stimulate a change in the status quo.
- It's a joint initiative of the U.S. Agency for International Development (USAID) and India's Ministry of Environment, Forest and Climate Change.
- In particular, we discovered that water availability and transition finance have been recurrent concerns for smallholders across these states.

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- **problem remains relevant and is especially acute for smallholders who need additional funding to secure water and/or who incur additional debt in doing so.**
- **Moreover, water availability is critical during the sapling stage but remains a constant concern if the trees compete with crops for water in water-constrained environments (e.g. hard rock aquifers and low-rainfall regions).**
- **One way to overcome this constraint is to grow trees that don't compete with the crops for water.**



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- **These instruments strengthen the ideology of nature-centred economics.**



Agroforestry Policy, 2014

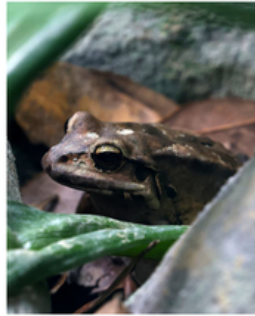
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DAC&FW formulated National Agroforestry Policy-approved by Cabinet in 2014- Policy laid on floor of the both Houses of Parliament in 2014 , which aims:

- National coordination, convergence, synergy and facilitation of agroforestry scaling up
- Relaxations in on-farm grown tree felling and transit regulations
- Mainstreaming agroforestry in all agricultural policies and strategies
- Standards for production, certification and supply of planting material
- Land tenure, loans and insurance for agroforestry
- Investments in agroforestry research, extension and capacity building
- Inclusion of agroforestry among qualified items for CSR support
- Profiling agroforestry for carbon sequestration, environmental services, INDCs, etc.
- Policy envisages setting up a National Agroforestry Mission or an Agroforestry Board

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A leaf litter frog emits ultrasonic sounds that are inaudible to humans but can scare off predators. REUTERS

When this tiny frog in Brazil screams, you won't hear it

Arkatapa Basu

Frogs use a myriad ways to defend themselves against predators. Some are poisonous. Some are brightly coloured. Some even inflate their bodies with air to appear bigger.

Another way frogs have been known to defend themselves, or alert others nearby, about a predator is to make loud sounds.

Recently, scientists have found that one tiny species of frog endemic to the Brazilian Atlantic rainforest emits ultrasonic sounds that are inaudible to humans but can scare off predators.

In their work, published in the journal *Acta Ethologica* earlier this year, Brazilian scientists from the Institute of Biology, São Paulo, and the Project Dacnis preserve recorded the ultrasonic 'screams' of the tiny leaf litter frog (*Haddadus binotatus*) while in the rainforest of Brazil.

The researchers found that the frog – which is smaller than an inch – while emitting the scream would raise the upper portion of its body, open its mouth wide, and throw its head back. This behaviour was, they said, was a typical defensive movement against predators.

The frog would then close its mouth just a little and appear to emit a call.

However, the researchers did not hear any sounds.

They subsequently used specialised

The frequency of the frog's call spanned the 7 kHz to 20 kHz range, which is within humans' hearing range, but also reached up to 20 kHz to 44 kHz, which is beyond what the human ear can discern

equipment to check for the presence of a call, and found that the frog was screaming at a frequency much higher than humans could hear.

After analysing the call, they ascertained that the call's frequency spanned the 7 kHz to 20 kHz range, which is within humans' hearing range, but also reached up to 20 kHz to 44 kHz, which is beyond what the human ear can discern.

Researchers think leaf litter frogs emit these ultrasonic calls to stave off predators or, possibly, attract other animals that might attack the predator and protect the frogs.

One of the scientists involved in this study, Mariana Retuci Pontes, had previously suspected the frogs used ultrasonic screams as a defence mechanism after she had come across what looked like a Hensel's big-headed frog (*Ischnocnema henselii*) in Brazil's rainforests.

When she picked up this frog to photograph it, it made defensive movements that resembled those of the leaf litter frog. However, she did not have the equipment to record its calls on hand at the time and could not tell if they were ultrasonic.

The finding that the leaf litter frog emits ultrasonic sounds has kicked up questions for the researchers about which predators are affected by the screams, how they react to it and what the scream's ultimate purpose is.



Frogs

- Frogs use a myriad ways to defend themselves against predators.

Some are poisonous.
- Some are brightly coloured. Some even inflate their bodies with air to appear bigger.
- Another way frogs have been known to defend themselves, or alert others nearby, about a predator is to make loud sounds.
- Recently, scientists have found that one tiny species of frog endemic to the Brazilian Atlantic rainforest emits ultrasonic sounds that are inaudible to humans but can scare of predators.

- leaf litter frogs emit these ultrasonic calls to stave off predators or, possibly, attract other animals that might attack the predator and protect the frogs.



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On India's 'heat action plans'

How does the India Meteorological Department define heatwaves? What do heat action plans recommend? Are special interventions needed for vulnerable communities during a heatwave? What about regional variations and socio-economic differences?

EXPLAINER

Indu K. Murthy
Sahil Mathew

The story so far:

Some summer, we are used to seeing heat alerts from the India Meteorological Department (IMD) for various parts of India. This year, these alerts began in February itself. Parts of the northeast and western India have already reported appreciably warm temperatures (3.1-5 degrees Celsius above normal) before the start of summer. The IMD has also predicted an increase in the maximum temperature and the frequency of heatwave conditions in the forthcoming days over eastern and southern India, raising the question of India's readiness to face this hazard.

What is a heatwave?

According to the IMD, the definition of a heatwave depends on the physiography of regions. The IMD will declare a heatwave if the maximum temperature recorded at a station is 40 degrees Celsius or more in the plains, 37 degrees Celsius or more in the coast, and 30 degrees Celsius or more in the hills.

A heatwave's severity is determined by its departure from normal temperature. There is a 'normal heatwave' when the departure is by 4.5-6.4 degrees Celsius and a 'severe heatwave' if the departure is greater. Heatwave declaration could also be based on actual maximum temperature: a 'heatwave' is when this figure is greater than 45 degrees Celsius and a 'severe heatwave' when greater than 47 degrees Celsius. The IMD takes the latter two 'routes' only when at least two stations in a meteorological subdivision report such a high maximum or when at least one station has recorded a corresponding departure from the normal for at least two consecutive days.

How are we tackling heatwaves?

With the severity and frequency of heatwaves increasing across the country, governments at various levels — State, district, and city — have prepared heat action plans (HAPs). HAPs aim to increase preparedness and lower the adverse impacts of extreme heat by outlining strategies and measures to prepare for, address, and recover from heatwaves. The National Disaster Management Authority and IMD are reported to be working with 23 States to develop HAPs. There is no centralised database on HAPs, but at least 23 HAPs exist at the State and city level, with a few States, such as Odisha and Maharashtra, laying out district-level HAPs.

HAPs in India follow a general pattern. They provide a snapshot of regions' heat profile, including information on the number of past heatwave events, yearly trends in the summer maximum temperature, land surface temperature, and so on, followed by a vulnerability assessment which maps out regions that require immediate attention and a response plan. This plan presents recommendations for mitigating and addressing heatwave impacts before, during, and after a heatwave and outlines the roles and responsibilities of various line departments, such as the disaster management authority, labour department, and police.

What do the HAPs recommend?

HAPs typically suggest a combination of measures such as using forecasts and early warning systems to alert the public and relevant authorities about heatwaves, educating the public through campaigns



Parched land: A local fisherman at the Chandola Lake in Ahmedabad on April 9. VJAY SONE/II

that provide information on risks associated with heatwaves, building heat shelters and cooling centres, and providing clean drinking water to avoid dehydration.

HAPs provide directives for hospitals to be well equipped with supplies and an adequate number of trained healthcare workers to recognise and treat a large influx of patients with heat-related illnesses. HAPs also suggest long-term measures such as adopting urban planning strategies that promote tree planting, using heat-resistant building materials to reduce urban heat island effect, and using cool roofing technologies to reduce solar absorption, thereby decreasing indoor temperatures. In addition, HAPs push for effective coordination among stakeholders, including government agencies, healthcare providers, community organisations, and emergency services.

What debilitates HAPs from addressing the problem effectively?

While HAPs are excellent guidelines that have brought into focus the problem of heatwaves and the need to address them, much work remains to make them practical to the highly variable weather conditions and the diversity of socio-economic conditions prevailing in the country.

The local context: A national threshold is what determines a heatwave today. However, heatwaves will have to be determined at disaggregated scales such as States, districts, and cities. Many cities have been reeling under extreme temperatures, although no heatwave has been declared. Aspects such as the urban heat island effect, the type of roofing, and proximity to water or green bodies are important influences on the local

temperature in addition to humidity. Further, the lived local experience is an important aspect to be considered. Therefore, the scope of a heatwave needs to be expanded to accommodate humid

heat and warmer nights in addition to extreme dry heat. This requires the development of a heat index that accounts for multiple factors beyond temperature. Regional variations also need to be considered, as HAPs that are tailored to specific climatic conditions, demography, and a region's infrastructure can lead to the formulation of strategies and interventions suited to the local context.

Inconsistent methods: While most HAPs have conducted vulnerability assessments during the development of the plans, the methods adopted are inconsistent. It is, therefore, time to transition to a robust, full-fledged climate risk assessment that can identify the likelihood of heatwaves in different areas and estimate the exposure of people and important assets to heatwaves while factoring in inherent vulnerabilities. Also, hotspot mapping for prioritising and formulating targeted interventions is needed, which is now possible with easy-to-access geospatial data.

Vulnerable populations: All HAPs prioritise the protection of vulnerable populations such as low-income communities, children, and the elderly. But what is missing are targeted interventions that account for the varying needs of populations based on local social and demographic factors, in addition to infrastructure elements that could exacerbate heat. Over 90% of India's economy is informal and starkly visible when we step out of our homes, be it a pushcart vendor, a *chaiwala*, household help, or sanitation worker. If we

acknowledge heatwaves as a public health concern, targeted strategies need to be formulated by recognising various socio-economic differences.

Resource allocation: The implementation of HAPs can vary significantly depending on the priorities of local governments and the capacities available. Hence, there is a need to allocate dedicated budgets for HAPs. Further, it is of utmost importance to hold dialogues between the state, civil society organisations, and worker unions to co-plan a financial mechanism that can allow informal workers to be indoors during a heatwave while not losing their incomes.

Breaking down silos: HAPs currently are stand-alone plans with limited finance. Pooling in resources would be possible if they are integrated with broader action plans promoting urban resilience and climate adaptation. Such an integration will likely have a bearing on the overall effectiveness of HAPs and their implementation and prompt improvements in data collection and monitoring systems, which are essential to help assess the effectiveness of HAPs over time.

Finally, while HAPs mention long-term measures, they are limited to building infrastructure (especially cool roofs), with a cursory mention of green and blue spaces. For HAPs to be effective, focused planning on including nature-based solutions to address extreme heat in hotspots is a must.

Indu K. Murthy is a principal research scientist heading the Climate, Environment, and Sustainability Sector at the Center for Study of Science, Technology and Policy (CSTEP). Sahil Mathew is an analyst in the Climate, Environment and Sustainability Sector at CSTEP.

THE GIST

▼ The IMD will declare a heatwave if the maximum temperature recorded at a station is 40 degrees Celsius or more in the plains, 37 degrees Celsius or more in the coast, and 30 degrees Celsius or more in the hills.

▼ With the severity and frequency of heatwaves increasing across the country, governments at various levels — State, district, and city — have prepared heat action plans (HAPs).

▼ While HAPs are excellent guidelines that have brought into focus the problem of heatwaves and the need to address them, much work remains to make them practical to the highly variable weather conditions.





Heat Waves

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- Heatwave declaration could also be based on actual maximum temperature: a 'heatwave' is when this figure is greater than 45 degrees Celsius and a 'severe heatwave' when greater than 47 degrees Celsius

The Hindu analysis by saurabh pandey sir



Heat action plans (HAPs).



- **heat action plans (HAPs).**-HAPs aim to increase preparedness and lower the **adverse impacts of extreme heat by outlining strategies and measures to prepare for, address, and recover from heatwaves.**
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What do the HAPs recommend?

- HAPs typically suggest a combination of measures such as using forecasts and early warning systems to alert the public and relevant authorities about heatwaves, educating the public through campaigns that provide information on risks associated with heatwaves, building heat shelters and cooling centres, and providing clean drinking water to avoid dehydration.
- HAPs provide directives for hospitals to be well equipped with supplies and an adequate number of trained healthcare workers to recognise and treat a large influx of patients with heat-related illnesses.
- HAPs also suggest long-term measures such as adopting urban planning strategies that promote tree planting, using heat-resistant building materials to reduce urban heat island effect, and using cool roofing technologies to reduce solar absorption, thereby decreasing indoor temperatures



What debilitates HAPs from addressing the problem effectively?

- **The local context**
- **Inconsistent methods**
- **Vulnerable populations:**
- **Resource allocation:**
- **Breaking down silos:**

Reforms needed in the voting process

When were Electronic Voting Machines (EVMs) first introduced? What have been the concerns raised by activists about EVMs? What are the voting practices in other countries? How can the process of voting be made more robust?

EXPLAINER

Rangarajan. R

The story so far:

The Supreme Court has decided to hear petitions seeking 100% cross-verification of the Voter Verifiable Paper Audit Trail (VVPAT) slips with the vote count as per Electronic Voting Machines (EVMs).

What is the history of voting process?

In the first two general elections of 1952 and 1957, a separate box was placed for each candidate with their election symbol. Voters had to drop a blank ballot paper into the box of the candidate whom they wanted to vote for. Thereafter from the third election, the ballot paper with names of candidate and their symbols was introduced with voters putting a stamp on the candidate of their choice.

The EVM was introduced on a trial basis in 1982 in the Assembly constituency of Paravur in Kerala. They were deployed in all booths during the Assembly elections of Tamil Nadu, Kerala, Puducherry and West Bengal in 2001. The Supreme Court in various judgments has upheld the validity of using EVMs in elections. In the 2004 general elections to the Lok Sabha, EVMs were used in all 543 constituencies. In *Subramanian Swamy versus Election Commission of India* (2013), the Supreme Court ruled that a paper trail is an indispensable requirement for free and fair elections. The 2019 elections had EVMs backed with 100% VVPAT in all constituencies.

What are international practices?

Many western democracies continue to have paper ballots for their elections. Countries like England, France, The Netherlands and the U.S. have discontinued the use of EVMs, for national or federal elections, after trials in the last two decades. In Germany, the Supreme Court of the country declared the use of EVMs in elections as



Ensuring transparency: An official marks an EVM at a distribution centre in Coimbatore on April 11. AFP

unconstitutional in 2009. Some countries like Brazil, however, use EVMs for their elections. Among our neighbours, Pakistan does not use EVMs. Bangladesh experimented in a few constituencies in 2018 but reverted to paper ballots for the general elections in 2024.

What are the features of EVMs?

EVMs bring significant benefits to the electoral process. First, the EVM has virtually eradicated booth capturing by limiting the rate of vote casting to four votes a minute and thus significantly increasing the time required for stuffing false votes. Second, invalid votes that were a bane of paper ballots and also a bone of contention during counting process have been eliminated through

EVMs. Third, considering the size of our electorate which is close to one billion, the use of EVMs is eco-friendly as it reduces the consumption of paper. Finally, it provides administrative convenience for the polling officers on the day of the poll and has made the counting process faster and error-free. There are mechanisms to uphold the integrity of EVM and VVPAT process. These include random allocation of EVMs to booths before polls; conduct of a mock poll to display the correctness of EVMs and VVPAT before commencement of the actual poll; and the serial number of EVMs along with total votes polled shared with agents of candidates to verify the same at the time of counting of votes.

Despite its advantages, there have been

doubts raised about the functioning of EVMs by various political parties and civil society activists from time to time. The most repeated allegation is that EVMs are susceptible to hacking as it is an electronic device. The ECI has time and again clarified that it is a standalone device like a calculator with no connectivity to any external device and hence free from any kind of external hack. The sample size for matching of the EVM count with VVPAT slips at present is five per assembly constituency/segment. This is not based on any scientific criteria and may fail to detect defective EVMs during counting. The present process also allows for booth-wise polling behaviour to be identified by various parties that can result in profiling and intimidation.

What can be the way forward?

In a transparent democracy, each citizen must be able to comprehend and verify the steps in the election process without any special technical knowledge. The 100% use of VVPAT has enabled the voters to verify that their votes are 'recorded as cast'. However, few additional steps need to be adopted to make the entire process more robust and ensure that the votes are 'counted as recorded'. 100% match of EVM count with VVPAT slips would be unscientific and cumbersome. The sample for matching of EVM count and VVPAT slips should be decided in a scientific manner by dividing each State into large regions as suggested by experts. In case of even a single error, the VVPAT slips should be counted fully for the concerned region and form the basis for results. This would instil a statistically significant confidence in the counting process. Further, in order to provide a degree of cover for voters at the booth level, 'totaliser' machines can be introduced that would aggregate votes in 15-20 EVMs before revealing the candidate-wise count.

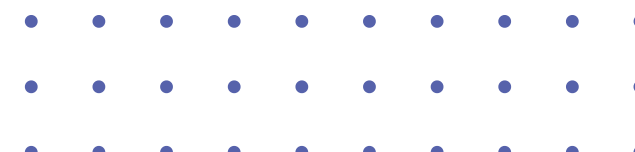
Rangarajan. R is a former IAS officer and author of 'Polity Simplified'. He trains civil-service aspirants at 'Officers IAS Academy'. Views expressed are personal.

THE GIST

▼ The EVM was introduced on a trial basis in 1982 in the Assembly constituency of Paravur in Kerala.

▼ Despite its advantages, there have been doubts raised about the functioning of EVMs by various political parties and civil society activists from time to time. The most repeated allegation is that EVMs are susceptible to hacking as it is an electronic device.

▼ In a transparent democracy, each citizen must be able to comprehend and verify the steps in the election process without any special technical knowledge.





The Hindu analysis by saurabh pandey.sir . . .

The Great Indian Bustard and climate action verdict



In a recent judgment, the Supreme Court of India has recognised the existence of a fundamental right to be free from the adverse impacts of climate change (hereinafter ‘the right’). The judgment has garnered significant attention from environmentalists, mostly focusing only on its impacts on the protection of the Great Indian Bustard. Taking a more comprehensive view, this article analyses the judgment from the lens of inclusive climate action. It argues that first, by limiting itself to only recognising the right, the Court has allowed time and space for a productive discourse on the right’s content. Accordingly, this could enable a more informed articulation of the right in the future. Second, given the nature of the core issue in this case, using the just transition framework is an excellent approach forward. It can facilitate equitable climate action, including, articulation of a more reflexive and inclusive right.

The Right

The States of Rajasthan and Gujarat are home to the critically endangered Great Indian Bustard. At the same time, both States also hold significant potential for the development of solar and wind power. In 2019, certain public-spirited individuals (petitioners), filed a public interest litigation, seeking conservation of the bustard. In the interim, they sought an order seeking a ban on further construction of solar and wind energy infrastructure, and the laying of overhead power transmission lines linked to these. They argued that these power lines were a hazard, causing the bustards to die due to frequent collisions with the lines. In its decision the Supreme Court imposed a blanket ban on the laying of overhead power lines in an area of 99,000 square kilometres; this included areas identified as priority and potential areas for bustard conservation. The Court also passed an order for undergrounding existing power lines, both high and low voltage.

The government challenged this order citing India’s international climate commitments on transitioning to non-fossil fuels and reducing carbon emissions. It argued that the blanket ban was issued for an area much larger than the actual area in which the bustard dwells. This area, it reiterated, held a major proportion of the country’s wind and solar energy potential. Further, it argued that undergrounding power lines was practically impossible. Lastly, it attributed the decline in the bustard population to other factors such as poaching, habitat destruction, and predation.

In its decision on March 21, 2024, the Court modified the earlier order, recalling the blanket prohibition on transmission lines. It left the recalibration of the order to scientific experts. To that end, it set up an expert committee to, *inter*



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With the final decision of India’s top court still pending, this is an ideal chance for the judiciary to pursue the just transition framework and enable inclusive and equitable climate action

alia, assess the feasibility of undergrounding power lines, and identifying measures for bustard conservation. This committee is required to submit its report by July 2024, after which the Court will pronounce its final judgment.

In a first, the Court used this opportunity to recognise the existence of a right against the adverse impacts of climate change. It noted that the right is recognised by the right to equality (Article 14) and the right to life (Article 21) enshrined under the Constitution of India. The Court began by explaining the threat posed by the impacts of climate change to the enjoyment of the right to life. Thereafter, it highlighted that disproportionate vulnerability to these impacts threatens the affected persons’ right to equality. Concluding this discussion, the Court found that the source of the right is in a conjunctive reading of judicial jurisprudence on Articles 21 and 14; India’s climate change action and international commitments, and, the scientific consensus on the adverse impacts of climate change.

Notably, the Court recognised the existence of the right, but did not articulate it any further. Additionally, it also underlined the need for articulation. However, it steered clear of undertaking that task. Arguably, the conscious choice of not articulating the right and only recognising it departs from the Court’s usual practice in environmental cases. Much of Indian environmental law has developed through the Court’s judicial decisions in public interest cases. In several cases, it has transplanted, recognised, and articulated environmental rights and legal principles. While appreciated for being proactive, this practice has been critiqued for judicial overreach and the creation of imprecise rights. Contrastingly, in this decision, the Court’s approach has been that of restraint. Arguably, this is an optimal approach at this early stage of the recognition of the right – in that, it catalyses the discourse on climate rights, simultaneously providing time and space for articulating a more informed right.

However, it must be noted that the Court’s recognition of the right does not appear in the operative part of the judgment. Therefore, it is not binding *per se*. While it will be instrumental in shaping future climate action, the extent to which it can do so remains to be seen.

Just transition framework

The central issue at stake was limiting the adverse impacts of renewable energy projects on the bustard. As rightly noted by conservationist Debadityo Sinha, the judgment approaches the central issue as presenting two competing choices, i.e., either protecting biodiversity or allowing mitigative climate action. In other words, it projects biodiversity protection and climate action as adversarial choices.

Furthermore, the recognition of the right is also contextualised in this approach which juxtaposed biodiversity protection and mitigative climate action. Accordingly, the right so recognised only relates to protecting humans’ interests against climate change.

Going forward, adopting an alternative approach could preclude this conundrum. This approach is: utilising the just transition framework. Currently being used in climate cases around the world, it aims to make transitions to a low carbon economy more equitable and inclusive. It particularly serves the interests of those most affected by such transitions. This includes, *inter alia*, workers, vulnerable communities, and small and medium-sized enterprises. Where the core issue is similar to the one in the present case, using the just transitions framework is an excellent approach. In that it allows protecting underrepresented interests (in the instant case, of the bustard) being threatened by slow carbon transition projects (in this case, solar energy).

This approach is advantageous in three ways. First, it will preclude climate action and protection of biodiversity from being pitted as adversarial choices. Instead, it can create a case for inclusive climate action, i.e., climate action alive to varied rights and interests. Second, it can enable the articulation of more reflexive and inclusive climate rights. To that end, utilising it in climate litigation can ensure that articulation and enforcement of climate rights are sensitive to the interests of the non-human nature and furthers ecological justice. Third, if the framework is used in the final decision of the Court, this case will be one of the first just transition litigations to consider a non-human interest. Of the existing just transition litigations globally, only one other case concerns protecting the interests of the non-human environment. Thus, the present case will be a frontrunner in such litigation. Theoretically, it will contribute to expanding the concept of a just transition to considering more than human interests.

A ‘shared burden’

Given that the final decision of the Court is still pending, this is an excellent opportunity for the judiciary to use the just transition framework and facilitate inclusive and equitable climate action. A right against climate change has been recognised and is yet to be articulated. This provides a productive space for initiating a discourse on the content of the right – an opportunity to make it inclusive and effective. However, this burden is a shared one. It falls not only on the state but also on activists, litigants, and academics – who provide content to rights by participating (indirectly or directly) in the process of their recognition, articulation, and enforcement.



Great Indian bustard



Key Facts

A

Common Name

Great Indian bustard

Aa

Scientific Name

Ardeotis nigriceps



Population

200 individuals worldwide



Height

100 cms or 1 metre



Length

Wingspan of 210-250 cm



Weight:

15-18 kg



Status

Listed in Schedule I of the Indian Wildlife (Protection) Act, 1972, in the CMS Convention and in Appendix I of CITES, as Critically Endangered on the IUCN Red List and the National Wildlife Action Plan (2002-2016). It has also been identified as one of the species for the recovery programme under the Integrated Development of Wildlife Habitats of the Ministry of Environment and Forests, Government of India.



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- They breed mostly during the monsoon season when females lay a single egg on open ground. Males have a gular pouch, which helps produce a resonant booming mating call to attract females and can be heard up to a distance of 500 metres.
- Males play no role in the incubation and care of the young, which remain with the mother till the next breeding season. These birds are opportunist eaters.
- Their diet ranges widely depending on the seasonal availability of food.



- The biggest threat to this species is hunting, which is still prevalent in Pakistan.
- This is followed by occasional poaching outside Protected Areas, collisions with high tension electric wires, fast moving vehicles and free-ranging dogs in villages

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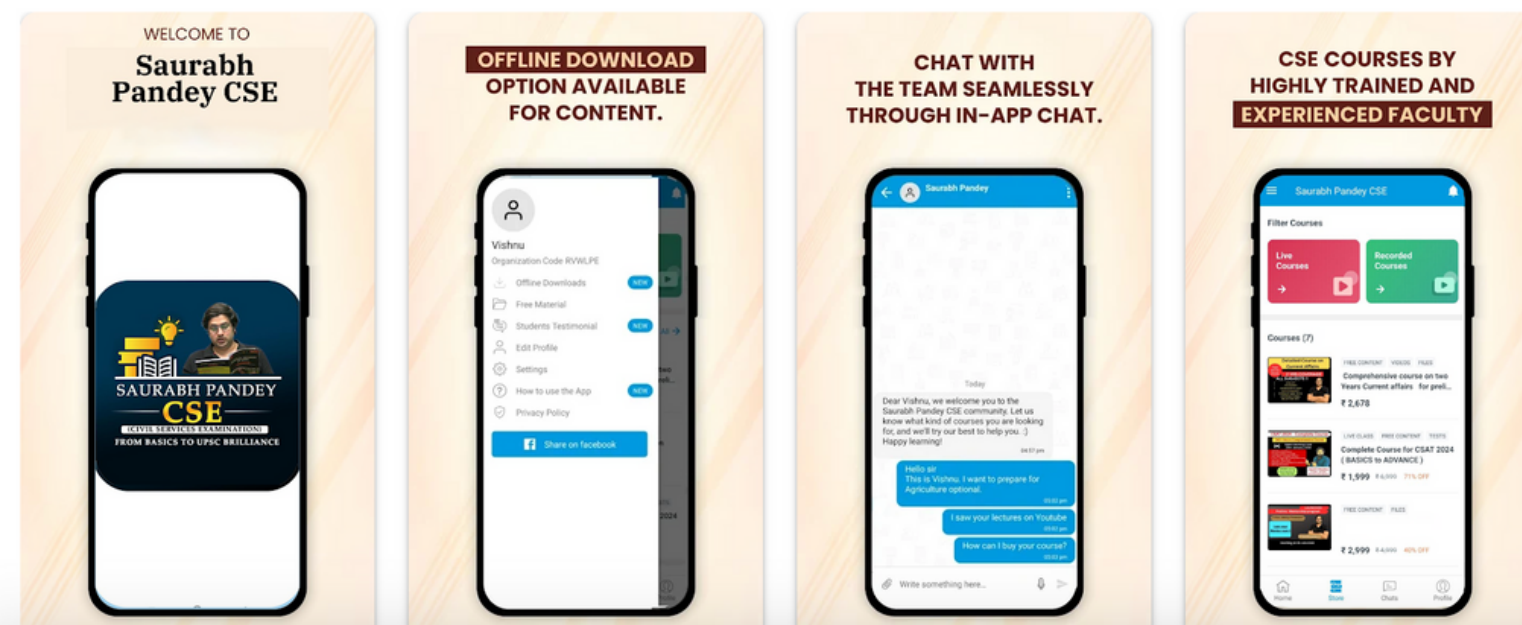
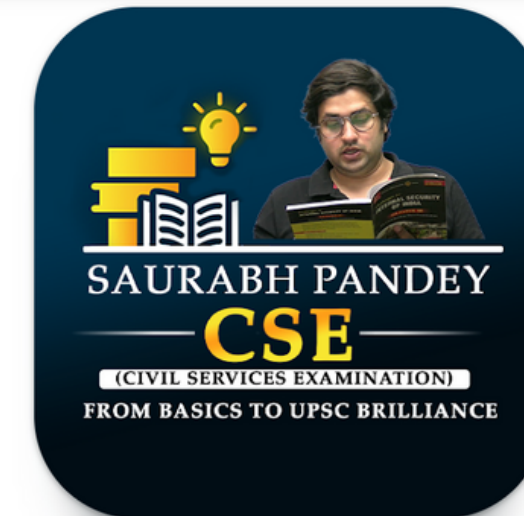
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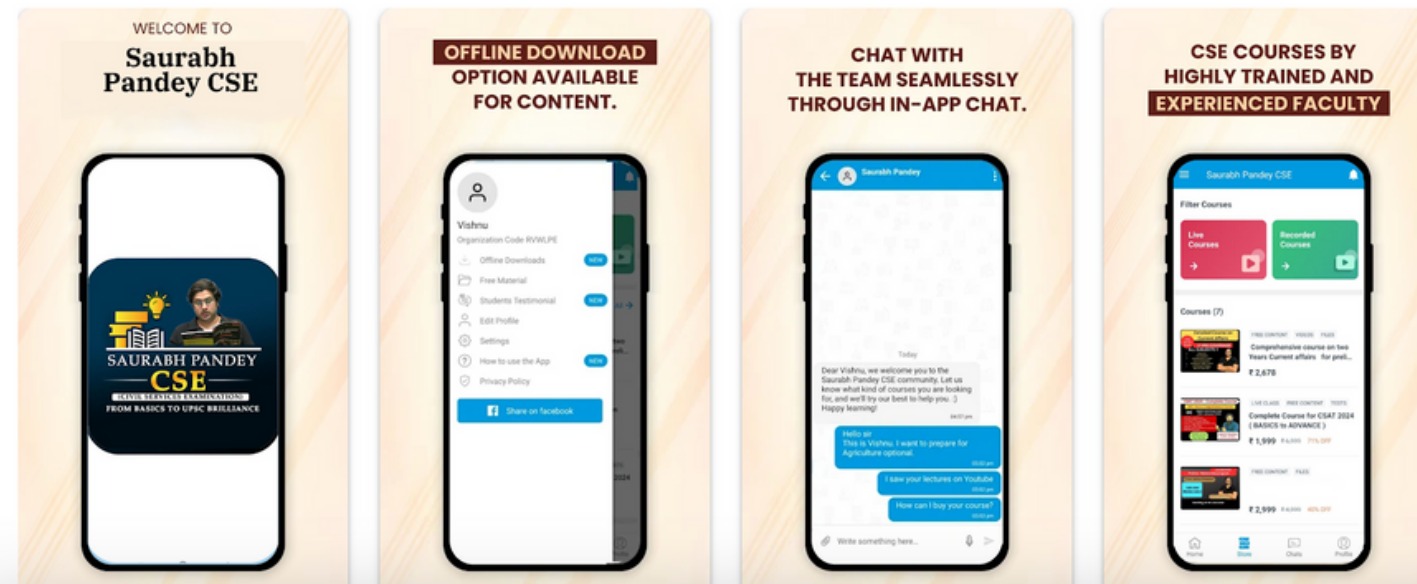
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