

P2. NATIONAL



Wayanad landslide: Heavy rain, huge pile-up of debris aggravated disaster, say experts - The fatal mudslide at the under-construction tunnel project highlighted the consequences of inadequate safety practices, poor spoil management and infrastructure development in ecologically fragile regions.

P4. CONTOURS



Linking women's incomes and healthcare - A new study found that increasing women's disposable income leads households to invest more in preventive healthcare, nutrition and healthier lifestyles, improving long-term health outcomes.

P7. INTERNATIONAL



Defence, critical minerals on table at India-Indonesia meeting - Prime Minister Narendra Modi's visit strengthened the India-Indonesia Comprehensive Strategic Partnership through expanded cooperation in defence, maritime security, trade, critical minerals, education and cultural ties.

P8. ECONOMICS



India's EV transition cannot afford to ignore retrofitment - Converting existing Internal Combustion Engine (ICE) vehicles into Electric Vehicles (EVs) offers an affordable pathway towards cleaner mobility while supporting circular economy principles.

Editor's Note

With today's edition of the Pala Civil Times, we explore a wide range of topics spanning governance, public policy, international relations, environment, economy and technology. This edition covers the Wayanad tunnel mudslide and the lessons it offers for disaster management in ecologically fragile regions, the Allahabad High Court's ruling affirming the primacy of the Prohibition of Child Marriage Act and POCSO Act over personal law, and a new research study highlighting how women's economic empowerment can improve household health and nutrition outcomes.

On the international front, we examine the key outcomes of Prime Minister Narendra Modi's visit to Indonesia, including developments in defence, maritime cooperation, trade, education and cultural ties. In the science and technology section, we discuss how vehicle retrofitting can accelerate India's transition to electric mobility, while also analysing why the government is adopting a calibrated approach towards ethanol blending beyond E20.

Our decoded editorials examine India's cooperative development model and its growing role in inclusive economic growth, alongside a balanced discussion on the opportunities and challenges associated with higher ethanol blending in petrol. Together, these topics highlight the interconnected nature of public policy, sustainable development, technological change and governance. We hope this edition encourages you to read beyond the headlines, connect current affairs with broader concepts, and develop a deeper analytical understanding of the issues shaping India and the world today. Happy reading!

Editorials Decoded

The Indian EXPRESS

On ethanol, make haste slowly



While higher ethanol blends can reduce oil imports and emissions, concerns over mileage loss, compatibility with older vehicles and consumer costs call for a gradual and evidence-based transition beyond E20.

THE HINDU

Grand ambitions



The cooperative sector is being positioned as a key pillar of inclusive and sustainable economic development, expanding beyond agriculture into new sectors while promoting collective ownership and cooperative federalism.

Wayanad landslide: Heavy rain, huge pile-up of debris aggravated disaster, say experts

A major mudslide at the under-construction Anakkampoyil–Kalladi–Meppadi twin-tube tunnel project in Kerala's Wayanad district claimed at least three lives, left several workers missing and injured many others after a massive heap of excavated soil collapsed near the tunnel portal. Preliminary findings indicate that prolonged rainfall destabilised the large quantity of excavated debris that had been piled near the construction site. The State government termed the incident a man-made disaster, alleging that repeated directions issued by the district administration to remove the accumulated spoil were ignored. The project, being executed by a private contractor for Konkan Railway Corporation Ltd., has once again brought attention to infrastructure development in ecologically fragile regions and the need for strict compliance with environmental and safety norms.

Mudslide and Wayanad's Vulnerability

A mudslide (or debris flow) is a fast-moving type of landslide in which water-saturated soil, rock and debris rapidly flow downslope, often through natural drainage channels. Unlike slow-moving landslides, mudslides occur suddenly and can engulf people, vehicles and infrastructure within minutes. They are generally triggered by intense rainfall, unstable slopes, earthquakes or human-induced slope disturbances. Wayanad remains particularly vulnerable because it lies in the Western Ghats, a region characterised by steep terrain, fragile geology and heavy southwest monsoon rainfall. Excavation, slope modification, deforestation and improper dumping of excavated material further reduce slope stability, increasing the likelihood of such disasters during periods of intense rainfall.

Rescue Operations and Disaster Management

Following the incident, rescue operations were launched by the National Disaster Response Force (NDRF), State Disaster Response Force (SDRF), Fire and Rescue Services, Police and local volunteers, who worked to rescue trapped workers and identify those missing using duty records. The State government shifted nearby residents to safer locations, suspended traffic on the affected bridge, ordered a structural safety review, and announced a multi-agency investigation to fix accountability for possible negligence. The tragedy has highlighted the importance of continuous risk assessment during large infrastructure projects, scientific disposal of excavated material, strict adherence to safety protocols and effective coordination between district disaster management authorities and project agencies.

RELEVANCE

GS III : Disaster Management

Western Ghats and Ecologically Sensitive Areas (ESA)

The incident has also revived concerns over undertaking large-scale infrastructure projects in the ecologically sensitive **Western Ghats, one of the world's eight biodiversity hotspots** and a UNESCO World Heritage Site. The mountain chain regulates the southwest monsoon, supports major peninsular rivers and provides critical ecosystem services. Committees headed by Madhav Gadgil (2011) and K. Kasturirangan (2013) recommended protection of **Ecologically Sensitive Areas (ESAs)** by restricting environmentally damaging activities such as mining, quarrying, polluting industries and large construction projects in ecologically fragile natural landscapes. The Wayanad disaster reinforces the need for rigorous environmental impact assessments, continuous monitoring of construction activities, scientific management of excavated spoil and effective implementation of ESA regulations to balance infrastructure development with ecological sustainability.

PYQ Compass

UPSC questions previously asked from the themes discussed on this page.



- Q. Which of the following are in Agasthyamala Biosphere Reserve? (2019)
- Neyyar, Idl Peppara and Shendurney Wildlife Sanctuaries; and Kalakad Mundanthurai Tiger Reserve
 - Mudumalai, Sathyamangalam and Wayanad Wildlife Sanctuaries; and Silent Valley National Park
 - Kaundinya, Gundla Brahmeswaram and Papikonda Wildlife Sanctuaries; and Mukurthi National Park
 - Kawal and Sri Venkateswara Wildlife Sanctuaries; and Nagarjunasagar–Srisailem Tiger Reserve

HC upholds uniform legal marriage age for all religions



The Allahabad High Court in a recent judgment held that the minimum age of marriage prescribed under the Prohibition of Child Marriage Act (PCMA), 2006 applies uniformly to all citizens irrespective of religion. In this regard, Muslim personal law principle recognising puberty as the age of marriage cannot override a Central statute. While hearing a petition seeking to quash an FIR relating to the proposed marriage of a 16-year-old girl, the Court rejected arguments based on the **Muslim Personal Law (Shariat) Application Act, 1937** and the **Indian Majority Act, 1875**, which were cited to contend that a Muslim girl attaining puberty is competent to marry. Referring to the Protection of Children from Sexual Offences (POCSO) Act, 2012, the Court observed that permitting the marriage of a person below 18 years would be inconsistent with the Act, which criminalises sexual relations with a child. It also endorsed the reasoning of the Kerala High Court in **Moidutty Musliyar v. Sub Inspector, Vadakkencherry Police Station**, holding that personal law cannot dilute statutory child protection laws.

The ruling reinforces the primacy of secular statutory protections over personal religious laws in matters concerning the welfare of minors by affirming that the PCMA, 2006 and the POCSO Act, 2012 prevail over conflicting personal law principles. It is significant because High Courts have previously taken divergent views on the applicability of Muslim personal law to child marriages, making this judgment an important contribution to the evolving legal position, although a final determination by the Supreme Court may still be required.

RELEVANCE

GS II ; Indian Polity; GS I : Indian Geography

Four States reach a pact on Narmada project payments

The Union Government, along with the Chief Ministers of Gujarat, Madhya Pradesh, Maharashtra and Rajasthan, signed a historic agreement to settle the long-pending financial issues arising from the implementation of the **Narmada Water Disputes Tribunal (NWDT) Award**. Constituted in 1969 under the Inter-State River Water Disputes Act, 1956, the NWDT delivered its Award in 1979, allocating the Narmada's waters among the four basin states, determining their shares in hydropower generated from the **Sardar Sarovar Project**, and laying down the framework for the development of major multipurpose projects on the river. While the Award settled the allocation of water and power, several implementation-related financial issues like cost-sharing for the Sardar Sarovar Project, expenditure on Resettlement and Rehabilitation (R&R), compensation for submerged land, and interest liabilities incurred during construction remained unresolved for decades. The latest agreement brings these outstanding dues to a final settlement, marking an important example of cooperative federalism in the management of interstate river projects.

The **Narmada** is **India's longest west-flowing river** and is shared primarily by Madhya Pradesh, Gujarat, Maharashtra and Rajasthan, making it one of the country's most significant interstate river systems. Flowing through a vast basin across central India, it supports irrigation, drinking water supply and hydroelectric power generation, with flagship projects such as the Sardar Sarovar Dam and Indira Sagar Dam serving millions of people across multiple states.

PYQ Compass

UPSC questions previously asked from the themes discussed on this page.



Q. The Narmada river flows to the west, while most other large peninsular rivers flow to the east. Why? (2013)

1. It occupies a linear rift valley.
2. It flows between the Vindhya and the Satpuras.
3. The land slopes to the west from Central India.

Select the correct answer using the codes given below.

- (a) 1 only (b) 2 and 3 (c) 1 and 3 (d) None

Linking women's incomes and healthcare

India is simultaneously witnessing rising female labour force participation and a growing burden of non-communicable diseases (NCDs) such as diabetes, hypertension, cardiovascular diseases, obesity and mental health disorders. While these trends are often viewed separately, emerging research suggests they are closely linked. Greater economic participation by women may improve household health outcomes by influencing spending decisions. This shifts the focus from healthcare alone to the broader role of women's financial empowerment in promoting healthier families and reducing long-term disease risks.

Health Beyond Healthcare Spending

Healthcare outcomes depend not only on hospitals, doctors and insurance but also on preventive factors such as nutrition, healthy lifestyles, sanitation, education and informed household decisions. While programmes like Ayushman Bharat have expanded financial protection, improved health can also result from greater household investments in prevention. Therefore, **lower healthcare expenditure does not necessarily indicate poorer access to care**. Rather, it may instead reflect better health arising from higher spending on activities that reduce the need for medical treatment.



Evidence from the EPF Reform

A new study, forthcoming in the Oxford Open Economics journal, examined India's 2018 Employees' Provident Fund (EPF) reform, which reduced mandatory provident fund contributions for newly employed women in the formal sector from 12% to 8% during their first three years of employment, thereby increasing their take-home income. Researchers found that beneficiary households reduced overall healthcare expenditure by about 11.6% while spending more on nutrition, physical fitness and other health-promoting activities. Electronic medical records from a major eye hospital network supported these findings, suggesting that lower healthcare spending reflected greater investment in preventive health rather than reduced access to healthcare.

RELEVANCE

GS II : Social Justice

Why Women's Income Changes Household Decisions

Earlier research by Esther Duflo, Abhijit Banerjee, and Paul Niehaus has shown that households spend resources differently depending on who earns the income. When women control a larger share of household resources, spending tends to shift towards education, nutrition, children's welfare and long-term wellbeing. The new study extends this evidence to healthcare, suggesting that women prioritise preventive health investments over immediate medical treatment, thereby lowering future health risks and reducing dependence on costly healthcare services.

Policy Implications for India's Development

The findings suggest that women's economic empowerment should also be viewed as a public health intervention. As India seeks to harness its demographic dividend, policies that increase women's participation in the workforce can generate benefits beyond employment by improving household nutrition, preventive healthcare and healthier lifestyles. Since out-of-pocket expenditure continues to account for a significant share of healthcare financing, strengthening women's economic agency can reduce pressure on the healthcare system while supporting a more preventive, sustainable and inclusive model of development.

PYQ Compass

UPSC questions previously asked from the themes discussed on this page.



Q. 1. Women's social capital complements in advancing empowerment and gender equity. Explain. (GS II – Social Justice – 2025)

Q. Can the vicious cycle of gender inequality, poverty and malnutrition be broken through microfinancing of women SHGs? Explain with examples. (GS II – Social Justice – 2021)

On ethanol, make haste slowly (Indian Express : 08-07-2026)

The Union Government is reportedly proceeding cautiously on introducing ethanol blends beyond E20, despite recent policy measures facilitating higher blends such as E22, E25, E27 and E30. India achieved its target of 20% ethanol blending (E20) five years ahead of schedule, making it the standard petrol blend from April 2026. While higher ethanol blending supports India's objectives of reducing crude oil imports, strengthening energy security and promoting domestic biofuels, the rapid transition from E10 to E20 has highlighted several practical challenges, making a calibrated approach necessary before progressing to higher blends.

Benefits and Long-Term Potential

Higher ethanol blending offers significant environmental and strategic benefits. Ethanol contains fewer carbon atoms than petrol, resulting in lower carbon dioxide emissions during combustion, while its high Research Octane Number (RON) of about 108 enables cleaner combustion, better anti-knock characteristics and improved performance in high-compression engines. Increased ethanol use can reduce India's dependence on imported crude oil, strengthen domestic biofuel production and support farmers by creating demand for agricultural feedstocks. Vehicle manufacturers also believe that future engines specifically designed for higher ethanol blends could extract better performance and fuel efficiency.



Consumer Concerns and Technical Challenges

The rapid transition to E20 exposed concerns, particularly for owners of vehicles manufactured before April 2023, which were primarily designed for E10 fuel. **Ethanol has a 30-35% lower calorific value than petrol**, leading to reduced mileage as blending levels increase. Its **hygroscopic nature** allows it to absorb moisture, raising concerns about corrosion of fuel tanks, rubber components and engine parts, particularly in older vehicles. Higher blends may also require engine recalibration, material compatibility upgrades, fresh homologation and validation, while consumers currently have limited fuel choices or pricing incentives to offset the lower fuel efficiency.

RELEVANCE

GS III ; Infrastructure : Energy

Scientific Evidence and Policy Considerations

Studies by the Automotive Research Association of India (ARAI) found that the impact of E20 on commonly used metals, elastomers and plastics was generally insignificant under laboratory conditions, and manufacturers have not officially reported major damage following the E20 rollout. However, concerns remain regarding the long-term effects of E25 and higher blends, particularly on older vehicles and two-wheelers. In addition, consumer experiences of reduced mileage have reinforced the need for transparent communication, further testing and gradual implementation before introducing higher ethanol blends nationwide.

Way Forward

India's long-term focus on biofuels and transport electrification remains essential for enhancing energy security amid recurring global oil supply disruptions. However, the transition to higher ethanol blends should be gradual and evidence-based. Future policy should prioritise extensive testing, consumer awareness, differentiated fuel pricing, wider fuel choices at retail outlets, and adequate time for manufacturers to redesign and certify vehicles.

PYQ Compass

UPSC questions previously asked from the themes discussed on this page.



- Q. With reference to the usefulness of the by products of the sugar industry, which of the following statements is / are correct? (2013) 1. Bagasse can be used as biomass fuel for the generation of energy. 2. Molasses can be used as one of the feedstocks for the production of synthetic chemical fertilizers. 3. Molasses can be used for the production of ethanol. Select the correct answer using the codes given below.
- (a) 1 only
 (b) 2 and 3 only
 (c) 1 and 3 only
 (d) 1, 2 and 3

Grand ambitions (The Hindu : 08-07-2026)

The establishment of the Ministry of Cooperation in 2021 marked a major institutional reform aimed at providing a unified policy framework for India's cooperative sector. The Ministry seeks to improve coordination across sectors, strengthen market linkages, promote digitalisation, build institutional capacity, and facilitate collaboration between the Centre, States, and national cooperative federations. A key reform has been the transformation of Primary Agricultural Credit Societies (PACS) into multipurpose institutions permitted to undertake over 25 different business activities, while newly created national multi-State cooperative societies aim to integrate producers into larger domestic and global value chains. The proposed National Cooperation Policy seeks to provide a long-term roadmap for the sector's development.

Cooperatives in India: Significance and Evolving Role

The cooperative model is a people-centric form of economic organisation based on the principles of voluntary participation, democratic governance, and mutual benefit. In contrast to purely profit-driven business models, cooperatives seek to balance economic efficiency with social welfare by empowering producers, consumers, and local communities. Traditionally concentrated in agriculture, dairy, and rural credit, India's cooperative sector is now being expanded into areas such as fisheries, housing, exports, banking, consumer services, and other service-sector activities. This diversification seeks to strengthen inclusive growth while creating resilient local economies.



Why the Cooperative Model Matters

The growing emphasis on cooperatives reflects concerns over the social and economic consequences of increasingly concentrated and hypercompetitive markets. **Cooperatives offer an alternative model by promoting equitable distribution of benefits, strengthening local ownership, generating employment, improving bargaining power for small producers, and supporting financial inclusion.** Their decentralised structure makes them particularly valuable for rural development, agricultural diversification, and community-led economic growth. By combining economic activity with social objectives, cooperatives can help reduce regional disparities while contributing to sustainable and inclusive development.

RELEVANCE

GS III : Indian Economy

Challenges Before India's Cooperative Sector

Issues such as **political interference, corruption, weak professional management, financial inefficiencies, and uneven institutional capacity have constrained their effectiveness.** The expansion of national-level cooperative institutions has also raised concerns regarding excessive centralisation and the possible erosion of State autonomy and local community control. Furthermore, enabling cooperatives to compete in increasingly technology-driven and globally integrated markets requires greater investment in digital infrastructure, skilled management, transparency, and stronger value-chain integration.

Way Forward

Realising the full potential of India's cooperative movement requires balancing local autonomy with national coordination, economic competitiveness with social objectives, and technology adoption with community participation. Strengthening governance, enhancing transparency, professionalising management, expanding digital platforms, and improving access to finance and markets will be essential.

PYQ Compass

UPSC questions previously asked from the themes discussed on this page.



Q. Consider the following statements: (2020)

1. In terms of short-term credit delivery to the agriculture sector, in District Central Cooperative Banks (DCCBs) deliver more credit comparison to Scheduled Commercial Banks and Regional Rural Banks

2. One of the most important functions of DCCBs is to provide funds to the Primary Agricultural Credit Societies.

Which of the statements given above is/are correct? a) 1 only

b) 2 only

c) Both 1 and 2

d) Neither 1 nor 2

Defence, critical minerals on table at India-Indonesia meeting

Prime Minister Narendra Modi's first bilateral visit to Indonesia since relations were elevated to a Comprehensive Strategic Partnership (2018) marked a significant step in advancing **India's Act East Policy, MAHASAGAR Vision, and commitment to a free, open and inclusive Indo-Pacific**. During talks with Indonesian President Prabowo Subianto, both leaders reaffirmed their commitment to expanding cooperation across strategic, economic, cultural and regional issues. The visit concluded with the signing of 14 Memoranda of Understanding (MoUs) covering defence, maritime cooperation, trade, education and other priority sectors, reflecting the growing depth of the bilateral partnership.

Defence and Maritime Cooperation

India and Indonesia signed agreements for the **supply of two batteries of the BrahMos supersonic cruise missile system**, valued at about US\$200 million, along with the export of **Astra Mk-1 Beyond-Visual-Range (BVR) air-to-air missiles**, marking a major milestone in India's defence exports. Both countries also agreed to deepen defence technology cooperation, maritime security and capacity building. The stationing of an Indonesian liaison officer at the Information Fusion Centre–Indian Ocean Region (IFC-IOR) and expanded training opportunities for Indonesian officers at India's National Defence Academy (NDA) and Defence Services Staff College (DSSC) will further strengthen maritime domain awareness and defence interoperability under the Shared Vision of India–Indonesia Maritime Cooperation in the Indo-Pacific.

Economic, Trade and Development Cooperation

Economic engagement received renewed emphasis with both sides seeking to align **Viksit Bharat 2047** and **Golden Indonesia (Emas) 2045**. **Indonesia** has emerged as **India's second-largest trading partner within ASEAN**, with bilateral trade reaching US\$24.78 billion in 2025–26, supported by investments from over 130 Indian companies. Cooperation was expanded in critical minerals, where **Indonesia is a leading producer of nickel, copper, bauxite and tin**, as well as in food security, digital economy and resilient supply chains. India also expressed interest in partnering in the development of Sabang Port. Both countries agreed to strengthen collaboration in social welfare and agricultural initiatives, with Indonesia drawing lessons from India's Public Distribution System (PDS), fortified rice programme and fertiliser subsidy reforms.

RELEVANCE

GS II : International Relations

Cultural and Educational Linkages

The visit reinforced the long-standing civilisational ties between the two countries, including a visit to the Prambanan Temple complex. India announced that the Indian Institute of Management Bangalore (IIM Bangalore) will establish its first overseas campus at the Singhasari Special Economic Zone (SEZ) in Malang. The campus will offer programmes in global supply chains, digital transformation, artificial intelligence, climate, sustainability and healthcare management, strengthening educational cooperation across the ASEAN region. India will also commemorate the **centenary of Rabindranath Tagore's visit to Indonesia in 2027**. During the visit, Indonesia conferred upon **Prime Minister Modi** its **highest civilian honour, the Bintang Adipurna**, recognising the enduring friendship between the two nations.

Overall Significance

The joint statement reflected convergence on regional and global issues, with both leaders expressing concern over the conflict in West Asia, supporting the peaceful resolution of disputes and emphasising the importance of freedom of navigation and transit through the Strait of Hormuz in accordance with international law. The visit demonstrated the broadening nature of India–Indonesia relations beyond traditional diplomacy into defence manufacturing, maritime security, critical minerals, education, culture and regional connectivity.

PYQ Compass

UPSC questions previously asked from the themes discussed on this page.



Q. Consider the following statements: (2018)

1. Most of the world's coral reefs are in tropical waters.
2. More than one third of the world's coral reefs are located in the territories of Australia, Indonesia and Philippines.
3. Coral reefs host far more animal phyla than those hosted by tropical rainforests.

Which of the statements given above is/are correct?

- a) 1 and 2 only b) 3 only c) 1 and 3 only d) 1, 2 and 3

India's EV transition cannot afford to ignore retrofitment

The recent conflict in West Asia has highlighted India's vulnerability arising from its dependence on imported crude oil, with over 85% of its crude oil requirements met through imports. Although government initiatives have accelerated electric mobility, with Electric Vehicles (EVs) accounting for **8.5% of new vehicle sales in FY 2025-26**, the *country's existing fleet of over 30 crore Internal Combustion Engine (ICE) vehicles continues to rely on petroleum fuels*. This has renewed interest in vehicle retrofitting as a practical pathway to accelerate transport decarbonisation while reducing energy dependence.

What is Vehicle Retrofitting?

Vehicle retrofitting refers to **converting an existing Internal Combustion Engine (ICE) vehicle into an Electric Vehicle (EV)** by replacing its engine, exhaust system and associated components with an electric motor, battery pack and control systems. Unlike purchasing a new EV, retrofitting retains the existing chassis and vehicle identity while replacing only the powertrain. This approach aligns with India's long-standing culture of repair, reuse and extending the life of durable assets, allowing functioning vehicles to remain economically useful for several more years.



Benefits of Retrofitting

- **Economic benefits:** Makes electric mobility more affordable than purchasing a new EV, reducing fuel and maintenance costs while extending the life of existing vehicles.
- **Social benefits:** Expands access to electric mobility for middle-income households and creates decentralised employment through technicians, service centres, battery management, software calibration, refurbishment supply chains and rural mobility enterprises.
- **Environmental benefits:** Supports a circular economy by extending the life of existing vehicles, reducing unnecessary scrappage, conserving resources and lowering waste generation.
- **Energy security:** Accelerates the transition away from petroleum-dependent Internal Combustion Engine (ICE) vehicles, reducing reliance on imported crude oil.

RELEVANCE

GS III : Science and Technology

Global and Indian Developments

Globally, several European countries are promoting circular mobility models as part of their climate strategies, while Nepal has moved towards permitting and supporting vehicle retrofitting. In India, although retrofitting received support under the initial Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme, policy emphasis has subsequently declined. However, Madhya Pradesh has emerged as a frontrunner by introducing upfront subsidies, a single-window subsidy portal and simplified registration mechanisms. Meanwhile, certified retrofit companies are increasingly collaborating with testing agencies, insurers, financiers and transport authorities, reflecting a maturing ecosystem.

Way Forward

India requires a comprehensive national framework to mainstream vehicle retrofitting. Key priorities include standardising retrofit regulations across States, recognising retrofitted vehicles as financeable assets, establishing robust certification and safety standards, rationalising Goods and Services Tax (GST) on retrofit kits, and creating transparent national data on retrofitting. The PM E-DRIVE scheme could also be expanded to support retrofitted zero-emission vehicles.

PYQ Compass

UPSC questions previously asked from the themes discussed on this page.



Q. Consider the following types of vehicles:

I. Full battery electric vehicles

II. Hydrogen fuel cell vehicles

III. Fuel cell-electric hybrid vehicles

How many of the above are considered as alternative powertrain vehicles?

(a) Only one

(b) Only two

(c) All the three

(d) None

PYQ Compass

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Q. The Narmada river flows to the west, while most other large peninsular rivers flow to the east. Why? (2013)

1. It occupies a linear rift valley.
 2. It flows between the Vindhya and the Satpuras.
 3. The land slopes to the west from Central India.
- Select the correct answer using the codes given below.

- (a) 1 only
- (b) 2 and 3
- (c) 1 and 3
- (d) None

Ans : a

1) It occupies a linear rift valley: This is Correct. The Narmada River flows through a rift valley formed due to tectonic activity. Rift valleys are linear depressions in the Earth's crust, and rivers flowing through such valleys often have constrained courses. In the case of the Narmada, the rift valley slopes towards the west, which determines the river's westward flow.

2) It flows between the Vindhya and the Satpuras: This is incorrect. While the **Narmada does flow between these mountain ranges**, this is a geographical location and **does not directly explain its westward flow**.

3) The land slopes to the west from Central India: This is Incorrect. The general slope of peninsular India is from west to east, which is why most rivers in the region, such as the Godavari, Krishna, and Kaveri, flow eastward. The westward flow of the Narmada is an exception due to the rift valley.

Q. Consider the following statements: (2018)

1. Most of the world's coral reefs are in tropical waters.
 2. More than one third of the world's coral reefs are located in the territories of Australia, Indonesia and Philippines.
 3. Coral reefs host far more animal phyla than those hosted by tropical rainforests.
- Which of the statements given above is/are correct?

- a) 1 and 2 only
- b) 3 only
- c) 1 and 3 only
- d) 1, 2 and 3

Ans : d

Coral reefs are found in circum-tropical shallow tropical waters along the shores of islands and continents. The reef substrate is mainly composed of calcium carbonate from living and dead corals. Many other invertebrates, vertebrates, and plants live in close association to the corals, with tight resource coupling and recycling, allowing coral reefs to have extremely high productivity and biodiversity, such that they are referred to as 'the Tropical Rainforests of the Oceans'. Coral reefs are believed by many to have the highest biodiversity of any ecosystem on the planet – even more than a tropical rainforest.

Major Regions of Coral Reef Development : Globally, three major regions of coral reef development are generally recognized, each with a somewhat distinctive biota.

These are: **The Indo-Pacific** – Includes most of the Indian Ocean (excluding the Red Sea), and the western Pacific. The Wider Caribbean (tropical western Atlantic) Includes Florida, The Bahamas, Caribbean Sea proper, and coastal waters off northeastern S. America. The Red Sea. **Thus Australia, Indonesia and Philippines cover one-third area.**

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- a) Neyyar, Idl Peppara and Shendurney Wildlife Sanctuaries; and Kalakad Mundanthurai Tiger Reserve
- b) Mudumalai, Sathyamangalam and Wayanad Wildlife Sanctuaries; and Silent Valley National Park
- c) Kaundinya, Gundla Brahmeswaram and Papikonda Wildlife Sanctuaries; and Mukurthi National Park
- d) Kawal and Sri Venkateswara Wildlife Sanctuaries; and Nagarjunasagar–Srisaïlam Tiger Reserve

Ans : a

The Agasthyamala Biosphere Reserve is located in the **Western Ghats region** and spans across the states of Kerala and Tamil Nadu. It is known for its rich biodiversity, particularly its unique flora and fauna. The reserve includes several important protected areas that help conserve the biodiversity of the region.

The correct set of protected areas that are part of the Agasthyamala Biosphere Reserve includes:

- Neyyar Wildlife Sanctuary (Kerala)
- Idamalayar (Idl) Wildlife Sanctuary (Kerala)
- Peppara Wildlife Sanctuary (Kerala)
- Shendurney Wildlife Sanctuary (Kerala)
- Kalakad Mundanthurai Tiger Reserve (Tamil Nadu)

These sanctuaries and reserves form an integral part of the Agasthyamala Biosphere Reserve, which is also a UNESCO Biosphere Reserve.

Q. Consider the following types of vehicles:

- I. Full battery electric vehicles
- II. Hydrogen fuel cell vehicles
- III. Fuel cell–electric hybrid vehicles

How many of the above are considered as alternative powertrain vehicles?

- (a) Only one
- (b) Only two
- (c) All the three
- (d) None

Ans : c

A powertrain is the system in a vehicle that generates power and delivers it to the wheels, allowing the vehicle to move. It typically includes the engine, transmission, and drivetrain (including axles, differentials, and drive shafts). Cars and buses have powertrains. All the three types of vehicles are alternative powertrain vehicles because they use non-conventional propulsion systems compared to traditional internal combustion engines (ICE). I. Full battery electric vehicles (BEVs): These are powered entirely by electricity stored in batteries and use non-ICE systems. Hence option I is correct. II. Hydrogen fuel cell vehicles (FCEVs): Use hydrogen fuel cells to generate electricity to power electric motors. Hence it has an alternative powertrain. Hence option II is correct. III. Fuel cell–electric hybrid vehicles: Combine a fuel cell and a battery or other electric storage system. Thus it is an alternative powertrain. Hence option III is correct.

PYQ Compass

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1. In terms of short-term credit delivery to the agriculture sector, in District Central Cooperative Banks (DCCBs) deliver more credit comparison to Scheduled Commercial Banks and Regional Rural Banks
2. One of the most important functions of DCCBs is to provide funds to the Primary Agricultural Credit Societies.

Which of the statements given above is/are correct? a) 1 only

- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

Ans : b

Statement 1: Incorrect. District Central Cooperative Banks (DCCBs) are intermediate-tier institutions in the three-tier cooperative credit structure. Their primary role is to channel funds to Primary Agricultural Credit Societies (PACS) rather than directly extending short-term agricultural loans to individual farmers. In terms of the overall volume of short-term agricultural credit, Scheduled Commercial Banks (SCBs) account for a much larger share than DCCBs. Hence, the statement that DCCBs deliver more short-term agricultural credit than SCBs and Regional Rural Banks (RRBs) is incorrect.

Statement 2: Correct. One of the principal functions of District Central Cooperative Banks (DCCBs) is to provide financial assistance and refinance to Primary Agricultural Credit Societies (PACS). DCCBs mobilise deposits, obtain funds from institutions such as State Cooperative Banks (StCBs) and NABARD, and supply short-term and medium-term credit to PACS, which in turn lend directly to farmers. Therefore, this statement is correct.

.Q. With reference to the usefulness of the by products of the sugar industry, which of the following statements is / are correct? (2013) 1. Bagasse can be used as biomass fuel for the generation of energy.

2. Molasses can be used as one of the feedstocks for the production of synthetic chemical fertilizers.

3. Molasses can be used for the production of ethanol.

Select the correct answer using the codes given below.

- (a) 1 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

Ans : C

1) Bagasse can be used as biomass fuel for the generation of energy: This is Correct.

Bagasse, the fibrous residue left after extracting juice from sugarcane, is an excellent biomass fuel. It is commonly used in sugar mills to generate electricity and steam for their operations.

2) Molasses can be used as one of the feedstocks for the production of synthetic chemical fertilizers: This is Incorrect. Molasses is not directly used as a feedstock for synthetic chemical fertilizers. It is primarily used in the production of ethanol, animal feed, and certain chemicals, but it has no significant role in fertilizer production.

3) Molasses can be used for the production of ethanol: This is correct. Molasses, a by-product of sugar production, is rich in sugars and is widely used for producing ethanol through fermentation.