



सीएसआईआर ने किया उच्च तापमान ईंधन सेल प्रणाली विकसित

स्वाति ठाकुर

नई दिल्ली: भारत के राष्ट्रपति राम नाथ कोविंद द्वारा नई दिल्ली स्थित विज्ञान भवन में देश की पहली स्वदेशी उच्च तापमान ईंधन सेल प्रणाली का अनावरण किया गया।

इस उच्च तापमान ईंधन सेल प्रणाली का विकास 'न्यू मिलेनियम इंडियन टेक्नोलॉजी लीडरशिप इनिशिएटिव' के तहत वैज्ञानिक और औद्योगिक अनुसंधान परिषद द्वारा भारतीय उद्योगों की साझेदारी में किया गया है।

वैज्ञानिक एवं औद्योगिक अनुसंधान परिषद (सीएसआईआर) की प्रयोगशालाओं में विज्ञान के विकास के पदार्थों को उद्योग द्वारा व्यवहार में लाने के विषय में सीएसआईआर की तीन प्रयोगशालाओं पुणे; नई दिल्ली और कराईकुडी चेन्नई केंद्र और भारत के दो उद्योगों (मैसर्स थर्मक्स लिमिटेड, पुणे और मैसर्स रिलायंस इंडस्ट्रीज लिमिटेड, मुंबई) के बीच सार्वजनिक रू निजी भागीदारी (पीपीपी) का एक उदाहरण प्रस्तुत किया गया है।

ये 5.0 किलोवाट की ईंधन सेल प्रणाली हरित तरीके से मेथनॉल



पहली स्वदेशी ईंधन सेल प्रणाली लांच करते राष्ट्रपति रामनाथ कोविंद (साभार: पत्र सूचना कार्यालय)

/ जैव-मीथेन का उपयोग करके बिजली पैदा करती है जिसमें आगे के उपयोग के लिए बाई-प्रोडक्ट के रूप में गर्मी और पानी होते हैं, जिसकी कुशलता 70 प्रतिशत से भी अधिक होती है जो कि अन्य ऊर्जा स्रोतों के साथ शायद संभव नहीं हो सकती है।

पेट्रोल डीजल बहुत सीमित है। दुनिया में बहुत कम आपूर्ति में है। जिस तरह से आज पेट्रोल डीजल को उपयोग में लाया जा रहा है। बहुत जल्द वह खत्म हो

जाएंगे। दूसरी सबसे बड़ी समस्या यह है कि किसी भी पेट्रोल और डीजल इंजन आधारित गाड़ी या मोटरसाइकिल से प्रदूषण होता है। वह बहुत नुकसानदायक है।

इसीलिए वैकल्पिक तरीके के जरिए गाड़ियों को कैसे पावर में ला सकते हैं, बिना पेट्रोल डीजल के इसके लिए फ्यूल सेल सबसे अच्छा साधन है। फ्यूल सेल के दो सबसे बड़े फायदे हैं। यह किसी पर निर्भर नहीं होता। हाइड्रोजन से इसका आउटपुट बिल्कुल

साफ पानी है। हमारे वातावरण को किसी भी तरह की हानि नहीं पहुंचाता।

डीजल ग्रसलिंग प्रदूषित डी सी सेल को ईंधन सेल द्वारा प्रतिस्थापित किया जाएगा जो पूरे भारत में हरित स्वच्छ और अत्यधिक विश्वसनीय बैकअप पावर समाधान और पूरे भारत में 6 लाखों टेलीकॉम टॉवरों की आवश्यकता को पूरा किया जाएगा। साथ-साथ सुधारक ईंधन सेल वैकल्पिक

दो इलेक्ट्रिक व्हेकल हैं और अस्थायी रूप से काम करते हैं।

ईंधन सेल से अस्वीकार ऊष्मा को 75% से अधिक सभी दक्षता से अधिक बढ़ाकर बिजली और ए सी प्रदान करने के लिए अच्छी तरह से उठाया जाता है।

पावर कंडीशनर को बिजली का उत्पादन करने के लिए हवा से ऑक्सीजन के साथ विद्युत रासायनिक प्रतिक्रिया से आउटपुट स्थिर डी सी या ए सी

को स्थिर किया गया।

परंतु साथ ही साथ फ्यूल सेल में कमियां भी हैं।

हाइड्रोजन को इकट्ठा करने में मुश्किल होती है। दुनिया में बहुत बड़ा हिस्सा हाइड्रोजन से बना है परंतु उसे अलग से निकालना कठिन है। इसे स्टोर करना मुश्किल है, लंबे समय तक स्टोर करके नहीं रख सकते।

विकसित किए गए ये ईंधन सेल उच्च तापमान प्रोटॉन एक्सचेंज मेम्ब्रेन (एचटीपीईएम) प्रौद्योगिकी पर आधारित हैं। ये प्रणाली छोटे कार्यालयों, वाणिज्यिक इकाइयों, डेटा केंद्रों जैसी स्थिर बिजली एप्लीकेशनों के लिए सबसे उपयुक्त है; जहां एयरकंडीशनिंग की समानांतर जरूरत के साथ ज्यादा भरोसेमंद बिजली एकदम आवश्यक है।

यह प्रणाली टेलीकॉम टावरों, दूरस्थ स्थानों और रणनीतिक एप्लीकेशनों के लिए कुशल, स्वच्छ और विश्वसनीय बैकअप पावर जनरेटर की आवश्यकता को भी पूरा करेगी। यह प्रणाली डीजल जनरेटिंग (डीजी) सेटों की जगह लेगी और वातावरण को स्वच्छ बनाने में सहयोग देती।

Hog deer population at the Manas National Park recovers

Harshil Thakur & Manish Gupta

Guwahati: According to the latest population survey carried out by the researchers at the Wildlife Institute in India, the population of the endangered hog deer in Manas National Park in Assam stands at 3,545 individuals. A previous estimate pegged it at 1,626 individuals.

The present study, published in the Journal of Threatened Taxa, was conducted in the central and eastern ranges of the park by making field observations on elephant-back from 2014 to 2016. Later, statistical estimations were employed to calculate the hog deer population.

The park harboured a population of about 10,000 hog deer in 1980's. But armed conflicts in the area from the mid 1980's to 2003 lowered its population density. The instability resulted in habitat degradation, disruption in park's infrastructure and poaching in the ab-



A mother hog deer feeding her baby calf at Kaziranga National park in Assam (Credit: Nejib Ahmed/Wkimedia commons)

sence of normal law and order. According to the study, 70 per cent of the hog deer population in Manas was wiped out during the period of conflict. Due to the decline in population across its range, Hog deer was categorised as endangered by International Union for Conservation of Nature (IUCN) in 2008.

The present increase in population is attributed to the conservation efforts by the government and non-governmental organisations,

especially after the establishment of Bodoland Territorial Autonomous Districts (BTAD) in 2003 and consequent decline in the armed conflicts in the region. Efforts to convert former poachers and hunters into volunteers to engage in conservation of the park was instrumental in this, says the study.

"With the restoration of governance and administration, the management intervention improved substantially. A major step was the conversion of the former poachers/

hunters into conservation volunteers and engaging them in regular patrolling of the park along with the forest personnel", it said.

The authors claim that the increase in the figures might also be due to the observations made on elephant-backs unlike similar studies in the past which relied on observations made on foot.

Despite the increase in the number of individuals, there are still threats to the deer population in Manas, says the study. Degradation of grasslands in the park due to spread of invasive plants and rampant cattle grazing is a major issue.

However, hunting and attacks by feral dogs are still a matter of concern. "We recorded six incidents over a period of two months between February-March 2016 where the feral dogs attacked and killed deer, although the dogs were not seen eating them", said the researchers.

Illegal traders smuggle more than ten thousand turtles from India annually

Himanshu Sharma

New Delhi: As much as 200 tortoises and turtles, harvested straight out of the wilderness, enter the illegal market in India every week, according to the estimates of a new report published by TRAFFIC, an international organisation which monitors the global illegal wildlife trade.

The report shows that over 1, 11,310 turtles and tortoises were smuggled by illegal wildlife traders in India during the 10 year period between 2009 to this year. That makes it 11,000 individuals a year.

The report which aggregated the figures based on documented seizures of illegally



Indian Star Tortoise is the most smuggled tortoise in India (Credit: N A Naseer/ Wikimedia commons)

traded turtles during the period indicates that the actual numbers could be much higher as a large proportion of this illegal trade goes undetected.

Uttar Pradesh and West Bengal turned out to be two major hotspots of this illegal trade, representing over 60 per cent of seizures by law

enforcing agencies documented during the period of the study.

A demand for exotic food, pets, and medicines in the international and domestic

market is the major reason behind this growing trade. "It is extremely worrisome to see the scale of the illegal

domestic market for these species for the pet trade and meat consumption" says Dr. Saket Badola, one of the authors of the study.

Even though most turtles and tortoise species in India are protected under the Wildlife Protection Act, the findings of the study reveal that the illegal trade is

still flourishing.

For the duration of study, 14 different species of turtles and tortoise in India were found to be unlawfully traded.

Among these, Indian Star Tortoise accounted for 49% of the trade, followed by Indian Soft-shell Turtle (26%), Indian Flap-shell Turtle (15%) and Black-spotted or Spotted Pond Turtle (9%). "The size of seizures of Indian species within India is indicative of a well-organized network of collectors, transporters, and traffickers operating this trade" Dr. Badola said.

As the penal provisions associated with the illegal trade of different turtle species under

the Wildlife Protection Act vary, species-level identification of turtles and tortoise by law enforcement officials is critical for ensuring appropriate action. However, this is a challenge, shows the findings of the study. In 51.5% of seizures made by law enforcement officials, the species were not identified or reported.

This calls for imparting training and awareness in this regard. "Training wildlife law enforcement agencies in identifying the species in trade is crucial to combating its poaching and illegal trade", says Dr. Shailendra Singh, Director of Turtle Survival Alliance India Program.

Reporting Rakhigarhi DNA studies: when sensationalism took over science in Indian media

Preshita Thakur

In the realm of Web 3.0 and clickbaits, what if the headline culture, the sensationalism or the politicization has truly hindered the value and importance of true Science Journalism? It seems that the Indian media have been carried away by such vested interests while reporting recent studies about Indus Valley Civilisation (IVC).

When a group of researchers from India and abroad recently published a much awaited study about the DNA samples collected from excavated IVC sites in Rakhigarhi, a village in Haryana, Indian media went berserk. Many mainstream media outlets went ecstatic to mix up what was revealed in the peer-reviewed study with glaring contradictions and high claims made by one of the authors in a press meet.

Tenets of professional science journalism consider peer-reviewed research as credible information, vetted by experts in the respective fields. So press meet claims made by scientists like in case of detection of gravitational waves, are always approached cautiously. In case of the Rakhigarhi study, media persons had both the options- the peer-reviewed study was available and then the press conference by the lead author. But they liberally mixed up both, giving actual science a back-seat.

But this is not a discussion of one's political or personal beliefs or how the research was used in any political propaganda (if any). It is simply that many of the reported claims were not made by the published research. In reality, the Rakhigarhi DNA study pub-

opinion

lished in the journal *Cell* states that the inhabitants of the Indus Valley Civilization lack Steppe pastoralist (ancient Eurasian farmer) ancestry that brought farming in South Asia. This study did not debunk the 'Aryan Invasion Theory' but instead pointed out that the invasion happened much later than the Indus Valley Civilization which explains the spread of Indo-European languages in South Asia. It also pointed out that agriculture was already practiced, contrary to the earlier belief that the migrants from Iran might have brought the practice here.

Despite the peer reviewed version of the study not mentioning even a single word "Aryan" or "Aryan invasion Theory" or making any direct claims that it debunks the theory, many news outlets used direct quotes attributed to the study which never existed in the published version. For instance, the Hindustan Times report on 7th September carried the following claim:

The study also says the people of Harappan civilisation are the ancestors of the most of the population of South Asia. "The Aryan invasion theory is based on very flimsy ground," it says.

The way the above claim is presented purports that the sentences are taken directly from the study. But that is not the case.

Such claims suddenly found a lot of takers, especially among the right wing troll armies, making the half-truths go viral. Several publications from the Economic Times to The Times of India to News18 went along to make such claims, especially in the headlines, mainly based on the comments of the author in the press conference without any regards to actual study or other scientist's interjections.

On the other hand, another related study published in the journal *Science* found no attention in the Indian mainstream media. It suggested that some form of migration did take place in the Indus Valley Civilization. In contrast, many international media outlets compared the findings of both the studies and made a balanced reporting, giving importance to the actual findings.

The press coverage around the Rakhigarhi DNA study in India is one of the many prime examples of the hindered attempts at science journalism, a true case of misinterpreting or misreporting scientific research. Science being one of the major educative and informative beats of journalism; the responsibilities of journalists working in it demands more in-depth journalistic research and not being carried away by tall claims with vested interests.

On the other hand, the topic of our origin will continue to dwell interest until a definite answer is found, the Indus Valley Civilization at the centre of it all. Until then, there is a definite need to listen, read, understand and write the truth.

Golden Apple Snail may invade parts of South Asia, shows study

Umang Arora

New Delhi: According to a study carried out by the researchers at the Chinese Academy of Sciences, Golden Apple Snail, an invasive species of freshwater snail, may spread across parts of South and West Asia in the near future.

These species are considered 'invasive' as they populate at a faster rate and cause substantial loss to agriculture and freshwater wetlands. The researchers found that the spread of the species is influenced by factors like humidity, temperature, precipitation and human population density.



(From Left) Eggs of Golden Apple Snail; Golden Apple Snail shells collected from an infested paddy field in Camodia (Credit: Frank Starmer)

Golden Apple Snail is the native species of South America and was first introduced to Asia in 1980, through South China from Argentina for aquaculture and food purposes. The study found that it is presently distributed across regions

with average temperature of 20-25 Degree Celsius and average annual rainfall of 1500mm.

Based on the examination of the dispersal pattern of the species across the globe presently, researchers warn that it might become an



imminent invasive threat to freshwater habitats in South and West Asia.

Climate change is one of the leading factors determining the distribution pattern of this species across the world. The researchers claim that estimated

increase in global mean temperature would result in relatively high temperatures during the winters in the Indian sub-continent. Such a condition, along with the population density and other factors, create a preferable condition

for the spread of the invasive snail species.

"Based on our results, this species shows enhanced ability of growth and distribution in the invaded areas, especially with greater capacity to spread in tropical and subtropical areas of Asia", says the study which was published in the Current Science journal.

"Considering the climate change trend and environment characters, we further speculate that it will have a trend of moving to potential habitats in South and West Asian countries", it said.

Menstrual cups a hygienic alternative but adoption rate low, says Lancet study

Shalini Thakur

Dharamshala: Menstrual cup is an alternative to existing menstrual products which is gradually getting popular in India. However, the adoption rate of such alternatives in developing countries is influenced by several factors shows a recent study published in the Lancet journal.

According to the study, menstrual cups are a safe option for menstruation management and are being used internationally. These are inserted into the vagina, and the blood is collected in the receptacle, which can hold 10-38 ml of blood. The menstrual cup should be emptied every 4-12 hour, depending on menstrual flow and type of cup.

Two types of cups are available, a vaginal cup, which is generally bell-shaped and placed in the vagina, and a cervical cup, which, like a diaphragm for contraception, is placed around the cervix high in the vagina. Menstrual cups are made of medical-grade silicon, rubber, latex, or elastomer and can last up to 10 years, resulting in an eco-friendly nature.

Adoption of menstrual cups was much slower than that of menstrual pads in India, shows the study. The adoption was mainly influenced by the presence of friends using it, training and familiarization. "Self-reported increased use 2 months after distribution was associated with the presence of friends who successfully used the menstrual cup", in countries like Nepal and Kenya, says the study.

The study systematically aggregated and analysed the findings of 43 studies which in total had 3,319 participants to understand different aspects like the adoption rates, issues and benefits of using menstrual cups. It found that decrease in stress and improved mobility was reported by the participants as the advantages of using menstrual cups.

"During college times I had the worst peri-



Representational image

ods. They were often so heavy that I bleed through a super pad in an hour. I was also drastically underweight and as a result had very irregular periods that started with no warning, so it was very difficult for me to manage the flow of my periods" says Anita Thakur a 22 year old from Dharamshala. "After giving a try to a menstrual cup, it became easy for me to roam around freely during my period time which was not possible earlier", she added.

"I used to prefer pads but this time I had to travel at night, so I decided to use a menstrual cup as changing pads is a tough task particularly when you are travelling at night. The whole journey was so relaxing and contented that I didn't even realize that I am on my periods. It was more affluent as compared to using pads" says Vipasha Bisht from Kinnaur, Himachal Pradesh.

Menstrual pads, the most popular hygienic product with the adult female population in urban and parts of rural India, are meant for single-use. Since they are mostly non-recyclable, they create a severe waste management issue too.

"When we talk about sanitary napkins, after the use, it is the biomedical waste which cannot be recycled and further there is no treatment for decomposition also", says

Anu Bala, who pursues an M.A environmental sciences from Central university of Himachal Pradesh.

"Menstrual cup is a change that should be brought in by creating awareness at educational institutions so as to train women and girls how to use it. Also, I agree with the fact that there might occur any problem in inserting the cup into the vagina, but the only solution for it is, awareness about the product, as well as exactly how to wear it,"- says she.

The Lancet study points out that the expenditure and environmental costs of using cups instead of pads would be very less. "if compared with using 12 pads per period, use of a menstrual cup would comprise 5% of the purchase costs and 0.4% of the plastic waste, and compared with 12 tampons per period, use of a menstrual cup would comprise 7% of the purchase costs and 6% of the plastic waste", it said.

A small section of the sample from the past studies reported issues of using the cup also. These included allergies or rashes, urinary tract complaints and similar issues. However, they constitute only 25 instances or individuals (0.75 per cent) out of the 3,319 individuals in the pooled sample of the Lancet analysis.

Researchers develop drug to reverse damage caused by heart attack

Ajay Kumar

Toronto: Results of a recent preclinical experiment of a new drug on mice show that it can prevent heart tissue damage and consequent heart failure caused by a heart attack. The drug successfully modified the body clock mechanism of the heart tissues which otherwise trigger harmful immune response in the event of a heart attack.

Researchers from the University of Guelph in Ontario, Canada who conducted the experiment claim that the survivors of heart attack can be treated with this medicine in a much better way than traditional therapies.

"This research is really exciting because it opens the door to use circadian medicine therapies to heal heart

attacks after they occur and to prevent the subsequent development of heart failure," said Tammy Martino, a co-author of the study who is an expert in circadian medicine.

Circadian medicine is a stream of medical sciences aims to modify biological clock, known as the circadian clock, in the cells for treating health conditions.

The circadian clock is found in virtually all cells of the body. It consists of genes and proteins that interact during 24-hour day and night cycles to regulate key functions such as heart rate and blood pressure.

In the experiments on mice, the treatment minimized the production of cellular sensor called NLRP3 inflammasome that contributes to scarring of heart tissue after a heart attack.



Representational image (Credit: Wikimedia Commons)

This is a usual response of the clock mechanism which controls the healthy cardiovascular physiology as well as how the heart responds to damage and undergoes repair. However, these scars usually lead to incurable heart failure leading to death of patients.

According to the results of the study, which was published in the journal *Nature Communications Bi-*

ology, the new drug when administered even after a day of the heart attack, led to less inflammation and better cardiac repair in mice.

"What we are discovering, is that the circadian clock mechanism is important not just for heart health but also for how to heal from heart disease", said Martino.

The drug specifically targets REV-ERB, a family of nuclear

receptors that regulate the circadian clock. The researchers found that activating REV-ERB with SR9009 in mice lowered the production of NLRP3, when they administered the drug after conventional heart attack treatments.

Since REV-ERB receptors are most active during sleep, the researchers tested the drug with some of the mice at bedtime. Those animals

showed better heart healing in comparison to the mice which were given the drug when they were awake.

The results suggest that the first dose could be given during the initial treatment after a heart attack with a follow-up dose at sleep time, they said.

"People can survive heart attacks because the heart won't even be damaged. We were amazed to see how quickly it worked, and how effective it was at curing heart attacks and preventing heart failure in our mouse models of the disease", said Martino.

The discovery might ultimately help in other heart therapies involving early adverse inflammatory response such as organ transplant or valve replacement.

Young, unemployed drug abuse patients have higher tendencies to self-harm, shows study

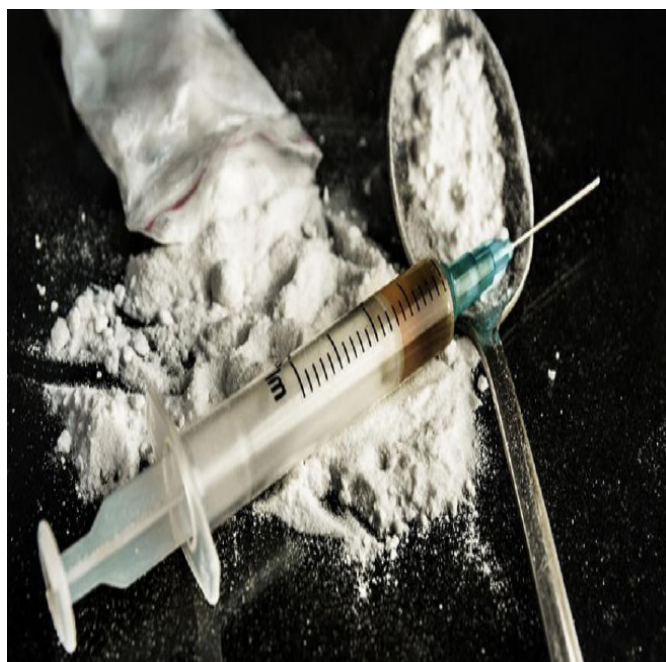
Sayed Adi Shah Ashraf

New Delhi: According to World Health Organisation, a suicidal death happens every 40 second.

There are many factors responsible for suicide but a recent study showed patients with a history of drug abuse exhibit higher tendencies of self-harm.

The observational study based on 300 patients in a hospital for drug abuse patients in India found that a tendency to harm themselves was present in 32.7 per cent of the patients.

This, according to the researchers, is much higher than the proportion of people with self-harm tendencies in the gen-



Representational image (Credit: Wikimedia Commons)

eral population.

However, they also found other social and clinical factors associated with the tendency to self-harm among the group of patients they studied.

For instance, the researchers claim that young unmar-

ried, unemployed men who are addicted to drugs have higher tendencies to commit self-harm.

"Those who had a history of self-harm were significantly younger, were more likely to be unmarried, were unemployed, and were liv-

ing in an urban area. They were also likely to have a significantly shorter duration of substance use at presentation, were more likely to be involved in injecting drug use, had high-risk sexual behavior, were more likely to have been caught by the police in the past and incarcerated, and were more likely to be dependent on cannabis", says the study.

Published in *Indian Journal of Psychiatry*, the study was carried out by researchers at the Department of Psychiatry and National Drug Dependence Treatment Centre, AIIMS, New Delhi.

नैनोफार्मास्युटिकल्स पर भारतीय सरकार के नए दिशानिर्देश

शुभम

नई दिल्ली: भारत के बाजार में नैनोफार्मास्युटिकल्स के लिए नए दिशानिर्देश जारी। इन दिशानिर्देशों की बदौलत अंतिम उपयोगकर्ता भी बाजार में गुणवत्तापूर्ण उत्पादों से लाभ उठाएंगे। नई नैनो टेक्नोलॉजी के माध्यम से कृषि उत्पादों, सौंदर्य प्रसाधनों, प्रत्यारोपण उपकरणों जैसे क्षेत्रों में भारत की आम जनता को लाभ मिलेगा।

इस नैनोफार्मास्युटिकल्स के अंतर्गत बहते छोटे इग्स कर्णों का प्रयोग करके दवाइयों का निर्माण किया जाता है। इन नैनो फार्म्यलैशन्स का प्रभाव अधिक होता है और इसके दुष्प्रभाव पारंपरिक दवाइयों के मुकाबले कम होता है। नैनोफार्मास्युटिकल्स तकनीक का उपयोग कैसे

के इलाज में रामबाण साबित हो सकता है। इन दिशानिर्देशों के अंतर्गत यह बताया गया कि इस मिशन का मुख्य उद्देश्य "सबके लिए" किफायती स्वास्थ्य सेवाओं में योगदान देना है।

ये दिशानिर्देश जैव प्रौद्योगिकी विभाग (डीबीटी), विज्ञान और प्रौद्योगिकी मंत्रालय, भारतीय चिकित्सा अनुसंधान परिषद (आईसीएमआर) और केंद्रीय औषधि मानक नियंत्रण संगठन (सीडीएससीओ), स्वास्थ्य और परिवार कल्याण मंत्रालय द्वारा विकसित किए गए हैं और डीबीटी द्वारा सभी संबद्ध मंत्रालयों के प्रयासों के समन्वय का निष्कर्ष है।

• For Voice E-paper and other stories, visit our blog :
• www.de-layer.blogspot.in

VOICE TEAM

Designing & Layout

Umang Arora, Ajay Kumar, Shalini Thakur

Reporters

Ajay Kumar, Harshil Thakur, Himanshu Sharma, Manish Gupta, Preshita Thakur, Shalini Thakur, Swati Thakur, Sayed Adi Shah Ashraf, Umang Arora