SUPERSENSITIVE Amphibian skin is extremely thin, which makes frogs acutely sensitive to even minor changes in temperature, humidity, and air or water quality. GETTY IMAGES

What frogs tell us about the planet

CLIMATE CHANGE IMPACT A team of scientists at Kalakad Mundanthurai Tiger Reserve reason that analysing sound recordings of frog croaking combined with readings from climate data loggers could improve our understanding of the effect of climate change on amphibian populations, writes **Atula Gupta**

Sitting 100 feet above the ground, in the dense canopies of the Kalakad Mundanthurai Tiger Reserve, three researchers were keen to finish their work before the approaching rain clouds drenched them from head to toe. But the trio were distracted, because with the impending storm, the forest had come alive with songs of frogs that happily conversed with the hovering clouds. It was right at that moment that a striking idea was born in the minds of the scientists: What if frog calls changed with changing climate? What if frogs could foretell the future of the planet?

Intrigued by the cacophony of sound that the rains triggered, KS Seshadri with T Ganesh, and S Devy initiated a monitoring programme to document the presence, or absence, of amphibians in the Kakachi-Kodayar region of Kalakad Mundanthurai Tiger Reserve (KMTR), paying special attention to canopy frogs.

The study's first aim is to document anurans, their calls and habitat, in the canopy or on the ground, and will be the first time that such an extensive effort is being made in India to monitor amphibians for long-term population dynamics based on calls.

Since frogs and toads respond to changes in atmospheric moisture and temperature, and specific frogs sing at specific times of the year, the team reasoned that an analysis of sound recordings, combined with readings from climate data loggers, could help improve understanding of the effect of climate change on amphibian populations.

Over the past two years, the researchers have successfully gathered lots of sounds during the south west and north-east monsoons using a programmable automated sound recording device called song meter. These calls are then being matched with individual frogs to identify them.

At the third stage, the sounds are being coupled with automated weather data logger device to know eventually how over the years, weather conditions are changing and affecting the presence or absence of frogs.

Weather forecasters

Amphibian skin is extremely thin, which makes frogs acutely sensitive to even minor changes in temperature, humidity, and air or water quality.

"Amphibians have long been considered to be the barometers of the climate and any subtle variations in the atmospheric conditions like moisture availability and temperature is likely to have profound impacts on them," said Seshadri. According to him, some frogs vocalise in a wide window of time while some are active for a very short duration, may be for a few weeks. If the climate change predictions are true, by monitoring the vocalising activity, an activity calendar for each of the indicator species can be made. The information can be discerned in the context of climatic variations.

Worldwide, various researchers have noted that frog species are dying at a very high rate and global warming may be the reason for the widespread extinctions. In 2006, American scientists suggested that many of the county's frog species were vanishing due to deadly infectious fungal diseases spurred by changing water and air temperatures.

"Disease is the bullet killing frogs, but climate change is pulling the trigger," said Pounds, lead study author. "Global warming is wreaking havoc on amphibians and will cause staggering losses of biodiversity if we don't do something fast."

India is home to 277 amphibians of which about 150 occupy the IUCN Red List for threatened species. Many of these species have been recently described to science and are already in danger of extinction. The long-term monitoring of frog activity therefore will be invaluable in knowing the greater impact of climate change and also saving the species.

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Role frogs play

But why invest so much time and money on saving frogs and not tigers that naturally seem to have a more poignant presence in the forests and are also known as the umbrella species whose conservation will help save all other species?

In nature's drama, even the seemingly insignificant frogs have an important role to play. Amphibians, although small, have a great impact in sustaining the biodiversity and ensuring that forest cover remains, monsoon showers occur in time and river do not run dry. If frogs and toads are gone, it will lead to rise in insect population, their main preys. These insects will feed on leaves destroying forests and leading to zero ground water precipitation. Clouds will not form and thus without rains, rivers will dry.

That the disappearance of frogs will then ultimately affect forests, rivers and humans is a given.

The human-led changes brought on to the planet have changed the dynamics of the earth so much that the possibility of mass extinction of all living beings is no more a fantastic thought.

That the summers are becoming hotter and winters unbearably cold, are phenomenon that everyone observes but no one cares enough to interpret the changing pattern with human enforced changes like pollution, deforestation and excessive harnessing of natural resources.

India also trails far behind when it comes to actual on-site data of its flora and fauna. Will the croak alarm finally wake us from our ignorant slumber? The answer lies in the future.