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Coastal Hardening

Context: A recent study published in Nature has revealed a concerning trend—about 33% of the world's sandy beaches have undergone coastal hardening.

Areas Most Affected:

- The study highlights that the Bay of Bengal leads the world in coastal hardening, with a staggering 84% of its beaches hardened. Following closely behind is western and central Europe, which has seen 68% of its sandy beaches hardened, while the Mediterranean region follows at 65%.
- Western North America and East Asia are also affected, with 61% and 50% of their beaches hardened, respectively.
- The findings point to significant geographic variation, with coastal regions in low and middle-income countries potentially facing even higher levels of beach degradation than previously understood.

About Coastal Hardening:

- Coastal hardening refers to the construction of rigid, semi-permeable human-made structures that alter the natural landscape and may obstruct the natural processes of shoreline retreat and landward movement of sandy beaches.
- This phenomenon is increasingly affecting beaches worldwide, with significant implications for coastal ecosystems.
- Coastal hardening involves the construction of various infrastructure projects that are designed to protect coastal areas from erosion, flooding, and other natural threats. These structures include seawalls, harbors, roads, highways, buildings, railway embankments, and other urban developments.
- While these constructions may offer immediate protection, they can have long-term environmental consequences, including disrupting natural processes and altering ecosystems.

Impacts of Coastal Hardening:

- **Disruption of Natural Processes:** One of the primary impacts of coastal hardening is the disruption of the natural movement of sand. Sandy beaches are dynamic, with sand constantly shifting due to the effects of wind, waves, and tides. When rigid structures are introduced, they prevent the sand from moving, leading to increased

erosion in other areas that may not be protected.

- **Loss of Habitats:** Coastal ecosystems, such as beaches, dunes, and wetlands, are vital habitats for many species of wildlife. Coastal hardening can destroy or degrade these environments, reducing biodiversity and affecting the animals and plants that rely on these areas for survival.
- **Long-Term Sustainability Issues:** As sea levels rise due to climate change, coastal hardening can "lock in" existing coastal conditions, making it more difficult to adapt to future changes. These structures can restrict the natural movement of the shoreline, leaving little room for beaches to migrate landward in response to rising seas. This can exacerbate the vulnerability of coastal areas to flooding and erosion.

Google's Quantum Computing Breakthrough: The Willow Chip and Its Implications

Context: In a significant breakthrough in quantum computing, Google has unveiled its Willow chip, marking a pivotal step towards making quantum technology more practical. The chip successfully solved a complex computation in under five minutes, a task that would have taken traditional supercomputers about 10 septillion years to complete.

What is Quantum Computing?

- Quantum computing is an emergent field of cutting-edge computer science harnessing the unique qualities of quantum mechanics to solve problems beyond the ability of even the most powerful classical computers.
- By taking advantage of quantum physics, fully realized quantum computers would be able to process massively complicated problems at orders of magnitude faster than modern machines. For a quantum computer, challenges that might take a classical computer thousands of years to complete might be reduced to a matter of minutes.

Google's Willow Chip: A Technological Leap:

- **Advanced Design:** The Willow chip is a quantum computing system that integrates advanced quantum error correction techniques to improve performance and reduce errors. Unlike previous systems, Willow

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reduces the error rate as more qubits are added, a significant challenge in quantum computing. Google's team was able to achieve real-time error correction, which ensures the accuracy of computations even as the complexity increases.

- **Performance Benchmarking:** In testing, the Willow chip surpassed some of the most powerful classical supercomputers in the world, including Frontier, using the Random Circuit Sampling (RCS) benchmark. This benchmark assesses the quantum computer's ability to perform tasks that classical computers cannot, marking a significant achievement in quantum computing performance.

Implications for AI, Data Security and National Policies:

- **Impact on Artificial Intelligence:**
 - » Quantum computing could dramatically accelerate AI development, particularly in areas requiring vast data processing. Quantum computers can train AI models more efficiently, potentially revolutionizing industries such as healthcare, finance, and cybersecurity.
 - » As AI grows in importance, governments will need to adapt policies to account for the integration of quantum computing in AI systems and ensure that these technologies are developed responsibly.
- **Challenges to Encryption and Data Security:**
 - » One major concern surrounding quantum computing is its potential to break RSA encryption, a widely-used method for securing online data.
 - » Although Willow is not yet capable of breaching RSA encryption, as quantum technology advances, this could become a threat to current security protocols. Governments may need to update cybersecurity policies to protect against future vulnerabilities in the quantum era.

Conclusion:

Google's Willow chip represents a major milestone in the development of quantum computing, signaling the transition from theoretical to practical applications. As quantum technology continues to evolve, it will have profound implications for Artificial Intelligence, cybersecurity, and technological policy. Governments worldwide must prepare for the transformative impact of quantum computing on industries and global security.

Maritime Cooperation between India and Manila

Context: India and the Philippines held their first Maritime Dialogue in Manila on December 14, 2024, aiming to strengthen bilateral ties and address regional maritime challenges. A central theme was upholding a rules-based international order, emphasizing adherence to the United Nations Convention on the Law of the Sea (UNCLOS). Both nations stressed the need for peaceful, sustainable, and equitable use of oceans.

Areas of Cooperation Discussed:

- The dialogue explored cooperation in maritime industry development, marine scientific research, ocean economy, and humanitarian assistance and disaster relief (HADR).
- India and the Philippines also discussed enhancing naval and coast guard cooperation, maritime law enforcement, and capacity-building initiatives.
- Both countries expressed a desire to collaborate in regional and international forums to advance shared maritime goals, ensuring economic prosperity and security.



Milestone in Bilateral Ties:

- The dialogue marked the 75th anniversary of diplomatic relations between India and the Philippines, symbolizing a long-standing and growing partnership.

Historical Context of India-Philippines Relations

- **Diplomatic Relations:** India and the Philippines have maintained diplomatic relations since 1949, with their ties deepening significantly in recent years.
- **Bilateral Trade Growth:** Bilateral trade increased from USD 1.89 billion in 2015-16 to USD 2.84 billion in 2023-24.

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2021-22. India is the largest supplier of pharmaceutical products to the Philippines.

- **Defense Cooperation:** Both countries participate in joint military exercises, including RIMPAC and the ASEAN-India Maritime Exercise. In 2022, India supplied BrahMos missiles to the Philippines, further enhancing defense ties.

Cultural and Technical Exchange:

- India and the Philippines have thriving cultural and educational exchanges, with India's Technical and Economic Cooperation (ITEC) program benefiting the Philippines. The two countries share a close relationship through institutions like the International Rice Research Institute (IRRI).

Recent Developments and Challenges

- **Collaboration in Emerging Sectors**
 - » There has been growing cooperation in fintech, space (through collaboration between the Philippine Space Agency and ISRO), and renewable energy sectors.
- **Shared Maritime Security Interests**
 - » As democratic nations in the Indo-Pacific, India and the Philippines have aligned their interests in maintaining maritime security.
 - » India's Act East Policy, aimed at enhancing engagement in Southeast Asia, has played a key role in strengthening ties with the Philippines.
 - » India has supported the Philippines' position on the South China Sea and opposed any attempts to alter the region's maritime order unilaterally.
- **Regional Challenges:**
 - » The region faces challenges from shifting power dynamics, particularly due to China's assertive role in the South China Sea and broader Indo-Pacific security issues. Concerns about sovereignty and freedom of navigation in contested waters, particularly in the South China Sea, have raised alarms for both India and the Philippines.

Bharatmala Project

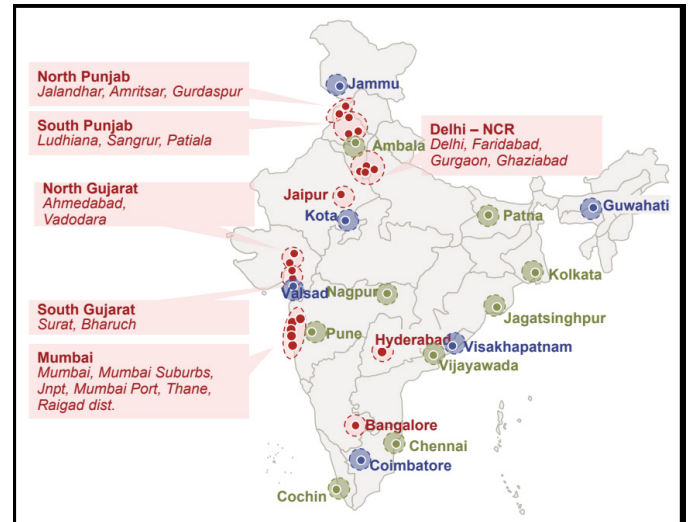
Context: Recently, Pankaj Chaudhary, the Minister of State for Finance, highlighted a key milestone of the Bharatmala project over 18,000 kilometers of national highways have already been constructed in Phase 1.

About the Bharatmala Project:

- The Bharatmala Project, launched in 2015 under Prime Minister Narendra Modi's leadership, is a major initiative aimed at enhancing India's transportation infrastructure.

Major Milestone:

- Over 18,000 kilometers of national highways have already been constructed in Phase 1, signaling significant progress.
- India's national highway network has grown by 1.6 times since 2014, from 91,287 km to 1,46,195 km by November 2024.
- The first phase aims to construct 34,800 km of roads, with 18,714 km already completed.



Project Overview and Objectives

- **Goal:** The Bharatmala Project is set to develop 83,677 kilometers of highways at an estimated cost of Rs 7 lakh crore.
- **Focus Areas:**
 - » Border and international connectivity roads.
 - » Coastal and port connectivity.
 - » Enhancement of national and economic corridors.
- **Objective:** The project aims to address transportation challenges, improve connectivity, and promote economic growth by bridging infrastructure gaps.

Key Features and Benefits:

- **Improved Connectivity:** The project will link 550 districts, increasing connectivity to remote regions. Expanding connectivity is expected to drive economic

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activities, reduce travel time, and enhance logistics performance.

- **Boost to Freight Movement:** The project will focus on economic corridors and inter-district connections to improve goods movement across the country. It is expected to reduce logistics costs and improve supply chain efficiency, benefiting trade and commerce.
- **Passenger Convenience:** The project aims to enhance

passenger travel experiences by improving existing roads and building new ones. Long-distance travel will be faster and more comfortable, benefitting commuters.

- **Job Creation and Economic Growth:** During Phase 1, the construction of highways is expected to generate up to 10 crore man-days of employment. The project will create nearly 22 million permanent jobs, boosting economic growth and improving livelihoods.

Power Packed News

Desert Knight Exercise

- Recently, India, France, and the United Arab Emirates (UAE) have conducted the Desert Knight defence exercise.
- This trilateral exercise aims to enhance the combat skills and interoperability of the air forces of these three nations.
- It took place over the Arabian Sea, approximately 350-400 km southwest of Karachi.
- The Desert Knight exercise is part of a broader strategy by India to strengthen defence cooperation with like-minded countries in the Indo-Pacific region.
- By working closely with France and the UAE, India seeks to enhance its strategic partnerships and ensure a free, open, and inclusive Indo-Pacific.
- The exercise also serves to counterbalance China's growing influence in the region.



Sursa released by Indian Spice Research Institute

- The Indian Spice Research Institute has developed a new variety of ginger called Sursa.
- It is the first ginger variety in India specifically designed for use as a vegetable. This variety is non-spicy and is described as being more flavorful.
- Sursa has a yield potential of up to 24.33 tons per hectare.
- Its rhizomes are thick, with a white-yellow flesh. Sursa contains less fiber and has a dry recovery rate of approximately 21%. It is also ideal for producing dried ginger and can be grown in polybags.
- The Kerala State Varietal Release Committee has approved the cultivation of this variety in the state.
- With the development of Sursa, new opportunities are expected to emerge in ginger farming and related industries in India.

Elon Musk's Net Worth Crosses \$400 Billion

- Elon Musk's net worth has crossed \$400 billion, making him the first person to achieve this milestone.
- The primary driver of this growth is Tesla's stock price, which reached an all-time high of \$420.
- Musk's appointment as co-leader of the Government Efficiency Department (DOGE) earlier this year has contributed to a 70% rise in the company's share price.
- Musk is currently the owner of X and the founder of SpaceX. During Tesla's "We, Robot" program, Musk unveiled a self-driving taxi and demonstrated the humanoid robot Optimus.
- Elon Musk has co-founded seven businesses, including Tesla, SpaceX, and xAI. In 2022,



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Musk purchased Twitter for \$44 billion and rebranded it as X.

François Bayrou Appointed as France's New Prime Minister

- French President Emmanuel Macron has appointed François Bayrou as the new Prime Minister of France. This appointment comes following a no-confidence motion against the previous government.
- François Bayrou is the fourth Prime Minister to be appointed in 2024. His predecessor, Michel Barnier, served for only three months, making him the shortest-serving Prime Minister in French history.
- In January 2024, Gabriel Attal became the youngest Prime Minister of France.
- In France, the Prime Minister is the head of the government of the French Republic and holds the second-highest position after the President.
- With Bayrou's appointment, changes in the government's stability and policy direction are anticipated.



22nd Divya Kala Mela

- The Department of Empowerment of Persons with Disabilities is organizing the 22nd Divya Kala Mela at India Gate from December 12 to 22, 2024.
- The event will feature around 100 entrepreneurs and artisans with disabilities from 20 states and union territories.
- The Divya Kala Mela provides a platform for persons with disabilities to showcase their talent and sell their products.
- Exhibits at the fair include handicrafts, handlooms, embroidery, eco-friendly stationery, lifestyle products, and home decor items.
- Since its inception in 2022, the Divya Kala Mela has been successfully held in 21 cities across India.
- This event is a significant initiative aimed at integrating persons with disabilities into the mainstream and promoting their economic independence.



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