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GS 3: ECONOMY, ECOLOGY, SCIENCE & TECHNOLOGY, DEFENCE, SECURITY AND DISASTER MANAGEMENT

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1. Australia, the partner for India's growth trajectory

Context: Australia is strengthening economic ties with India through a new roadmap. The roadmap focuses on trade, investment, energy, education, and diaspora collaboration. Fuelled by our free trade agreement, the Economic Cooperation and Trade Agreement (ECTA), the India-Australia relationship has grown at the high end of our expectations. The roadmap also describes another seven 'major economic roads' to mutual prosperity: investment; tech; sports; culture and the arts; resources; defence; space and health. These are the fields in which our complementary capabilities can be most naturally leveraged.

Key points

- **India's Growth:** Australia sees India as a rising economic power and expects it to become the third-largest economy by 2030. It supports India's demand for a permanent seat on the United Nations Security Council.
- **Roadmap for Economic Engagement:** The roadmap outlines how Australia can contribute to and benefit from India's economic expansion. It builds on the success of the 2018 economic strategy and reflects significant changes in global trade.
- **Impact of the Free Trade Agreement:** The Economic Cooperation and Trade Agreement (ECTA) has helped trade between India and Australia grow significantly. India's exports to the world increased by 35% in five years, while exports to Australia grew by 66%, showing a strong trade relationship.
- **Australia's Contribution to India's Growth:** Australia supplies India with energy, critical minerals, and resources necessary for its economic and industrial growth. It also supports India's skill development initiatives to train millions of professionals every year.
- **Key Sectors for Future Collaboration:** The roadmap focuses on four major sectors called "Superhighways of Growth" –
 - Clean energy to support India's transition to sustainable power.
 - Education and skills to enhance workforce capabilities.
 - Agribusiness to improve food security and trade.
 - Tourism to boost people-to-people ties.
- **The Role of the Indian Diaspora:** Over one million people of Indian origin live in Australia, playing a key role in business and community development. The diaspora strengthens India-Australia ties by fostering mutual understanding and trade opportunities. Additional investments are being made in programs to enhance cultural and business exchanges.
- **Conclusion:** The roadmap encourages Australian businesses to explore new opportunities in India. The next step is to finalize the Comprehensive Economic Cooperation Agreement (CECA) to deepen trade and investment. With the roadmap in place, the future of India-Australia economic relations looks promising.

Q. 'Quadrilateral Security Dialogue (Quad)' is transforming itself into a trade bloc from a military alliance, in present times. ('কোৱাড্ৰিলেটবেল ছিকিউৰিটি ডায়ালগ (কোৱাড) "ই বৰ্তমান সময়ত সামৰিক মিত্ৰতাৰ পৰা নিজকে এক বাণিজ্যিক গোটলৈ ৰূপান্তৰিত কৰিছে।')

2. India's burden of rising obesity, the hefty cost to pay

Context: In the last two decades in India, a major epidemiological transition has happened that has not captured sufficient public attention — the challenge of overweight and obesity. The National Family Health Survey round 5 (NFHS-5, 2019-21) suggests that nearly one in every four men or women is obese. The proportion of those who are overweight and obese ranges from 8% to 50% across States, in both men and women, and in rural and urban settings.

Key points

- **Overview:** The general societal attitude in the country which normalises overweight, or obesity must change; holistic interventions are needed to ensure a healthy nation.
- **India's Rising Obesity:** *Childhood Obesity in India* - The World Obesity Federation estimates that India's annual increase in childhood obesity is one of the world's steepest.
Findings from Nationwide Study (ICMR - The Lancet Diabetes and Endocrinology, 2023) - Amongst adults over 20 years of age in India. One in every third person (35 crore) has abdominal obesity. One in every fourth person (25 crore) has generalised obesity. One in every fifth person (21 crore) has high levels of blood cholesterol.
- **Focus points:** *Personal and societal perception* - Being overweight and obese is often considered a personal issue. The general societal attitude in India normalises obesity or being overweight.
Epidemiological shift - Over the past few decades, India has transitioned from being 'food or calorie deficient' to becoming 'food or calorie sufficient' (with inequitable distribution).
Food security and nutrition report (2024) - Estimated that around 55% (78 crore) of India's population could not afford a healthy diet. Nearly 40% of people fall short of an adequate-nutrient diet.
Projected economic burden (2030) - Expected to rise to ₹4,700 per capita (or 1.57% of GDP) without sufficient interventions.
- **Policy and programmatic solutions:** *Societal dialogue and awareness* - A structured science communication and public awareness campaign is needed to highlight obesity as a disease that contributes to diabetes, hypertension, and liver disorders. Obesity needs prevention, care, and management like any other health condition.
Regulating HFSS and UPF products - Higher taxation on HFSS and UPF products. Subsidies for healthier food like fruits and vegetables. Food industry should adopt ethical marketing practices.
- **Way ahead:** *Inter-ministerial collaboration* - India's nutrition intervention programme should be reimagined as 'Suposhan Abhiyan', focusing not just on feeding but also on 'mindful under-feeding' and 'rightful micronutrient supplementation'.
Research and evidence generation - The research community, medical and public health professionals need to generate additional evidence on overweight and obesity.
Making healthy eating affordable - Healthy food is becoming more expensive than junk food. The food industry, especially online food delivery platforms, must encourage healthy eating.
- **Conclusion:** Obesity is a public health challenge, waiting for holistic, multipronged and comprehensive interventions. Tackling overweight and obesity is a sine qua non for a healthy, economically prosperous and developed India.

3. Mapping Her Work

Context: The latest rounds of the periodic labour force surveys show that overall employment, particularly self-employment, among rural women, has increased significantly since 2017-18. Most of these women report being helpers in a home-based enterprise. Women spend majority of their daily time cooking, as shown by the 2019 Time Use Survey of India. Almost 75% of these women use firewood and cow dung for cooking, which not only makes cooking and cleaning more time-consuming, but also exposes these women to cardiovascular and lung disease due to indoor smoke inhalation.

Key points

- **Time Use and Domestic Work Burden:** Rural women spend ~60 hours/week on domestic tasks (2019 Time Use Survey).
Cooking and Cleaning - 40+ hours/week (4 hours/day) spent on cooking/cleaning. 75% use firewood/dung as primary fuel, increasing time and health risks (indoor pollution).
- **Pradhan Mantri Ujjwala Yojana (PMUY):** The Ministry of Petroleum and Natural Gas (MOPNG), introduced the 'Pradhan Mantri Ujjwala Yojana' (PMUY) as a flagship scheme with the objective of making clean cooking fuel such as LPG available to the rural and deprived households which were otherwise using traditional cooking fuels such as firewood, coal, cow-dung cakes etc.
Objectives - Empowering women and protecting their health. Reducing the number of deaths in India due to unclean cooking fuel.
Features - The scheme provides a financial support of Rs 1600 for each LPG connection to the BPL households. Along with a deposit-free LPG connection, Ujjwala 2.0 will provide the first refill and a hotplate free of cost to the beneficiaries.
Benefits - The eligible beneficiaries receive a free LPG connection. The beneficiaries also receive a subsidy on the first six refills of 14.2 kg cylinders or eight refills of 5 kg cylinders. The beneficiaries can opt for an EMI facility to pay for the cost of the stove and the first refill.
- **Economic and Social Barriers:** *Low Value of Women's Time* - Saved time valued at ~5% of monthly household income (based on rural unskilled wages). Limited high-return job opportunities (e.g. manufacturing/services) in rural areas.
Employment Context - Only 15% (primarily agricultural self-employment). Flexible work options for women are scarce.
- **Structural Challenges:** *Mixed-Fuel Usage* - Low LPG adoption despite PMUY success (3 cylinders/year vs. potential 12 for a 4-member household).
Gender Dynamics - Men control LPG refill decisions, perpetuating reliance on solid fuels.
- **Barriers to LPG Usage:** *Cost and Accessibility* - High refill costs deter regular use.
Cultural Preferences - Dependence on traditional fuels due to familiarity.
- **Health vs. Economic Trade-offs:** Clean fuels reduce health risks but offer limited economic incentives for households.
- **Conclusion:** The fact sheet on the 2024 Time Use Survey shows a 1.5 percentage point increase in overall employment and 24 more minutes spent on employment activities by women, relative to 2019. The reasons behind the observed 20 percentage point increase in women's self-employment between 2017-18 and 2023-24, therefore, remains unresolved.

4. The way to protect orans

Context: In December 2024, the Supreme Court acknowledged the socio-ecological and cultural significance of orans (sacred forests) for local communities in Rajasthan. The judgment aims to further the protection of orans and harness local communities' agency for doing so. It seeks to achieve these objectives by formalising the governance and management of orans — that is, by bringing them within the purview of biodiversity-related laws.

Key points

- **Orans:** Orans are sacred groves that have been preserved by communities since ancient times. Each Oran is associated with a local deity, and it is a common belief that cutting trees using an axe can result in divine retribution.
Importance - Orans enhance local biodiversity and support traditional water sources. By trapping surface runoff, orans help in recharging groundwater levels, improving water availability in villages.
- **Declaration as Forests Under the Forest (Conservation) Act, 1980:** The Court declared orans as 'forests' under the Act, granting them legal protection. However, the Act contains exemptions that allow the diversion of forest land for purposes like zoos, safaris, and ecotourism.
- **Designation as Community Reserves Under the Wildlife (Protection) Act, 1972:** The Court suggested designating orans as 'community reserves,' which would create a management committee with local and state representation. However, this committee is primarily responsible for administrative tasks and does not have decision-making power.
- **Common Forest Land Under the Forest Rights Act, 2006:** Another suggestion was to classify orans as 'common forest land' under this Act. Rights under this Act can only be granted if communities or individuals meet specific eligibility criteria.
- **Way ahead:** The Supreme Court recommended that the Environment Ministry develop a comprehensive policy for Oran governance. Different states currently manage orans through various formal and informal methods, highlighting the need for a unified approach. Instead of imposing legal formalization, successful community-led governance models should be identified, supported, and replicated.

Q. How can the formalization of orans under existing forest and wildlife laws impact traditional community-led conservation efforts? Suggest a balanced approach to their governance. (বর্তমানৰ বন আৰু বন্যপ্ৰাণী আইনৰ অধীনত ওৰানৰ আনুষ্ঠানিককৰণে পৰম্পৰাগত সম্প্ৰদায়ৰ নেতৃত্বাধীন সংৰক্ষণ প্ৰচেষ্টাক কেনেদৰে প্ৰভাৱিত কৰিব পাৰে?)

5. Research team takes big step towards making a Bose metal

Context: Researchers have recently discovered a potential new state of matter, the Bose metal, found between a regular metal and a superconductor, with evidence of this phase in Niobium Diselenide (NbSe₂) by a team of Chinese and Japanese scientists. Traditional theories for disordered metals say that at absolute zero temperature, the metals should either become an insulator or a superconductor. A Bose metal challenges this description because its conductivity stays between zero and infinity as the temperature tends to absolute zero.

Key points

- **Bose Metal:** A Bose metal is a hypothetical anomalous metallic state where Cooper pairs (electron pairs) form but do not transition into a superconducting state. This state exists between a normal metal and a superconductor, challenging traditional theories of condensed matter physics. In simple terms, a Bose metal is a material where –
 - Electrons pair up into Cooper pairs (like in superconductors).
 - These Cooper pairs fail to achieve long-range coherence, meaning the material remains metallic instead of becoming superconducting.
 - This results in partial electrical resistance, unlike superconductors that have zero resistance.
- **Intermediate State:** Exists between a metal and a superconductor.
- **Cooper Pair Formation:** Electrons form pairs, but they don't condense into superconductivity.
- **Anomalous Conductivity:** Higher than normal metals but not infinite like superconductors.
- **Quantum Fluctuations:** Strong phase fluctuations disrupt Cooper pair coherence.
- **Hall Resistance Vanishing:** Indicates charge transport by Cooper pairs rather than individual electrons.
- **Observed in Thin 2D Materials:** Seen in ultra-thin films of superconductors under specific conditions.

Q. Due to improper/indiscriminate disposal of old and used computers or their parts, which of the following are released into the environment as e-waste?

1. Beryllium
2. Cadmium
3. Chromium
4. Heptachlor
5. Mercury
6. Lead
7. Plutonium

Select the correct answer using the codes given below:

- | | |
|---------------------------|----------------------------|
| (a) 1, 3, 4, 6 and 7 only | (b) 1, 2, 3, 5 and 6 only |
| (c) 2, 4, 5 and 7 only | (d) 1, 2, 3, 4, 5, 6 and 7 |