The Authority would formulate an 'Integrated Management Plan' for all bird sanctuaries in the State. FILE PHOTO

# T.N. constitutes State Bird Authority to improve sanctuaries

**The Hindu Bureau**
CHENNAI

The Tamil Nadu government has constituted a State Bird Authority to monitor and improve bird sanctuaries, nesting conditions for birds, and ecotourism facilities.

The committee, chaired by Supriya Sahu, Additional Chief Secretary, Environment, Climate Change and Forests, will comprise representatives from various departments such as Forests, Revenue and Disaster Management, Rural Development and Panchayati Raj, Public Works, and Tamil Nadu Tourism Department Corporation.

The Authority would formulate an 'Integrated Management Plan' for all bird sanctuaries, map locations where native and migratory birds visit to create new protected areas for birds, improve visitor facilities and ecotourism development opportunities, as per the recently issued Government Order.

"This is a much-needed authority as Tamil Nadu has 17 bird sanctuaries, of which 14 are Ramsar sites. The State is also part of the Central Asian Flyway so it is important that there is a body to put together the efforts taken in different sanctuaries," Ms. Sahu told *The Hindu*.

The integrated plan is also set to include monitoring the number of birds and addressing local shortcomings. "But some issues such as visitor facilities, toilets are common in all the places so we are looking to improve them," said Ms. Sahu.

Welcoming the establishment of a high-level authority, K.V.R.K. Thirunaranan of The Nature Trust, said steps should also be taken for creating awareness among people on bird conservation.

# A new regime

## India must keep an eye on adverse reactions from new drugs and vaccines

Last week, the Drug Controller General of India cleared, under the provisions of 'emergency use authorisation', a new mRNA vaccine for COVID-19 developed by Pune-based Gennova Biopharmaceuticals, a pioneer in India in developing mRNA vaccines. The vaccine is meant to be particularly effective against the dominant Omicron variant. With the World Health Organization having officially declared the end of the COVID-19 pandemic, there is no longer the obsessive public interest in new variants. Even less so in newer vaccines. Data suggest that the uptake of booster, or 'precautionary doses' of the array of COVID vaccines available in India has been declining for several months. Therefore, the significance of the new vaccine, GEMCOVAC-OM, is that it shows that an Indian company has the capability to make an mRNA vaccine, believed to be amenable to rapid production and scale-up, that could be useful against any future virus.

Normally, vaccines must go through progressive stages of testing, from petri dishes, to animals and expanding cohorts of human test subjects. Doing greater harm than good, or being unable to be better than the alternative in any of these stages is a ground for disqualification. Which is why vaccine development and approvals are a decades-long enterprise. During COVID-19, this risk-averse strategy was deemed unsuitable for the crisis at hand because of which drug regulators globally allowed vaccine makers to combine multiple stages while evaluating efficacy, thus giving greater leeway to experimental formulations. This underlines the basic framework of 'emergency use authorizations (EUA)' adopted by regulators globally. Unlike the U.S. Food and Drug Administration (FDA) that has for many years been evaluating novel drug and vaccine candidates, India's regulatory system has largely been geared toward evaluating formulations that have been approved abroad and in assessing their suitability to India. Mistrust, arbitrary decree and lax regulations have historically plagued clinical trials in India. More than evidence-based assessment, it was a technicality in India's 'New Drugs and Clinical Trials Rules, 2019' that allowed EUA in India for COVID-19 vaccines. A credible regime of phased, clinical trials and independent regulation for new drugs is still in its infancy in India. The FDA still authorises updated COVID-19 vaccines under emergency use provisions because while the pandemic is over, COVID-19 is not and thousands continue to die globally. This alone, however, cannot be the basis for continuing with the EUA regime in India. While the flexibility to accelerate should always be present, India must specify a streamlined regulatory process that weeds out non-essential steps but is hawk-eyed on safety and adverse reactions from new drugs and vaccines.

# Vikram, Pragyan to return for another tryst with the moon

Chandrayaan-3 lander, rover named after those in the previous mission; India's third moon exploration mission slated for mid-July launch

Tiki Rajwi
THIRUVANANTHAPURAM

India's third moon exploration mission, slated for a mid-July launch, will share the names associated with the 2019 Chandrayaan-2 lunar adventure.

The Indian Space Research Organisation (ISRO) plans to retain the names of the Chandrayaan-2 lander and rover for their Chandrayaan-3 equivalents as well, ISRO Chairman S. Somanath told *The Hindu*. This means, the Chandrayaan-3 lander will bear the name Vikram (after Vikram Sarabhai, the father of the Indian space programme) and the rover, Pragyan.

Much to its disappointment, the ISRO had lost the Chandrayaan-2 lander-rover configuration and the payloads aboard after Vikram crashed on the lunar surface while attempting a soft landing. Earlier this month, Mr. Somanath announced ISRO's plans to launch the third moon mission in mid-July aboard the LVM3 (formerly GSLV Mk-III) rocket from Sriharikota. A propulsion module will carry the lander-rover configuration to a 100-km lunar orbit. Once the Vikram lander module makes it safely to the moon, it will deploy Pragyan, "which will carry out in-situ chemical analysis of the lunar surface during the course of its mobility", the ISRO said.

India's second moon mission, Chandrayaan-2, lifts off from the Satish Dhawan Space Centre on July 22, 2019. PTI

**Scientific experiments**

The lander, rover and the propulsion module will have payloads for performing experiments designed to give scientists new insights into the characteristics of earth's lone natural satellite. The lander will have four payloads – Radio Anatomy of Moon Bound Hypersensitive Ionosphere and Atmosphere (RAMBHA), Chandra's Surface Thermo physical Experiment (ChaSTE), Instrument for Lunar Seismic Activity (ILSA) and the LASER Retroreflector Array (LRA).

The six-wheeled rover will have two payloads – the Alpha Particle X-ray Spectrometer (APXS) and the LASER Induced Breakdown Spectroscope (LIBS).

In addition to these, there will be one payload on the propulsion module, the Spectro-polarimetry of HAbitable Planet Earth (SHAPE).

# Did climate change really make U.P.'s deadly heatwave twice as likely?

A deadly heatwave over Uttar Pradesh recently claimed as many as 100 lives. There were subsequently several reports saying that according to a model called the 'Climate Shift Index', developed by a reputable U.S. nonprofit called Climate Central, this heatwave was made twice as likely by climate change

Raghu Murtugudde

A deadly heatwave over Uttar Pradesh recently claimed as many as 100 lives. There were subsequently several reports saying that according to a model called the 'Climate Shift Index' (CSI), developed by a reputed U.S. nonprofit called Climate Central, this heatwave was made twice as likely by climate change.

What is the scientific confidence level in such local attribution of individual weather events to climate change? And what are the consequences of such claims?

## Climate change and weather

An exercise to determine climate change's influence on a weather event involves two exercises: detection and attribution. A heatwave is defined based on the normal temperature of a region; 'normal' in turn is defined based on long-term historical data. The temperatures in Uttar Pradesh during the June 14-16 period met the definition of a heatwave. Put another way, a heatwave was definitely *detected*. Next, in terms of *attribution*, the CSI implies that the heatwave was made twice as likely due to global warming.

Several scientific and socioeconomic questions arise with such proclamations from trusted climate organisations.

Equally important, the experts who developed methods to rapidly compute the extent to which a weather event can be attributed to climate change have set out caveats and shortcomings – and these tend to get lost when the impact of climate change on a particular event is reported to the general public in a context-agnostic manner.

Scientifically speaking, an attribution exercise compares real conditions that have occurred with a so-called counterfactual world - a hypothetical world where climate change has not occurred. Scientists create counterfactual worlds for these weather events using historical weather data and model simulations. The observations are constrained by limitations and the models are never accurate. Setting them aside, we must also take a fuller view of attributions and their associated claims.According to Climate Central, its CSI is "grounded" in work described in a paper published in June 2022.

## Model accuracy

Experts developed rapid attribution methods to help with policies, climate adaptation, and for health-impact studies. On the other hand, the outcomes of heatwaves and such extreme weather events are related to the vulnerability of the population exposed to the hazard, which attributions must account for - but they don't.

Women rest under a tree in Ballia, Uttar Pradesh. REUTERS

Attributions also do not account for the confluence of multiple natural weather conditions as well as human decisions that led to a heatwave being so deadly. (The most dire consequence of natural hazards often tends to be the product of too little attention being paid to early warnings that may already have been issued.) Our historic analysis of temperatures allows us to say, with high confidence, that in the past few decades, heatwaves have been getting worse over many parts of India even as other parts of the country appear to be cooling. On the other hand, our confidence in the changes in extreme rainfall events is not as high. This is partly due to the smaller spatial scales at which rainfall events happen and their ability to change at shorter timescales.

Some of the low-confidence in historic changes is also related to a lack of reliable data with sufficient spatial and temporal coverage, even though India has some of the best rainfall data among the world's countries. Poor data coverage in turn affects the counterfactual world built by combining the sparse data and imperfect models. Ultimately, This is how the inferred impact of climate change on a particular weather event can be erroneous. In fact, we must accept that there is really no way to scientifically ensure the accuracy of such attributions.

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In this context, we need to ask some key science questions. A rather unique set-up of events – including warming of the northern Indian Ocean from January onwards and the cyclones and typhoons during May and June – have disrupted the normal march of the southwest monsoon this year. Also playing out in the background is the world's transition from a La Niña winter in 2022-2023 to the emerging El Niño summer of 2023.

These events also underscore the fact that natural variability – i.e. natural variations in the climate – always adds to or subtracts from the effects of climate change at the local level. For example, South India can have its hottest summer and in the same season Chennai can have its coolest day in June.

Climate change also affects the natural variability itself. The number and intensities of tropical cyclones as well as the El Niños and the La Niñas are also likely being affected by climate change. But the models do not agree on some of these estimates; the models used for attributions don't even simulate cyclones!

## The U.P. heatwave

The attribution approach that the CSI has taken does not consider such local weather systems. Studies have found that even irrigation can affect heatwaves, but neither the attribution data nor the models in the Uttar Pradesh case represent such effects.This brings us to the socioeconomic and sociopolitical implications of claims that climate change made the heatwave X-times more likely. What is the longer-term context? Should farmers worry about what it means for the rest of the agricultural season? Should people start moving? Should businesses and investors begin to reconsider their plans in the State?

It is naïve to assume that limited indices - which have their purpose in a specific context, in a supplementary capacity - will only impel climate adaptation, to deal with heatwaves, and not have other off-target consequences.

So, we desperately need a 360-degree view of such claims, especially in light of their potential deficiencies. Event-by-event attribution on a daily timescale is neither possible with sufficient accuracy nor is it practically valuable. It can also divert resources away from other, more worthy efforts, such as improving early-warning systems.

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# The India-U.S. deal for 31 MQ-9B drones

What are the capabilities of the soon-to-be procured MQ-9B High Altitude Long Endurance Unmanned Aerial vehicles? What is the process to be followed for timely delivery?

EXPLAINER

Dinakar Peri

**The story so far:**

U.S President Joe Biden and Prime Minister Narendra Modi welcomed India's plans to procure General Atomics MQ-9B High Altitude Long Endurance (HALE) Unmanned Aerial vehicles (UAV), the joint statement issued last week after talks between the two leaders said. This sets the stage for the acquisition of 31 of these armed UAVs, 15 SeaGuardians for the Indian Navy and 16 SkyGuardians – eight each for the Indian Army and Air Force.

**What is the cost and the process to be followed?**

Giving more details on the nature of purchase, the joint statement said that the MQ-9Bs, which will be assembled in India, will enhance the intelligence, Surveillance, and Reconnaissance (ISR) capabilities of India's armed forces across domains. "As part of this plan, General Atomics will also establish a Comprehensive Global Maintenance, Repair and Overhaul (MRO) facility in India in support of India's long-term goals to boost indigenous defence capabilities."

The procurement process has commenced with the Defence Acquisition Council (DAC) chaired by Defence Minister Rajnath Singh according the Acceptance of Necessity (AoN) on June 15, the first step in the process. The deal will be executed through the Foreign Military Sales (FMS) route of the U.S. government and is expected to take a few months to be concluded.

On this a Ministry of Defence (MoD) statement said the AoN noted the estimated cost of $3,072 million provided by the U.S. government. "However, price will be negotiated once policy approval of the US Government is received. The MoD will compare the acquisition cost with the best price offered by General Atomics (GA) to other countries. The procurement is in progress and would be completed as per the laid down procedure." The price and other terms and conditions of the purchase are yet to be finalised and are subject to negotiations, the MoD statement noted.

**An upgrade:** The MQ-9B SkyGuardian and, bottom, an aerial shot of the MQ-9B SeaGuardian. GA-ASI

According to a senior MoD official, India is negotiating to increase the indigenous content under the deal. "The current indigenous content proposed is 8-9% while India is hoping it can be increased upto 15-20%. Discussions are underway. General Atomics is positive to it and the U.S. government has to accept it," the official said. General Atomics is in talks with several Indian companies for domestic manufacture of components as part of the deal, officials said. This could expand further to potentially include the manufacture of some electronics, sensor and avionics if the indigenous content goes up.

Detailing the process to be followed, the MoD statement said that under the FMS route, a Letter of Request (LOR) would be sent to the U.S. government where tri-services requirements, details of equipment and terms of the procurement would be included. "Based on the LOR, the U.S. government and the MoD will finalise the Letter of Offer and Acceptance (LOA) where details of equipment and terms of the procurement would be negotiated and finalised in accordance with the FMS programme and the price and terms offered by the U.S. Government and General Atomics to other countries", the Ministry detailed. The U.S. Administration will have to notify the U.S. Congress of the sale, expected to be a formality in this case. In the penultimate step, the deal has to be approved by the Cabinet Committee on Security after which the contract will be concluded.

**What do the UAV's bring in terms of capability?**

The MQ-9B has two variants – the SkyGuardian and the SeaGuardian, its maritime variant. The MQ-9B is designed to fly over the horizon via satellite for up to 40 hours, depending on configuration, in all types of weather and safely integrate into civil airspace, according to its manufacturer. For instance, the SeaGuardian configuration can include a 360-degree surface-search maritime radar, automatic identification system, sonobuoy monitoring system, and sonobuoy dispensers for persistent anti-surface and anti-submarine warfare missions.

According to General Atomics, the MQ-9B can provide roughly 80% of the capability of a large human-flown maritime patrol aircraft at about 20% of its cost per hour. That makes it much more economical for navies to, for example, send out SeaGuardians to clear big volumes of air or sea and then, if anything of interest is discovered, vector in a human-crewed aircraft to save it the time, cost, and wear that it otherwise might have expended, the company stated. This is the primary reason the Indian Navy is keen on these UAVs as it significantly reduces the wear and tear on manned aircraft, its fleet of 12 P-8I long range maritime patrol aircraft, as well as reduce crew fatigue in keeping an eye over the wide expanse of the Indian Ocean Region and beyond.

For the Army and Air Force, the MQ-9Bs can provide round-the-clock surveillance looking far beyond the borders, for instance on the movement of Chinese military buildup and troop movement along the Line of Actual Control (LAC) and deep inside. It also seamlessly integrates with other U.S.-origin platforms that India operates, the P-8Is, AH-64 Apache attack helicopters, MH-60R multi-role helicopters among others expanding MQ-9B's multi-domain mission set.

**What UAVs are already in service?**

The Indian Navy has leased two MQ-9As from General Atomics with the maiden flight taking place on November 21, 2020. In their two years of operation till November 2022, they had completed 10,000 flight hours, and "helped the Indian Navy to cover over 14 million square miles of operating area", General Atomics has announced.

At Aero India in Bengaluru in February 2023, Hindustan Aeronautics Limited (HAL) and General Atomics announced that the turbo-propeller engines which power the MQ-9B will be supported by HAL's engine division for the Indian market. "The companies are looking to formulate a comprehensive engine MRO programme for upcoming HALE Remotely Piloted Aircraft projects," a joint statement said.

The MQ-9 is a significant technological leap from the original RQ-1/MQ-1Predator that heralded the arrival of long endurance armed drones at the end of the twentieth century. Armed with AGM-114 Hellfire missiles, the Predator became a symbol of the U.S. war on terror after the 9/11 attacks, with their extensive employment in Afghanistan and the tribal areas of Pakistan in the early 2000s. The RQ-1 Predator, which was first flown by the U.S. Air Force (USAF) in 1995, was retired in 2018 and replaced by the MQ-9 Reaper.

According to the USAF, the Reaper is employed primarily as an intelligence-collection asset and secondarily against dynamic execution targets. "Given its significant loiter time, wide-range sensors, multi-mode communications suite, and precision weapons, it provides a unique capability to perform strike, coordination, and reconnaissance against high-value, fleeting, and time-sensitive targets."