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Index

Marine heat waves may become more intense, frequent: study.....	2
Budget 2021: Language translation mission to local language content development.....	5
Preliminary survey shows deposits of Lithium in Mandya district of Karnataka.....	7
Several studies conducted by various scientific institutes in the country in regard to the impact of western disturbances during winter season on Indian climate.....	9
Water scarcity likely in the Himalayan catchment if warming continues.....	12
Explained: How glaciers, glacial lakes form and why they break.....	15
Wettest place on Earth sees decreasing trend in rainfall.....	18
Dr. Harsh Vardhan addresses 'Population versus Planet' Conference.....	21

MARINE HEAT WAVES MAY BECOME MORE INTENSE, FREQUENT: STUDY

Relevant for: Geography | Topic: Important Geophysical Phenomenon - Atmosphere, its Composition and Circulation

Bleached massive coral (*Porites solida*) in Vilanguchalli island in Thoothukudi coast of Gulf of Mannar.

The mixed layer of the ocean which blankets the top 20 to 200 metres is becoming thinner each year, says a new study which warns that the continued loss of this buffer may lead to more frequent and destructive warming events such as marine heat waves.

Researchers from the University of Colorado at Boulder in the U.S. said the thickness of this top layer of the ocean is responsible for marine heat events.

The thicker this mixed layer, they said the more it can act as a buffer to shield the waters below from incoming hot air.

[According to the study](#), published in the journal *Bulletin of the American Meteorological Society*, the scientists found that this armour is thinning, causing the oceans to become more susceptible to rapid swings in temperature.

"Marine heatwaves will be more intense and happen more often in the future," said Dillon Amaya, lead author of the study. "When the mixed layer is thin, it takes less heat to warm the ocean more," Amaya explained.

In the study, Amaya and his team used a combination of ocean observations and models to estimate the depth of the mixed layer back to 1980, and also project out into the future.

They found that over the last 40 years, the layer has thinned by nearly three metres in some regions of the North Pacific.

By 2100, they believe the mixed layer could be four metres thinner which is about 30% less than what it is today.

According to the researchers, this thin mixed layer combined with warmer global temperatures could set the stage for drastic swings in ocean temperatures, leading to much more frequent and extreme heating events.

"Think of the mixed layer as boiling a pot of water. It will take no time at all for an inch of water to come to a boil, but much longer for a pot filled to the brim to heat through," Amaya said.

They also warned that as the climate continues to warm and the mixed layer continues to thin, scientists might lose the ability to predict annual ocean surface temperatures.

Fisheries and other coastal operations could be in danger without this ability to accurately forecast ocean temperatures, the scientists warned.

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Suresh Nambath

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Registration of health-care workers on CoWIN is incomplete, many practising alternative medicine are not included

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BUDGET 2021: LANGUAGE TRANSLATION MISSION TO LOCAL LANGUAGE CONTENT DEVELOPMENT

Relevant for: Geography | Topic: Important Schemes & Programmes of the Government

NEW DELHI: India plans to set up a National Language Translation Mission, finance minister Nirmala Sitharaman announced while presenting the Union Budget for 2021-22. The announcement comes in the backdrop of growing demand for accessing online services in local Indian languages.

"We will undertake a new initiative – National Language Translation Mission (NTLM). This will enable the wealth of governance-and-policy related knowledge on the Internet being made available in major Indian languages," Sitharman said.

Also Read | [How India can fight vaccine hesitancy](#)

Implication

A national level mission focusing on local language translation will provide big boost to regional language initiatives. It will also encourage agencies to translate science and technology related content, currently available mostly in English language, in Indian languages. This will enhance access to digital content to wider demographic of Indian users.

In 2020, during the peak covid-19 months, the government had tied up with Reverie Technologies and had deployed their language translation technology Anuvadak to translate and publish the MyGov Covid-19 page in 10 Indian languages.

Context

More and more Indians from tier 2 and tier 3 cities are using online services since the pandemic hit. As a result, several consumer facing businesses and government agencies started offering services in local Indian languages. For instance, Google rolled out new language-centric features across its various platforms such as Search, Maps and Lens. Axis Bank deployed a multi-lingual voice bot named AXAA to handle customer queries and requests. It supported over 10 Indian languages with over 160 dialects.

2020 also saw increase in investments in start-ups offering services in local languages. According to Venture Intelligence, local language startup ecosystem in India raised \$217 million (approx 1600 crore) until October 2020.

Vernacular.ai through Series A funding raised \$5.1 million (approx 37 crore) led by Kalaari Capital and Exfinity Ventures in May.

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PRELIMINARY SURVEY SHOWS DEPOSITS OF LITHIUM IN MANDYA DISTRICT OF KARNATAKA

Relevant for: Geography | Topic: Distribution of key Natural Resources - Mineral & Oil Resources of India

The Government today said that preliminary surveys on surface and limited subsurface by Atomic Minerals Directorate for Exploration and Research (AMD), a constituent unit of Department of Atomic Energy have shown presence of Lithium resources of 1,600 tonnes (inferred category) in the pegmatites of Marlagalla – Allapatna area, Mandya district, Karnataka.

Lithium is a key element for new technologies and finds its use in ceramics, glass, telecommunication and aerospace industries. The well-known uses of Lithium are in Lithium ion batteries, lubricating grease, high energy additive to rocket propellants, optical modulators for mobile phones and as convertor to tritium used as a raw material for thermonuclear reactions i.e. fusion. The thermonuclear application makes Lithium as “Prescribed substance” under the Atomic Energy Act, 1962 which permits AMD for exploration of Lithium in various geological domains of the country. Due to the continuously increasing demand of Lithium ion batteries, the requirement of Lithium has increased over last few years.

The significance and quantity of lithium resources in Marlagalla-Allapatna area, Mandya district, Karnataka may be established only after the completion of exploration in the entire area. Subsequently, plan for commercial exploitation of the lithium deposits can commence after the technical, social and economic feasibility studies in the area.

This information was given by the Union Minister of State (Independent Charge), Development of North Eastern Region (DoNER), MoS PMO, Personnel, Public Grievances, Pensions, Atomic Energy and Space, DrJitendra Singh in a written reply in the Lok Sabha today.

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SEVERAL STUDIES CONDUCTED BY VARIOUS SCIENTIFIC INSTITUTES IN THE COUNTRY IN REGARD TO THE IMPACT OF WESTERN DISTURBANCES DURING WINTER SEASON ON INDIAN CLIMATE

Relevant for: Geography | Topic: Important Geophysical Phenomenon - Atmosphere, its Composition and Circulation

IMPACT OF WESTERN DISTURBANCES

There are several studies conducted by various scientific institutes in the country in regard to the impact of western disturbances during winter season on Indian climate. The studies show that;

The adverse weather elements associated with Western Disturbances are;

However, precipitation from the western disturbances is very vital for the Rabi Crop over northwest India. Also snowfall/snowmelt in the Hilly regions contribute to river flow and drinking water for people living downstream.

In addition to these, a Forecast Demonstration Project (FDP) for winter weather systems has been initiated from 2016 and it has brought together several institutes other than IMD to enhance the monitoring and forecast of weather elements related to WD. Accordingly a FDP bulletin is prepared and issued daily during November to February when the Western Disturbances are more active.

From November 2020 onwards, IMD started issuing a special bulletin related to winter weather systems (All India Multi-hazard Winter Warning Bulletin) which provides colour coded warning for five days for the adverse weather elements associated with WD, along with present weather scenario.

IMD started issuing Impact Based Forecast (IBF) in the recent past. Impact Based Warning contains guidelines to the general public while getting exposed to the severe weather. These guidelines are finalized by NDMA (National Disaster Management Authority) in coordination with IMD and the same is being issued for the adverse weather elements related with WD.

This information was given by the Minister of Science & Technology; Earth Science and Health & Family Welfare Dr. Harsh Vardhan in the Lok Sabha today.

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WATER SCARCITY LIKELY IN THE HIMALAYAN CATCHMENT IF WARMING CONTINUES

Relevant for: Environment | Topic: Environmental Degradation - GHGs, Ozone Depletion and Climate Change

Role of melt: The glacier-melt increases about 15% to 70% in a warmer environment with its present volume, but then decreases when glacier volumes shrink. | Photo Credit: [Yumi mini](#)

The coldly white snowpacks and glaciers of the Himalayas that make for a picturesque panorama are also important sources of water for about a billion people who live in the basins of the Indus, Ganges and Brahmaputra rivers. But with rising global temperatures, these snowpacks and glaciers, which are highly sensitive, are affected.

This, in turn, affects the Himalayan hydrology. India, Nepal, Pakistan and China hugely depend on these Himalayan rivers for their daily needs and energy production.

A new paper published last month studied how these Himalayan rivers are affected by the different components – rainfall-runoff, snow-melt and glacier-melt – and notes that if drier and warmer scenarios continue in the near future (2031–2050), we are more likely to face water stress in these catchment areas. They also note that if there is increased rainfall, this could lead to a water surplus situation.

The team studied five basins in the central Himalaya – Sutlej, Thulo Bheri, Kali Gandaki, Dudh Kosi and Arun. They analysed the daily precipitation, maximum and minimum daily temperatures, wind speeds, land cover, elevation and soil properties. “We developed a new glacier melt model and integrated it to the currently used land surface model. The currently used land surface model – used even by the Ministry of Earth Sciences – does not take into account glacier melt. This could lead to serious errors in the study of north-Indian rivers. Our model helps make the current one complete and turns it into a more advanced and better one,” explains Subimal Ghosh, the corresponding author of the paper published in *Water Resources Research*. He is from the Department of Civil Engineering at the Indian Institute of Technology Bombay.

The results show that the glacier-melt increases about 15% to 70% in a warmer environment with its present volume, but then decreases to 3%–38% substantially when the glacier volumes shrink. However, such a decrease can be compensated if there is increased rainfall and if a wetter scenario persists.

“Snowpacks and glaciers are two important water storage units in the Himalaya. Though snow is lower density and will melt easily in a warming climate, the reduced snowfall will in turn reduce the amount of snow-melt. Though glacier melt will increase initially, they will shrink in size quickly and the amount of glacier melt will also decline in the latter end of the century,” adds Vikram S. Chandel, first author of the paper. He is a research scholar of Interdisciplinary Program in Climate Studies, IIT Bombay. The future study will focus on understanding the predictability of the land-atmospheric processes.

The team notes that proper water-management and governance are urgently required. “Changing patterns of precipitation systems — Indian Summer Monsoon and Western Disturbances — are important for the future situation of water resources in Himalayan catchments,” adds the paper.

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Here are some of the most interesting research papers to have appeared in top science journals last week.

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EXPLAINED: HOW GLACIERS, GLACIAL LAKES FORM AND WHY THEY BREAK

Relevant for: Geography | Topic: Important Geophysical phenomena - Weathering, Mass Movement & Groundwater

Rescuers leave on a boat to search for bodies in the downstream of Alaknanda River in Rudrapur, Uttarakhand on Feb.8, 2021. | Photo Credit: [AP](#)

The floods that [slammed into two hydroelectric plants](#) and [damaged villages in Uttarakhand](#) were set off by a break on a Himalayan glacier upstream. Here's a look at how glaciers and glacial lakes form and why they may sometimes break:

Glaciers are found on every continent except Australia and some are hundreds of thousands of years old. A large cluster of glaciers are in the Himalayas, and Sunday's disaster occurred in the western part of the Himalayas.

Glaciers are made of layers of compressed snow that move or "flow" due to gravity and the softness of ice relative to rock. A glacier's "tongue" can extend hundreds of kilometers from its high-altitude origins, and the end, or "snout," can advance or retreat based on snow accumulating or melting.

Uttarakhand glacier burst | Experts point to climate change impact

"Ice may flow down mountain valleys, fan out across plains, or in some locations, spread out onto the sea," according to the U.S. National Snow and Ice Data Center.

Proglacial lakes, formed after glaciers retreat, are often bound by sediment and boulder formations. Additional water or pressure, or structural weakness, can cause both natural and manmade dams to burst, sending a mass of floodwater surging down the rivers and streams fed by the glacier.

Also read: [Uttarakhand glacier burst brings back memory of 2013 flash floods](#)

It's not yet known what caused part of the Nanda Devi glacier to snap off Sunday morning, sending floodwater surging downstream toward power plants and villages in India's northern state of Uttarakhand.

Seismic activity and a buildup of water pressure can cause glaciers to burst, but one particular concern is climate change. High temperatures coupled with less snowfall can accelerate melting, which causes water to rise to potentially dangerous levels.

"Most mountain glaciers around the world were much larger in the past and have been melting and shrinking dramatically due to climate change and global warming," said Sarah Das, an associate scientist at Woods Hole Oceanographic Institute.

Past deadly or highly destructive glacial floods have occurred in Peru and Nepal. But the remote locations of glaciers and a lack of monitoring mean we don't have a clear understanding of how often they occur and if they are increasing, Dr. Das said.

Lessons from Ladakh's glacial lake outburst

“Given the overall pattern of warming, glacier retreat, and increase in infrastructure projects, though, it seems natural to hypothesize that these events will occur more frequently and will become overall more destructive if measures are not taken to mitigate these risks,” said Dr. Das.

A number of imminent potentially deadly glacier burst and flood situations have been identified worldwide, including in the Himalayas and South American Andes. But while monitoring is possible, the remoteness of most glaciers presents challenges.

“There are many glaciers and glacial dammed lakes across the Himalayas, but most are unmonitored,” Dr. Das said. “Many of these lakes are upstream of steep river valleys and have the potential to cause extreme flooding when they break. Where these floods reach inhabited regions and sensitive infrastructure, things will be catastrophic.”

A 2010 information page published by the International Centre for Integrated Mountain Development called for more glacier monitoring in the Hindu Kush Himalayas to better understand “the real degree of glacial lake instability.” The region where the glacial burst occurred is prone to landslide and flash flooding, and environmentalists have cautioned against building in the region.

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WETTEST PLACE ON EARTH SEES DECREASING TREND IN RAINFALL

Relevant for: Geography | Topic: Important Geophysical Phenomenon - Atmosphere, its Composition and Circulation

Role of humans: Our study saw decrease in vegetation cover and increase in areas of cropland from the year 2006 onwards, says Jayanarayanan Kuttippurath | Photo Credit: [File photo](#)

The quiet, sleepy, yet mesmerising village of Mawsynram trounced Cherrapunji to become the wettest place in the world. Mawsynram receives over 10,000 millimetres of rain in a year.

A recent study that looked at the rainfall pattern in the past 119 years found a decreasing trend at Cherrapunji and nearby areas. The team analysed daily rain gauge measurements during 1901–2019, and noted that the changes in the Indian Ocean temperature have a huge effect on the rainfall in the region. They also analysed satellite data and add that there was a reduction in the vegetation area in northeast India in the past two decades, implying that human influence also plays an important role in the changing rainfall patterns.

“The traditional way of cultivation known as Jhum cultivation or shifting cultivation is now decreased and being replaced by other methods. Also, previous studies have noted there is sizable deforestation in the region. Our study also saw the decrease in vegetation cover and increase in the areas of cropland mainly from the year 2006 onwards,” says Jayanarayanan Kuttippurath from Indian Institute of Technology Kharagpur. He is the lead author of the paper published last month in *Environmental Research Letters*.

The analysis showed reductions in vegetation with 104.5 sqkm lost per year. On the other hand, there were significant increases in crop-land (182.1 sqkm per year) and urban and built-up lands (0.3 sqkm per year) during the period 2001–2018.

The team noted that the annual mean rainfall for the period 1973–2019 showed decreasing trends of about 0.42 mm per decade. It was statistically significant along seven stations (Agartala, Cherrapunji, Guwahati, Kailashahar, Pasighat, Shillong and Silchar).

But why study the northeast region? The team writes that since northeast India is mostly hilly and is an extension of the Indo-Gangetic Plains, the region is highly sensitive to changes in regional and global climate. “It has to be noted that the first signs of the effect of climate change will be evident for the extreme cases such as the rainfall at Cherrapunji,” adds the paper. “Northeast India has the highest vegetation cover in India and includes 18 biodiversity hotspots of the world, indicating the importance of the region in terms of its greenery and climate-change sensitivity.”

The team is currently looking at the changes in rainfall patterns across India. “We need to conserve the vegetation or forest area, biodiversity parks, the hills and valleys in the northeast. Also, solid water management strategies are inevitable to combat climate-induced changes of water bodies and ground water. Long-term plans are necessary,” adds Prof. Kuttippurath.

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Five WIHG researchers travel to disaster site and undertake aerial surveys

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DR. HARSH VARDHAN ADDRESSES 'POPULATION VERSUS PLANET' CONFERENCE

Relevant for: Geography | Topic: Demography of the World - Growth of Population

Dr. Harsh Vardhan, Union Minister for Health and Family Welfare today participated and expressed his views in WION and Zee Media's 'Population versus Planet' Conference which is a part of its year-long campaign called 'Mission Sustainability: Population Vs Planet'.

This e-conclave marking the campaign's launch will host deliberations between numerous policy experts, demographic researchers & academicians on socially important themes like population stabilisation, empowering women & youth through education among various others as the world population witnesses an increase from 1 billion in the year 1800 to 7.8 billion today.



Expressing his satisfaction at the timely importance of holding the event, Dr. Harsh Vardhan said, “More people require more resources, and as the population increases, the earth’s resources deplete. The population boom has been affecting the planet and the human race in many adverse ways. People in developing countries like India, feel the impact of environmental problems more acutely.”

Thereafter he spoke on the exhaustive efforts undertaken by India to encourage the adoption of family planning: India was one of the first countries in the world to formulate a National Family Planning Program way back in 1952 which was later expanded to cover maternal and child health as well as adolescent health and nutrition and has taken giant strides in spreading awareness & enhancing adoption of family planning techniques while also ensuring healthier lives for its citizens; even though India's population has increased from 36 crore in 1951 to 121.02 crore in 2011, the country has witnessed significant decline in both fertility and mortality; the crude birth rate which was recorded at 40.8 per 1000 in 1951 has declined to 20.0 in 2018; Total Fertility Rate (TFR) has declined from 6.0 in 1951 to 2.2 in 2015-16; death rate in India has declined from 7 in 2012 to 6.2 in 2018.

Speaking on India's co-ordination in this regard with other developing countries, he observed, “India has been an important and active member of Family Planning 2020 partnership, advancing collaborative efforts to address the policy, financing, delivery and socio-cultural

barriers to women accessing contraceptive information, services and supplies. The alliance, which is now entering its next phase, provided an impetus to our national agenda of protecting mothers and children through improving access to family planning choices. From the time of the partnership's initiation in 2012, India added more than 1.5 crore additional users for modern contraceptives thereby increasing the modern contraceptive use to 55%." He also reminded that the Partnership helped India add two new contraceptives, namely the Injectable Medroxy Progesterone Acetate (MPA) and Centchroman in the National contraceptive basket while the total allocation for Family Planning during this period was to the tune of 3 billion USD. India not only achieved its committed targets under the partnership, but also exceeded them.

On the achievements of the ambitious and overarching Mission Parivar Vikas launched in 2016, Dr. Harsh Vardhan stated, "Family Planning Logistics Management and Information system was developed under the Digital India initiative for ensuring last mile availability of the contraceptives. A holistic media campaign covered all aspects of Information Education & Communication as well as Behaviour Change Communication and this is how demand generation was achieved. Strengthening post pregnancy contraception with more than 10 million pregnant women benefiting through Post-Partum Intra-Uterine Contraceptive Device (PPIUCD) and improving quality remained the central tenets of the program. As a result of our persistent efforts on three key fronts of Supplies, Services and Information, India was able to provide modern contraceptive access to 14.2 Crore beneficiaries and thus averting 5.6 Crore unintended pregnancies, 18.6 lakh unsafe abortion and 30 thousand maternal deaths in 2019."

He also shared insights from the recent National Family Health Survey 5 that bolsters India's remarkable achievements in Family Planning- 20 out of 22 States surveyed so far have shown an increase in modern contraceptive use and 21 showing a decline in unmet needs for contraception while 19 of them have shown a decline in fertility. India is on the verge of achieving the replacement Total Fertility Rate with 28 out of 36 states & UTs having already achieved the replacement Total fertility rate of 2.1.

Expanding on the significance of the numbers on India's future, Dr. Harsh Vardhan said, "Population projection for India and States 2011-2036, released in July 2020, indicates that the Total Fertility Rate is expected to decline from 2.37 during 2011-2015 to 1.73 during 2031-35. India is now in a phase of demographic transition with a substantial percentage of youth population. The youth population in the age group of 15-24 years is projected to decline from 233 million in 2011 to 227 million in 2036. However, the proportion of the working age population is expected to increase from 61% in 2011 to 65% in 2036. India is adding 12 million people to the working age population each year."

The Minister described how the exemplar leadership of Prime Minister Shri Narendra Modi is providing a crucial leverage for this transmission to happen, helping India's youth fulfil their potential, meet all their aspirations while contributing to the nation's progress: "Ours is a government committed to delivering a prosperous New India where no one is left behind. The Aatma Nirbhar Bharat of our dreams will be built on the shoulders of empowered youth. Our various policy interventions like National Education Policy, Science Technology & Innovation Policy as well as programs like Start-up India, Fit India and many other stand testimony to our resolve to facilitate holistic growth of our youth ultimately leading to India's rise as a Vishwa Guru."

Dr. Harsh Vardhan also spoke on the government's commitment to women's health. "Over 9 lakh ASHA workers in the country are the drivers of health and represent the empowered rural women. The Government is now ensuring inclusive growth for all through our Honorable Prime Minister's ambitious Aspirational Districts Program where Health, Nutrition and Education forms important pillars. India made remarkable progress in the past by reducing teenage marriages

from 47% to 26.8% and teenage fertility from 16% to 7%. India has also expanded women's education and female workforce participation."

Noting this as a success story driven by political will and strengthened by improved governance, provision of finances, meticulous planning, implementation and effective monitoring and learnings, the Health Minister concluded, "It is evident that the impact of the interventions is now beginning to yield dividends. Today, India is knocking at the door of achieving replacement level fertility, and has made remarkable improvement in reducing maternal and child mortality. With commitment and perseverance, India can achieve the goal of population stabilization and advancing the development goals of the country."

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Dr. Harsh Vardhan, Union Minister for Health and Family Welfare today participated and expressed his views in WION and Zee Media's 'Population versus Planet' Conference which is a part of its year-long campaign called 'Mission Sustainability: Population Vs Planet'.

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