



News Analysis (29 Nov, 2018)

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ISRO Launched Satellite HySIS

ISRO launched rocket PSLV-C43 carrying India's earth observation satellite **Hyperspectral Imaging Satellite (HySIS)** and 30 co-passenger satellites from Sriharikota on November 29.

- The **co-passengers of HySIS** include **one micro and 29 nano satellites from eight different countries.**
- The satellite have been projected into a **polar sun-synchronous orbit.**
- HySIS is ISRO's **first full-scale working satellite with Hyper-spectral imaging capability.**
- The space agency tested hyperspectral imaging technology in April 2008, a small 83-kg demonstration microsatellite called IMS-1 (Indian Mini Satellite-1) was launched as a secondary passenger with Cartosat-2A.
- In October, 2008, it put a HySI or Hyperspectral Imager on the Chandrayaan-1 and used it to scan Moon's surface for minerals.

Significance of HySIS

- The primary goal of HySIS is to study the **Earth's surface in visible, near-infrared and shortwave infrared regions** of the electromagnetic spectrum.
- Hyperspectral imaging satellite can see in 55 spectral or colour bands from 630 km above ground.
- 'Hypex' imaging allows **distinct identification of objects, materials or processes on Earth** by reading the spectrum for each pixel of a scene from space.
- It can be highly useful in marking out a suspect object or person and separate it from the background. This could aid in detecting transborder or other stealthy movements.
- It can be used for a range of activities from monitoring the **atmospheric activity and climate change, studies of Earth's magnetic field, agriculture, forestry, water management, coastal patterns, looking for oil and minerals all the way up to military surveillance.**

Government Allows Ethanol Extraction for Blending from Foodgrains

- The Central Government has extended the ambit of the Ethanol Blended Petrol (EBP) programme to extract the fuel from surplus quantities of food grains such as maize, jawar, bajra fruit and vegetable waste.
- Till now, only excess sugarcane production was allowed to be converted into ethanol for procurement under the fuel blending programme.

Importance

- It will enable the farmers by enabling them **to make additional money from surplus production and broaden the sources for producing ethanol** for the EBP programme.
- The policy of ethanol blending can help in reducing vehicle exhaust emissions and also to reduce the import burden on account of crude petroleum from which petrol is produced.
- It is estimated that a 5% blending (105 crore litres) can result in replacement of around 1.8 million Barrels of crude oil.
- The renewable ethanol content is expected to result **in a net reduction in the emission of carbon dioxide, carbon monoxide (CO) and hydrocarbons (HC)**.
- Ethanol itself burns cleaner and burns more completely than petrol it is blended into.

Ethanol Blending Programme (EBP)

- It aims at blending ethanol with petrol, thereby bringing it under the category of biofuels and saving millions of dollars by cutting fuel imports.
- Under EBP program, availability of ethanol will increase due to the higher price for C heavy molasses based ethanol and enabling procurement of ethanol from B heavy molasses and sugarcane juice for the first time.
- The Government has also reduced GST on ethanol for blending in fuel from 18% to 5%.

National Policy on Bio-fuels

- The National Policy on Bio- fuels 2018 has empowered the **National Bio-fuel Coordination Committee (NBCC)** to allow conversion of surplus quantities of food-grains for production of ethanol during an agriculture crop year when there is projected oversupply of food-grains.

- The objective of the Bio- fuel policy is to achieve **20% ethanol-blending and 5% biodiesel-blending** by the year 2030. The policy also expands the scope of feedstock for ethanol production and has provided for incentives for production of advanced bio-fuels.

National Biofuel Coordination Committee is headed by - **Prime-Minister** to provide policy guidance and coordination.

Concerns

- Under the EBP programme, the Centre has asked the oil marketing companies (OMCs) to target 10% blending of ethanol with petrol by 2022. However, there is a major shortfall in the availability of ethanol as sugar mills currently tap only 'C-heavy' molasses for ethanol production.
- The fuel requirements can compete with food requirements and that only surplus food crops should be used for fuel production, if at all.
- The annual capacity of biorefinery is still not enough to meet the 5% petrol-ethanol blending requirement.

Way Forward

- There should be Increase in the ethanol production capacity of bio-refineries.
- Alternatives like 3rd generation (derived from algae) and 4th generation biofuels (derived from specially engineered plants or biomass) should be encouraged.

World's First Gene Edited Babies

A Chinese researcher, He Jiankui, has claimed that he used **CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats)** to produce the world's first gene-edited babies.

- He said that he altered the genes of a pair of twins while they were embryos to make them resistant to HIV, the virus that causes AIDS.
- If proven, it would be the first instance of human offspring having been produced with specific desired attributes, using gene editing.
- Many scientists have called this experiment as unethical. As there are serious unanswered questions about the safety of embryo editing.

What is a Gene?

- Genes are made up of DNA (Deoxyribonucleic acid).

- Genes contain the **bio-information that defines any individual**. Physical attributes like height, skin or hair colour, more subtle features like intelligence or eyesight, susceptibility to certain diseases, and even behavioural traits can be attributed to information encoded in the genetic material.
- An ability to alter this information gives scientists the power to control some of these features in humans.

What is Gene Editing?

- Gene editing is also called as genetic modification, genetic manipulation or genetic engineering.
- Genome editing is a group of technologies that give scientists the **ability to change an organism's DNA**. These technologies allow genetic material to be added, removed, or altered at particular locations in the genome.
- Gene Editing is widely practised in agriculture, to increase productivity or resistance to diseases, etc.

What is CRISPR?

- Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) is a gene editing technology, which **replicates natural defence mechanism** in bacteria to fight virus attacks, using a special protein called Cas9.
- CRISPR-Cas9 technology behaves like **a cut-and-paste mechanism on DNA strands that contain genetic information**. The specific location of the genetic codes that need to be changed, or edited, is identified on the DNA strand, and then, using the Cas9 protein, which acts like a pair of scissors, that location is cut off from the strand.
- A DNA strand, when broken, has a natural tendency to repair itself. Scientists intervene during this auto-repair process, supplying the desired sequence of genetic codes that binds itself with the broken DNA strand.
- CRISPR-Cas9 is a simple, effective, and incredibly precise technology with potential to revolutionise human existence in future.

Applications and Potential Impact

- The most promising use of the CRISPR technology is in **treatment of wide variety of diseases**, including single-gene disorders such as cystic fibrosis, hemophilia, and sickle cell disease.
- It also holds promise for the treatment and **prevention of more complex diseases**, such as cancer, heart disease, mental illness, and human immunodeficiency virus (HIV) infection.
- CRISPR is extremely precise, but not 100% precise every time. So, it can have unintended outcomes with effects unknown.

- Leading scientists in the field have for long been calling for a **“global pause”** on clinical applications of the technology in human beings, till such time as internationally accepted protocols are developed.
 - This technology also raises serious **ethical questions like designer babies and changing genes without the informed consent of future generation**
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Sustainable Blue Economy Conference

The first global conference on the sustainable blue economy was held on 26-28th November in Nairobi, Kenya.

- The Sustainable Blue Economy Conference was organised by Kenya with Canada and Japan as co-hosts. India made its presence in the conference highlighting India's strategic advantages in Blue Economy.
- The conference builds on the momentum of the UN's 2030 Agenda for Sustainable Development, the 2015 Climate Change Conference in Paris and the UN Ocean Conference 2017 “Call to Action”.

What is the Blue Economy?

Blue Economy refers to sustainable use of ocean resources for growth, jobs and improved living standards while preserving the ecosystem. It encompasses areas like maritime transport, fisheries, renewable energy, waste management, and tourism.

The Significance of the Conference

- The conference identified the potential of the blue economy to create employment, combat poverty and hunger.
- It brought countries together to learn how economic development and healthy waters go hand in hand.
- The conference captured concrete commitments and practical actions that can be taken today to help the world transition to the blue economy.
- The impacts of climate change and plastic pollution in oceans and waters has increased the need to develop an inclusive and sustainable blue economy.

India and Blue Economy

- India has a strategic location in the Indian Ocean Region, and on this basis, it endorses the growth of the blue economy in a sustainable, inclusive and people-centred manner through the framework of the **Indian Ocean Rim Association**.

- Under **Sagarmala Programme**, India is developing maritime infrastructure as well as inland waterways and coastal shipping which will revolutionise maritime logistics, creating million new jobs, reduce logistics costs and bring port-led developments in the country.
 - Development of **Coastal Economic Zones (CEZ)** under Sagarmala, would become a microcosm of the blue economy, wherein industries and townships that depend on the sea will contribute to global trade.
 - **Security and Growth for All in the Region (SAGAR)** is India's vision for the Indian Ocean Region. It aims at sustained, peaceful and yet responsive presence of Indian naval ships in the critical area and choke points in the Indian ocean.
 - The Blue economy is crucial for India's economic development.
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Lancet Report on Climate Change and Human Health

Lancet's Countdown: Tracking Progress on Health and Climate Change 2018 report has recommended that Indian government must take a series of initiatives to mitigate the increased risks to health, and the loss of labour hours due to a surge in exposure to heatwave events in the country over the 2012-2016 period.

- The Lancet Countdown's 2018 report tracks 41 indicators across five key domains in health and climate change. It arrives at three key conclusions:
- From 2014-2017, the average length of heatwaves in India ranged from 3-4 days compared to the global average of 0.8-1.8 days.
- Almost 153 billion hours of labour were lost globally in 2017 due to heat, an increase of 62 billion hours from the year 2000.

Findings of the Report

- Present day changes in heat waves labour capacity, vector-borne disease, and food security provide early warning of compounded and overwhelming impacts expected if temperature continues to rise.
- A lack of progress in reducing emissions and building adaptive capacity threatens both human lives and the viability of the national health systems they depend on, with the potential to disrupt core public health infrastructure and overwhelm health services.
- Despite these delays, trends in a number of sectors see the beginning of a low-carbon transition, and it is clear that the nature and scale of the response to climate change will be the determining factor in shaping the health of nations for centuries to come.
- The number of hours of labour lost due to heat wave increased between 2000-2017 across India.

- In 2012, 20 million people were exposed to heatwaves, compared to 60 million in 2016 a 200% increase.
- For the agriculture sector alone, this rose to about 60,000 million hours in 2017, from about 40,000 million hours in 2000.
- Overall, across sectors India lost almost 75,000 million hours of labour in 2017, from about 43,000 million hours in 2000.
- The agriculture sector was more vulnerable compared to the industrial and service sectors because workers there were more likely to be exposed to heat.
- The findings are significant for **India as agriculture makes up 18% of the country's GDP** and employs almost half the population. Also, a fall in living standards, due to reduced precipitation and temperature changes, could therefore affect just over half of the population who are employed in agriculture related jobs.
- Developed in conjunction with the Public Health Foundation of India and their Center for Environmental Health, the Lancet has also come up with a brief for Indian policymakers. It provides strategic direction for policy makers in four key areas:
 - Health effects of heatwaves and change in labour capacity due to heat
 - Premature mortality from ambient air pollution by sector
 - Sustainable travel infrastructure and uptake
 - Media coverage of health and climate change

Recommendation of Report

Considering India is amongst the countries who most experience high social and economic costs from climate change the study makes several recommendations like:

- Identifying **“heat hot-spots”** through appropriate tracking of meteorological data.
- Promoting development and **implementation of local Heat Action Plans** with strategic inter-agency coordination, and a response which targets the most vulnerable groups.
- The report urges a **review of existing occupational health standards, labour laws and sectoral regulations for worker safety** in relation to climatic conditions.
- **Decrease health-harming air pollution** by carrying out source apportionment studies, emission inventories, and health impact assessments of ambient and household air pollution through Statewise Clean Air Action Plans, and use these findings to inform policies targeted at reducing the main sources of pollution via an inter-ministerial approach.
- **Carry out annual comprehensive city-level traffic diary surveys to guide urban infrastructure planning and facilitate solutions** which address growth in population and travel demands while promoting uptake of sustainable travel forms like walking and cycling.
- **Promote strategic media coverage of climate and health linkages at the state level**, in regional languages, to increase support for state-by-state climate mitigation and adaptation responses.

What is a Heat Wave?

- A Heat Wave is a period of **abnormally high temperatures, more than the normal maximum temperature** that occurs during the summer season in the North Western parts of India between March and June, and in some rare cases even extend till July.
- Depending on whether a place’s historical temperature is 40 degree C or less, a 4.5 degree C (or greater) rise in temperature counts as a ‘heat wave’ and 6.5 degree C and more, a ‘severe heat wave.’

Important Facts for Prelims (29th November 2018)

Emergency Response Support System (ERSS)

- Emergency Response Support System (ERSS) has been launched for Himachal Pradesh.
- **Himachal Pradesh is the first state** to launch pan-India single emergency number ‘112’ under ERSS.

- Under this project, one Emergency Response Centre (ERC) is established along with District Command Centers (DCCs) covering entire State.
 - This marks the commencement of a **single number based 112 emergency services** which will connect to Police, Fire, Health and other helplines through an Emergency Response Centre in the State.
 - Emergency Response Centre is **integrated with Police (100), Fire (101), Health (108) and Women helpline (1090)** Services to provide emergency services via single emergency number - 112.
 - This service will remove the need for citizens to remember multiple helpline numbers.
 - The service also includes a **'112 India' mobile app** integrated with Panic Button of smartphones and ERSS State website for ease of citizen in availing immediate assistance.
 - To increase the effectiveness of Emergency Response, the ERC has also been integrated with Location Based Services provided by Telecom Service Providers.
 - To ensure safety of women, a **SHOUT feature has been introduced in '112 India'** mobile app to seek immediate assistance from registered volunteers in the vicinity apart from the immediate assistance from Emergency Response Centre.
 - **ERSS was formed on the recommendation of Justice Verma Committee**, formed in the backdrop of unfortunate incident of Nirbhaya in December 2012.
 - 'Emergency Response Support System (ERSS)' was earlier known as Nationwide Emergency Response System.
 - Central Government has allocated funds under Nirbhaya Fund for implementation of ERSS project across the country.
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