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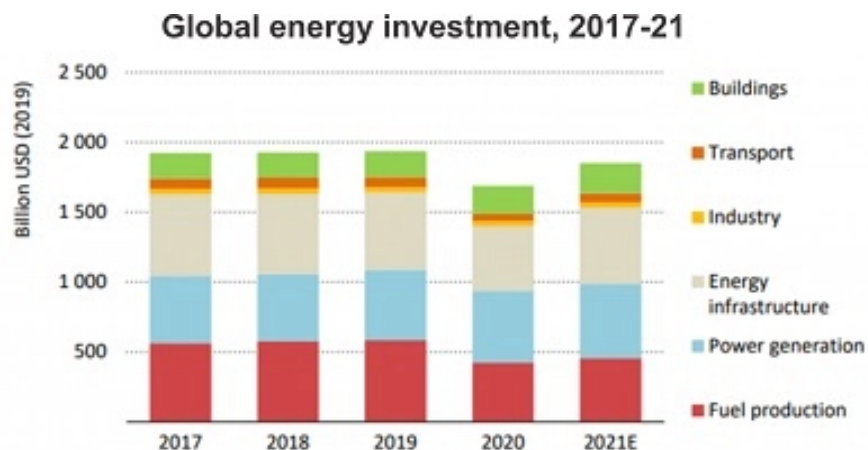
News Analysis (05 Jun, 2021)

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World Energy Investment Report, 2021: IEA

Why in News

Recently, the International Energy Agency (IEA) published the **World Energy Investment Report, 2021**.



Key Points

- **Increased Investment in Energy Sector:**
 - Global energy investment is expected to rebound in 2021 and increase 10% year-on-year to around **USD 1.9 trillion**.
 - Most of this investment will flow towards power and end-use sectors, shifting out of traditional fossil fuel production.
 - The scenario is perfectly aligned with the projection that global energy demand will rise 4.6% year-on-year in 2021, offsetting its contraction in 2020.

- **Renewable Energy:**
 - Renewable power **will have the largest share** - around 70% of the total will be spent on new power generation capacity.
 - There will be **substantial gain of renewable energy** as the future energy outlook has been dependent on technological development, well-established supply chain and demand from consumers for carbon-neutral electricity.
- **Fossil Fuels:**
 - Upstream (production and exploration) **investment in oil is expected to grow 10%**. This expansion in fossil fuels was planned with novel technologies like **Carbon Capture and Storage (CCS)** and **bioenergy** CCS, which are yet to attain commercial success.
 - The increment of **coal-fired power in 2020, mostly driven by China, is indicating that coal is down but not yet out.**
- **Increased Emissions:**
 - The above **positive scenarios will still not deter the increase in carbon dioxide emission**, after contraction in 2020 mainly due to economic slowdown induced by the novel coronavirus pandemic.
Global emission is **set to grow by 1.5 billion tonnes in 2021.**
 - Many developing nations' **supporting policy and regulatory frameworks are not yet aligned with long-term net-zero goals.**
Net zero emissions refers to achieving an overall balance between **greenhouse gas** emissions produced and greenhouse gas emissions taken out of the atmosphere.
 - In many **Emerging Market and Developing Economies (EMDEs)**, investment in renewables was hit harder by **Covid-19** than in developed nations – and now many EMDEs have prioritised coal and oil in recovery plans.
- **Reasons of Increased Emissions:**
 - The **emerging market is almost 70% responsible** for demand growth and **India plays an important part in this block.**
 - **China is showing a tremendous expansion in coal-based power production** — their coal consumption in December 2020 was a historic high — though the country has a commendable renewable growth.
 - The **responsibility-share of developed nations should not be undermined.** Their in-country **growth of emission is moderate but their exported emission is of concern.**
Australia's exported emission through coal is double its domestic emission.
 - Although the US has shown renewed commitment to the multilateral **United Nations** system for tackling **climate change** by re-joining the **Paris agreement**. Its fascination with cheap shale gas is creating an investment distortion and **adversely affecting the sustainability of developmental pathways of countries like India.**

- **About:**
 - It is an **autonomous Intergovernmental Organisation established in 1974** in Paris, France.
 - IEA mainly **focuses on its energy policies** which include **economic development, energy security and environmental protection**. These policies are also known as the **3 E's of IEA**.
- **India and IEA:**
 - **India became an Associate member of IEA in March 2017** but it was in engagement with IEA long before its association with the organization.
 - Recently, India has inked a **Strategic Partnership Agreement with the IEA** to strengthen cooperation in global energy security, stability and sustainability.
- **IEA Clean Coal Centre:**

It is dedicated to providing independent information and analysis on how coal can become a cleaner source of energy, compatible with the UN Sustainable Development Goals.
- **Reports:**
 - **World Energy Investment Report, World Energy Outlook Report, Global Energy Review.**
 - Recently, it has released the **India Energy Outlook 2021 Report and Net Zero by 2050**, World's first comprehensive energy roadmap.

Way Forward

- Market stimulus **amid the pandemic may have lost the opportunity** to maximise the clean developmental pathway, which the world is in dire need of.
- The **urgency visible in communication is still not satisfactorily reflected in action** and the world is far away from the scientific target of limiting climate change within two degrees Celsius.
- A **more democratic decision-making process and de-corporatisation of the energy sector is the need of the future** for the survival of civilization on this planet.

Source:DTE

Black Carbon and Glacier Melting

Why in News

The report titled “**Glaciers of the Himalayas: Climate Change, Black Carbon and Regional Resilience**” says that the **glaciers** are melting faster than the global average ice mass. However, the strong policy on **black carbon** can sharply cut glacier melt.

The research report is **released by the World Bank** and covers the **Himalaya, Karakoram, and Hindu Kush (HKHK)** mountain ranges.

Black Carbon

- Black carbon is **a kind of an aerosol**.
An **aerosol** is a suspension of fine solid particles or liquid droplets in the air.
- Among aerosols (such as brown carbon, sulphates), Black Carbon (BC) has been **recognized as the second most important anthropogenic agent for climate change** and the **primary marker to understand the adverse effects caused by air pollution**.
- It **gets emitted** from gas and diesel engines, coal-fired power plants, and other sources that burn fossil fuel. It **comprises a significant portion of particulate matter or PM**, which is an air pollutant.

HKHK Mountain Region:

- HKHK Region **spans eight countries**; Afghanistan, Pakistan, India, Nepal, China, Bhutan, Bangladesh and Myanmar and also **has some of the world's tallest mountains including Mt. Everest and K2**.
- HKHK Glaciers **feed into river systems** including Ganga, Yangtze, Irrawaddy, and Mekong.
The water that runs down from glaciers **feeds the agriculture**, on which nearly 2 billion people are dependent upon.
- HKHK Region, also known as the **third pole**, along with China's Tien Shan Mountains holds most ice outside the North and the South Pole.

Key Points

- **About Black Carbon:**
BC is a **short-lived pollutant** that is the **second-largest contributor to warming the planet behind carbon dioxide (CO₂)**.
 - Unlike other greenhouse gas emissions, BC is **quickly washed out and can be eliminated from the atmosphere if emissions stop**.
 - Unlike historical carbon emissions it is **also a localised source with greater local impact**.
- **Source of Black Carbon in Himalayan Region:**
Industry (primarily brick kilns) and **residential burning of solid fuel** together account for 45-66% of regional anthropogenic (man-made) BC deposition, followed by **on-road diesel fuels** (7-18%) and **open burning** (less than 3% in all seasons) in the region.
- **Impact of Deposits of BC:**
It **acts in two ways** hastening the pace of glacier melt:
 - By decreasing surface reflectance of sunlight.
 - By raising the air temperature.

- **Rate of De-glaciation:**

- The rate of retreat of HKHK glaciers is **estimated to be 0.3 metres per year in the west to 1.0 metre per year** in the east.
- Full implementation of **current policies to mitigate BC can achieve a 23% reduction** but **enacting new policies** and incorporating them through regional cooperation among countries can achieve enhanced benefits.

National Mission on Sustaining Himalayan Ecosystem (NMSHE) is one such policy adopted in India. It is one of the eight missions under the **National Action Plan on Climate Change (NAPCC)**.

- **BC deposits can be sharply reduced** through new, currently feasible policies **by an additional 50%** from current levels.

- **Impact of Glacier Melt:**

- Glacier melt **produces flash floods, landslips, soil erosion, and glacial lake outburst floods (GLOF)**.
- In the short run, the higher volumes of melt water **could replace receding groundwater downstream**. But in the long run, decreased water availability would **aggravate water shortage**.

- **Measures to be Taken:**

In the Himalayas, **reducing black carbon emissions from cookstoves, diesel engines, and open burning** would have the greatest impact and could significantly **reduce radiative forcing** and help to maintain a greater portion of Himalayan glacier systems.

Radiative forcing is a measure of the change in energy balance as a result of a change in a forcing agent (e.g., greenhouse gases, aerosol, cloud, and surface albedo) to affect the global energy balance and contribute to climate change.

- **Steps to be Taken by Regional Governments:**

- Review the **policies on water management**, with an emphasis on basin-based regulation and use of price signals (value of a particular action) for efficiency.
- Careful **planning and use of hydropower** to reflect changes in water flows and availability.
- Increasing the **efficiency of brick kilns** through proven technologies.
- There must also be greater **knowledge sharing** in the region.

Source: TH

World Environment Day 2021

Why in News

The **World Environment Day** is observed on the **5th of June annually** to encourage awareness and environmental protection.

Key Points

World Environment Day:

- **History:**
 - The **United Nations Assembly** established World Environment Day in 1972, which was the first day of the **Stockholm Conference** on the human environment.
- **Theme for 2021:**
 - **'Ecosystem Restoration'**.
 - It will kick off the **UN Decade on Ecosystem Restoration (2021-2030)** - a global mission to revive billions of hectares, from forests to farmlands, from the top of mountains to the depth of the sea.
 - The theme for this year's in India is '**promotion of biofuels for a better environment**'.
- **Host Nation:**
 - Pakistan will be the global host for 2021.
- **Initiatives Taken by India:**
 - **E-100 pilot project** has been launched in Pune for the production and distribution of ethanol across the country.
 - The government is **releasing the E-20 notification** that will allow oil companies to sell 20% ethanol blended petrol from 1st April, 2023, and BIS specifications for ethanol blends E12 and E15.

Ecosystem Restoration

- **Ecosystem:**
 - It is a **community of plants and animals interacting with each other in a given area**, and also with their **non-living environments**. The non-living environments include weather, earth, sun, soil, climate and atmosphere.
 - The ecosystem **relates to the way** that all these different organisms live in close proximity to each other and how they interact with each other.
- **Ecosystem Restoration:**
 - Ecosystem restoration means **assisting in the recovery of ecosystems** that have been degraded or destroyed, as well as **conserving the ecosystems** that are still intact.
 - It involves reviving old water bodies, building natural forests, providing space to wildlife and reducing water pollution to restore aquatic life.
 - Healthier ecosystems, with richer biodiversity, **yield greater benefits** such as more fertile soil, bigger yields of timber and fish, and larger stores of greenhouse gases.

- **Need of Restoration:**
 - Ecosystem loss is **depriving the world of carbon sinks**, like forests and wetlands, at a time when humanity can least afford it.
 - **Global greenhouse gas emissions** have grown for three consecutive years and the planet is one place for potentially catastrophic climate change.
- **India's Restoration Initiatives:**
 - **National Afforestation Programme (NAP)**: It focuses on the rehabilitation of degraded forests and afforestation around forests.
 - **National Mission for a Green India (GIM)**: It is under the **National Action Plan on Climate Change (NAPCC)** and aimed at improving and increasing tree cover as a climate adaptation and mitigation strategy.
 - **National Biodiversity Action Plan**: It has been launched to implement strategies for the reduction in rates of degradation, fragmentation and loss of natural habitats.
 - **Rural Livelihood Schemes**: Recognition of natural resources intrinsically linked to rural livelihoods is also reflected in flagship schemes like the **Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)** and the **National Rural Livelihood Mission (NRLM)**.
 - Potential for restoration through MGNREGA lies in its plantation and rejuvenation of water bodies subcomponents, through which provisions for livelihoods in afforestation, tree plantation, horticulture, and construction of new ponds have been made.
 - Similarly, schemes under NRLM, bifurcated into farm and non-farm livelihoods, focus on interventions to enhance natural capital and present opportunities for ecosystem restoration.

Source: BS

Seniorcare Aging Growth Engine Initiative

Why in News

Recently, the **Ministry of Social Justice and Empowerment** virtually launched the **SAGE (Seniorcare Aging Growth Engine) initiative** and **SAGE portal for elderly persons**.

An amount of **Rs. 100 crore** has been assigned for the **promotion of the silver economy**.

Silver Economy

- Silver economy is the system of **production, distribution and consumption of goods and services aimed at using the purchasing potential of older and ageing people** and satisfying their consumption, living and health needs.

- The silver economy is **analyzed in the field of social gerontology** (study of aging) **not as an existing economic system but as an instrument of ageing policy** and the political idea of forming a potential, needs-oriented economic system for an aging population.
- Its **main element is gerontechnology** (Technology pertaining to aged people) as a new scientific, research and implementation paradigm.

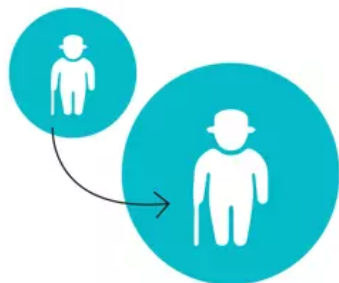
Key Points

- **About:**
 - The **SAGE portal** will be a **“one-stop access” of elderly care products and services by credible start-ups.**
 - It has been launched with a view to **help such persons who are interested in entrepreneurship in the field of providing services for elderly care.**
 - The **SAGE project aims to identify, evaluate, verify, aggregate, and deliver** products, solutions and services directly to the stakeholders. The **Ministry will act as a facilitator**, enabling the elderly to access the products through identified start-ups.
- **Features:**
 - **Start-ups can apply** for being a part of SAGE through a dedicated portal.
 - The start-ups selected under SAGE will be those which will provide new innovative products and services to elderly persons in **various areas like health, travel, finance, legal, housing, food among others.**
 - An allocation of **Rs. 25 crores** has been made for the SAGE project in the current financial year i.e **2021-22.**
- **Need for the Initiative:**

The **share of elders**, as a percentage of the total population in the country, is expected to **increase from around 7.5% in 2001 to almost 12.5% by 2026**, and surpass **19.5% by 2050.**

300M ELDERLY BY 2050

30 years from now, the elderly population in India is expected to triple from **104 million** in 2011 to **300 million** in 2050



Elderly population in **India (134m)** in 2020) is fast reaching the current size of population of **Mexico (130m)** or **Russia (143m)**

The 2050 population of elderly will be close to the population of the US (**326m** in 2018) today

India's **12 million** population of 80+ is equal to the total population of countries such as Belgium, Greece, or Cuba

Other Government Initiatives for Elderly people:

- **Integrated Programme for Older Persons (IPOP):**

The main objective of the scheme is to improve the quality of life of older persons by providing basic amenities like shelter, food, medical care and entertainment opportunities, etc.
- **Rashtriya Vayoshri Yojana (RVY):**
 - This is a **central sector scheme** funded from the **Senior Citizens' Welfare Fund**. The fund was notified in the year 2016.
 - It aims to provide **aids and assistive living devices to senior citizens belonging to Below Poverty Line (BPL) category** who suffer from age-related disabilities such as low vision, hearing impairment, loss of teeth and locomotor disabilities.
- **Pradhan Mantri Vaya Vandana Yojana (PMVVY):**
 - PMVVY was **launched in May 2017** to provide social security during old age.
 - It is a **pension scheme for senior citizens** that comes with guaranteed returns on monthly, quarterly, half-yearly or on an annual basis for a period of 10 years. It is **exclusively available to those who are 60 years of age and above**.
- **Vayoshreshtha Samman:**

Conferred as a **National award**, and given to eminent senior citizens & institutions under various categories for their contributions on **International day of older persons on 1st October**.
- **Maintenance and Welfare of Parents and Senior Citizens (MWPCS) Act, 2007:**

To ensure need-based maintenance for Parents and Senior Citizens and their welfare.

Bamboo Market Window on GeM Portal

Why in News

Recently, the government of India has dedicated a window 'The Green Gold Collection' on the **GeM (Government e-Marketplace) portal** for the **marketing of Bamboo Goods**.

This window is the collective work of the **National Bamboo Mission (NBM)** and **GeM**.

Key Points

- **About:**
 - It showcases a range of exquisitely handcrafted bamboo and bamboo products, handicrafts, disposals and office utility products on the GeM portal.
 - It **aims to** provide bamboo artisans, weavers and entrepreneurs in rural areas with market access to Government buyers.
 - It seeks **to promote** the adoption and **use of bamboo products** among Government buyers and usher a sustainable rural economy for an **Atmanirbhar Bharat**.
- **National Bamboo Mission:**
 - **Launch:**

The **restructured NBM** was launched in **2018-19** for the holistic development of the complete value chain of the bamboo sector and is being **implemented in a hub & spoke model**.

“Hub & Spoke” model wherein the **Mentor Institution**, called the **“Hub”** is centralized and will have the responsibility of guiding the **Mentee institution** through the secondary branches the **“Spoke”** i.e. through the services provided to the mentee for self improvement.
 - **Objectives:**
 - **Connecting farmers to markets** so as to enable farmer producers to get a ready market for the bamboo grown and to increase the supply of appropriate raw material to the domestic industry.
 - It also endeavours **to upgrade skills** of traditional bamboo craftsmen as per the requirement of contemporary markets with a tie-up with enterprises and premier institutes.
 - **Nodal Ministry:**

Ministry of Agriculture and Farmers Welfare.

- **Government e-Marketplace:**

- **About:**

- **GeM** is a **one-stop National Public Procurement Portal** to facilitate online procurement of common use Goods & Services required by various Central and State Government Departments/Organizations /Public Sector Undertakings (PSUs).
 - The procurement of goods and services by Ministries and the Central Public Sector Enterprises (CPSEs) is **mandatory for goods and services available on GeM**.
 - It also provides the tools of **e-bidding and reverse e-auction** to facilitate the government users achieve the best value for their money.
 - At present, GeM has more than **30 lakh products**, over Rs. 10 lakh crore worth of transactions have happened so far at the portal.

- **Launch:**

- It was launched **in 2016** to bring transparency and efficiency in the government buying process.

- **Nodal Ministry:**

- Ministry of Commerce and Industry.

Bamboo

- **18th September** is observed as **World Bamboo Day by the World Bamboo Organisation**.
- **India is the world's second-largest cultivator of bamboo** after China, with **136 species** and **23 genera** spread over 13.96 million hectares, according to the **State of Environment report 2018**.
- **Green Gold**, as bamboo is often known, is **found everywhere in India**.
- Known as '**poor man's timber**', bamboo is omnipresent in tribal cultures and community living. Rural communities engage with bamboo handicrafts, textiles, artifacts, and household utilities.

- Examples** include **Tripura bamboo silks**, heritage cuisines with roasted and pickled bamboo shoots, cultural symbols like the **Assamese 'Jaapi'** (made of bamboo, cane, and palm), widely popular bamboo tree houses, machans, besides modern sustainable architectural concepts and musical instruments.

- **Initiatives Taken:** National Bamboo Mission, **Bamboo Clusters**, Removal of Bamboo from 'Tree' Category (**Indian Forest Act 1927** was amended in 2017),

Source: PIB

Corbevax Covid-19 Vaccine

Why in News

India has placed an advance order to block 300 million doses of a new **Covid-19** vaccine, **Corbevax**.

Key Points

- **Corbevax:**
 - **About:** It is India's indigenous **Covid-19 vaccine** which is currently **undergoing Phase 3 clinical trials**.
 - **Working:**
 - It is a “**recombinant protein sub-unit**” vaccine.
It means it is made up of a **specific part of SARS-CoV-2** - the **spike protein** on the virus's surface.
 - The **spike protein allows the virus** to enter the cells in the body so that it can replicate and cause disease.
 - However, when this **protein alone is given to the body**, it is not expected to be harmful as the rest of the virus is absent.
 - The body is expected to **develop an immune response** against the injected spike protein.
 - Therefore, when the real virus attempts to infect the body, it will already have an immune response ready that will make it unlikely for the person to fall severely ill.
- **Difference between Corbevax and Other Covid-19 Vaccines:**
 - They are either **mRNA vaccines** (Pfizer and Moderna), **viral vector vaccines** (**Covishield** and **Sputnik V**) or **inactivated vaccines** (**Covaxin**, Sinovac-CoronaVac and Sinopharm's Vero Cell).
 - **Viral vector and mRNA vaccines use a code to induce our cells** to make the spike proteins against which the body has to build immunity.
 - In the case of Corbevax, protein itself is given.
 - **mRNA vaccines** work by using messenger RNA (mRNA), which is the molecule that essentially puts DNA instructions into action. Inside a cell, mRNA is used as a template to build a protein.
 - **Viral vector vaccines** use a modified version of a different virus (the vector) to deliver important instructions to our cells.
 - **Inactivated vaccines include killed particles of the whole SARS-CoV-2 virus**, attempting to target the entire structure of the virus.
Corbevax, like the mRNA and viral vector Covid-19 vaccines, targets only the spike protein, but in a different way.

Other Types of Vaccine

- **Live-attenuated Vaccines:**
 - Live vaccines use a **weakened (or attenuated) form of the germ** that causes a disease.
 - Because these vaccines are so **similar to the natural infection** that they help prevent, they create a strong and long-lasting immune response.
 - The limitation of this approach is that these vaccines usually **cannot be given to people with weakened immune systems**.
 - Live vaccines are used against: **Measles, mumps, rubella (MMR combined vaccine), Rotavirus, Smallpox** among others.
- **Subunit, recombinant, polysaccharide, and conjugate Vaccines:**
 - They **use specific pieces of the germ** - like its protein, sugar, or capsid (a casing around the germ). They give a very strong immune response.
 - They can also be used on people with weakened immune systems and long-term health problems.
 - These vaccines are used to protect against: **Hib** (Haemophilus influenzae type b) disease, **Hepatitis B**, **HPV (Human papillomavirus)**, **Pneumococcal disease** among others.
- **Toxoid Vaccines:**

Toxoid vaccines **use a toxin made by the germ that causes a disease**. Toxoid vaccines are used to protect against: **Diphtheria, Tetanus**.

Source: IE

Council of Scientific and Industrial Research

Why in News

Recently, the Prime Minister chaired a meeting of the **Council of Scientific and Industrial Research (CSIR) Society** through video conference.

- Earlier **CSIR Floriculture Mission** was approved for implementation in 21 States and Union Territories of India.
- It is also planning to **undertake genome sequencing** of a sample of nearly 1000 Indian **rural youth to determine unique genetic traits, susceptibility (and resilience) to disease**.

Key Points

- **About:**

- It is the **largest research and development (R&D) organisation in India**. It has a **pan-India presence** and has a dynamic network of **37 national laboratories, 39 outreach centres, 3 Innovation Complexes and 5 units**.
- It is **ranked 37th among 1587 government institutions worldwide** and is the only Indian organization among the top 100 global government institutions, according to the **Scimago Institutions Ranking World Report 2021**.
CSIR holds the **7th rank in Asia and leads the country at the first position**.
- The **Prime Minister** is the **President** (Ex-officio) and the **Union Minister of Science and Technology** is the **Vice President** (Ex-officio).

- **Funding:**

CSIR is funded by the **Ministry of Science and Technology** and it operates as an autonomous body through the **Societies Registration Act, 1860**.

- **Established:**

September 1942.

- **Located:**

New Delhi.

- **Objectives:**

- **Scientific and industrial/applied research of national importance**. It covers a wide spectrum of streams such as: Radio and space physics, oceanography, **biotechnology**, **nanotechnology**, information technology, etc.
- It **provides significant technological intervention** in many areas with regard to societal efforts which include the environment, health, drinking water, food, housing, energy, farm and non-farm sectors.

- **Some Initiatives:**

- **Covid-19:**

CSIR has set up **five technology verticals** for addressing the emerging situation due to **pandemic**:

- Digital and Molecular Surveillance.
- Rapid and Economical Diagnostics.
- Repurposing of Drugs, Vaccine and Convalescent Plasma Therapy.
- Hospital Assistive Devices and PPEs (Personal Protective Equipment).
- Supply Chain and Logistics Support Systems.

- **Strategic:**

Head-Up-Display (HUD): It developed indigenous Head-Up- display (HUD) for Indian Light Combat Aircraft, Tejas. HUD **aids the pilot in flying the aircraft and in critical flight maneuvers including weapon aiming.**

- **Energy & Environment:**

- **Solar Tree:** It occupies **minimum space to produce clean power.**
- **Lithium Ion Battery:** India's **first lithium ion battery fabrication facility** based on indigenous novel materials for making 4.0 V/14 h standard cells has been established.

- **Agriculture:**

- **Samba Mahsuri Rice Variety:** It developed a **Bacterial Blight Resistant Rice.**
- **Rice Cultivar (Muktashree):** A rice variety has been developed which **restricts assimilation of Arsenic within permissible limits.**
- **White-fly resistant Cotton variety:** Developed a **transgenic cotton line** which is resistant to whiteflies.

- **Healthcare:**

Genomics and other omics technologies for Enabling Medical Decision – GOMED: It has been developed by the CSIR which provides a platform of disease genomics to solve clinical problems.

- **Food & Nutrition:**

- **Ksheer-scanner:** It detects the **level of milk adulteration** and adulterants in 45 seconds at the cost of 10 paise.
- **Double-Fortified Salt:** Salt **fortified with iodine and iron** having improved properties developed and tested for **addressing anaemia in people.**

Source: PIB

CIBER-2: Counting of Stars

Why in News

A **NASA** (National Aeronautics and Space Administration) **funded CIBER-2 sounding rocket's** launch window will open at the **White Sands Missile Range** in New Mexico, USA.

- The **aim** of CIBER-2 mission is **to look for evidence of extra stars** that may have been missed in stellar head counts.
- The **ESA (European Space Agency) infrared space observatory Herschel** also counted the number of galaxies in infrared and measured their luminosity previously.

Key Points

- **Sounding Rocket:**
 - Sounding rockets take their name from the nautical term "**to sound,**" which means to **take measurements.**
 - Since 1959, NASA-sponsored space and earth science research has used sounding rockets to test instruments used on satellites and spacecraft and to provide information about the **Sun, stars, galaxies** and **Earth's atmosphere and radiation.**
- **About CIBER-2 (Cosmic Infrared Background Experiment-2):**
 - The mission is the **latest in a series of sounding rocket launches** that began in 2009. The count from the first CIBER mission paved the way to reorganize the research and give the counting of stars another run.
 - The CIBER-2 instrument will **launch aboard a sounding rocket,** a small suborbital rocket that will carry scientific instruments on brief trips into space before it falls back to Earth for recovery.
 - Once above Earth's atmosphere, CIBER-2 will **survey a patch of sky about 4 square degrees** - for reference, the full Moon takes up about half a degree – that includes dozens of galaxy clusters.
 - It **will not actually count individual stars** but it will instead detect the **extragalactic background light,** which is all of the light that has been emitted throughout the history of the Universe.
 - From all of this extragalactic background light, the CIBER-2 **will focus on a portion of this called cosmic infrared background,** which is emitted by some of the most common stars.

Essentially, this approach is aiming to look at how bright this light is to give scientists an estimate of how many of these stars are out there.

- **Rough Estimate of Stars:**

- To get a rough estimate of the total number of stars in the universe, scientists have calculated the **average number of stars in a galaxy** – some estimates put it at about **100 million**, though it could be 10 or more times higher.
- **Multiplying it by the number of galaxies**, taken to be about **2 trillion** (also very tentative), there are **one hundred quintillion stars (or 1 with 21 zeros after it)**.
- But this calculation **assumes that all stars are inside galaxies**, which might not be true and this is what the **CIBER-2 instrument will try to find out**.
- The European Space Agency (ESA) says **there could be 100 thousand million stars in the Milky Way alone**.

Source: IE
