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FORTNIGHTLY ON POLITICS OF DEVELOPMENT,
ENVIRONMENT AND HEALTH

**Science
Reporter**



MK Yadav Sir

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GENOME INDIA PROJECT

(Syllabus: GS Paper 3 – Sci and Tech)

'10,000 genome' project completed, says govt.

Jacob Koshy
NEW DELHI

The Department of Biotechnology (DBT) on Tuesday officially announced the completion of the '10,000 genome' project – an attempt to create a reference database of whole-genome sequences out of India.

While India first sequenced a complete human genome in 2006, creating a database that is representative of India's population diversity is seen as a key step to being able to learn about genetic variations that are unique to India's population groups and use that to customise drugs and therapies.

About 20 institutions across India are involved in the project with the Indian Institute of Science (IISc), Bengaluru and the Centre for Cellular and Molecular Biology, Hyderabad being the lead institutions coordinating the project.

The Indian population of 1.3 billion consists of over 4,600 population groups, and many of them are endogamous. These factors have contributed to the genetic diversity of the current population. Thus, the Indian population harbours distinct variations and often many disease-causing mutations are amplified within some of these groups. "There are harmful mutations that are less prevalent in the world but located in endogamous groups at a high frequency [relative to their population] in India," said Kumaraswamy Thangaraj of the CCMB and one of the leaders of the initiative. "This has been a revolutionary initiative but going ahead we will need to sample many more thousands of genomes to pick out more, rare mutations." The main outcomes would be to gain deeper insight into India's population diversity, improve diagnostic methods and medical counselling, find genetic predispositions to disease, develop personalised and customisable drugs, improve gene therapy and throw more light on individual susceptibility to infectious disease. Y. Narahari of the IISc said the creation of a biobank housing 20,000 blood samples (from which genomes were sequenced) at the Centre for Brain Research, IISc, coupled with data archiving at the Indian Biological Data Centre "exemplified" the project's commitment to transparency, collaboration, and future research endeavours.



About 20 institutions across India are involved in the project. GETTY IMAGES

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Road to Future

Aim of Genome Mapping Project

Developing therapies for diseases such as cancer and other rare ones

Predictive diagnosis and precision medicine

22
Partner organisations to be roped in

Dept of Biotechnology has initiated the project

10,000
Number of Indians whose genomic data will be catalogued in phase 1

Context: The Department of Biotechnology (DBT) recently officially announced the completion of the '10,000 genome' project an endeavor aimed at establishing a reference database of whole-genome sequences originating from India.

Genome India Project

- **About:** It is a gene mapping initiative authorized and funded by the Department of Biotechnology and led by the Indian Institute of Science's Centre for Brain Research.
- **Inspired from:** Human Genome Project (HGP), an international effort that successfully decoded the entire human genome between 1990 and 2003.
- **Genetic Database:** Launched to establish a thorough database of genetic variations within the Indian populace.
- **Aim:** To sequence genomes of 10,000+ individuals across diverse regions to establish a reference genome.
- **Priority Areas of Investigation**
 - Precision Health
 - Rare Genetic Disorders
 - Mutation Spectrum of Genetic Diseases
 - Genetic Epidemiology of Lifestyle Diseases
 - Translational Research
- **Significance of the Genome India Project**
 - **Understanding Unique Genetic Variants:** Provides insight into genetic variants specific to India's population, enabling tailored drug and therapy development.
 - **Unraveling Genetic Underpinnings:** Helps uncover genetic roots of prevalent chronic diseases like diabetes, hypertension, cardiovascular diseases, neurodegenerative disorders, and cancer.
 - **Database for Diverse Population:** India's diverse population, comprising over 4,600 groups, harbors distinct genetic variations, necessitating a specific database.
 - **Uniqueness of Indian Genetic Landscape.**

CAA rules likely to be notified before poll code, to seek proof of India entry, religion

DEEPTIMANTIWARY
NEW DELHI, FEBRUARY 27

THE RULES for implementation of the Citizenship (Amendment) Act (CAA), which was enacted by Parliament in December 2019 and spawned protests in parts of the country, are likely to be notified within the next fortnight or so, sources in the Ministry of Home

Affairs (MHA) said Tuesday.

"I cannot tell you the date, but they will be notified before the Model Code of Conduct (MCC) comes into force," an official of the MHA said.

The MCC comes into force when the Election Commission announces polls. It is expected that the Lok Sabha poll dates will be announced sometime next month.

Despite its enactment four years ago, the CAA could not be implemented because the rules were not notified.

Sources said the rules will specify the evidence needed for applicants to prove their credentials and eligibility for citizenship under the new law.

The CAA allows non-Muslim migrants from Pakistan, Bangladesh and Afghanistan to

apply for Indian citizenship through the naturalisation process – the applicants must belong to the Hindu, Sikh, Christian, Parsi, Jain and Buddhist communities. The legislation grants citizenship on the basis of the assumption that these communities faced religious persecution in these three Islamic countries.

CONTINUED ON PAGE 2

Context: The rules for implementation of the Citizenship (Amendment) Act (CAA), which was enacted by Parliament in December 2019 and spawned protests in parts of the country, are likely to be notified within the next fortnight or so, sources in the Ministry of Home Affairs (MHA).

Citizenship (Amendment) Act 2019 (Syllabus GS Paper 2 – Polity)

Citizenship (Amendment) Act 2019

- **Amended the Citizenship Act, 1955:** The act amended the Citizenship Act, 1955 to make illegal migrants eligible for citizenship of India.
- **Citizenship on the basis of religion:** The CAA provides citizenship on the basis of religion to six undocumented non-Muslim communities (Hindus, Sikhs, Buddhists, Jains, Parsis and Christians) from Pakistan, Afghanistan and Bangladesh who entered India on or before 31st December, 2014.
- **Definition:** Under the Act, an illegal migrant is a foreigner who:
 - Enters the country without valid travel documents like a passport and visa, or
 - Enters with valid documents, but stays beyond the permitted time period.
- **Exemption:** Illegal migrants may be put in jail or deported under The Foreigners Act, 1946 and The Passport (Entry into India) Act, 1920.
 - It exempts the members of the six communities from any criminal case under the Foreigners Act, 1946 and the Passport Act, 1920.
 - The two Acts specify punishment for entering the country illegally and staying here on expired visas and permits.
- **Citizenship by registration or naturalisation:** The Act allows a person to apply for citizenship by registration or naturalisation if the person meets certain qualifications.
- **Relaxations:** Under The Citizenship Act, 1955, one of the requirements for citizenship by naturalisation is that the applicant must have resided in India during the last 12 months, as well as for 11 of the previous 14 years.

PM Modi launches two major initiatives to uplift MSMEs in Indian automotive industry

Context: Recently, the Prime Minister of India inaugurated the TVS Open mobility platform and the Centre of Excellence on Employment and Livelihood in Madurai, emphasizing the importance of the manufacturing sector adopting a policy of 'Zero defect and zero effect.'

Zero Defect Zero Effect (ZED)

- **About:** The ZED scheme offers environmentally conscious manufacturing certification with gold, silver, and bronze levels based on 20 performance parameters.
- **Launched in:** October 2016
- **Revamped in:** April 2022
- **Nodal Ministry:** Ministry of MSME
- **Aim:** To enhance MSME competitiveness, make them sustainable and transform them as National and International Champions.
- **Objectives of the ZED Scheme**
 - Create awareness about ZED manufacturing.
 - Motivate MSMEs for ZED rating assessment.
 - Drive manufacturing with Zero-Defect processes.
 - Emphasize environmental impact minimization (Zero Effect).
 - Encourage MSMEs to upgrade quality standards in products and processes.
 - Contribute to the "Make in India" campaign.
- **Applicability:** Currently applicable exclusively for manufacturing MSMEs.
- **MSME Sustainable (ZED) Certification:** It is an extensive drive to create awareness amongst MSMEs about Zero Defect Zero Effect (ZED) practices and motivate & incentivise
- **Certification Levels:**
 - **Level 1:** BRONZE
 - **Level 2:** SILVER
 - **Level 3:** GOLD

Micro, Small & Medium Enterprises (MSMEs)

- **About:** MSMEs fall under the regulatory purview of the Micro, Small & Medium Enterprises Development (MSMED) Act of 2006.
- **Classification of MSMEs:**
 - **Micro:** Investment in Plant and Machinery or Equipment: Not more than Rs.1 crore and Annual Turnover ; not more than Rs. 5 crore.
 - **Small:** Investment in Plant and Machinery or Equipment: Not more than Rs.10 crore and Annual Turnover ; not more than Rs. 50 crore.
 - **Medium:** Investment in Plant and Machinery or Equipment: Not more than Rs.50 crore and Annual Turnover ; not more than Rs. 250 crore.

UNEA-6 opens with a call for environmental multilateralism

Context: The sixth assembly of the United Nations Environmental Programme (UNEA-6) opened in Nairobi, Kenya on February 26, 2024 with a call for multilateral actions to address the rising environmental crisis fuelled by climate change.

United Nations Environmental Programme (UNEA-6)

- **About:** The sixth session of the United Nations Environment Assembly (UNEA-6) takes place recently at the United Nations Environment Programme (UNEP) headquarters in Nairobi, Kenya.
- **Aim:** To help restore harmony between humanity and nature, improving the lives of the world's most vulnerable people.
- **Focus:** How multilateralism can help tackle the triple planetary crisis of climate change, nature and biodiversity loss, and pollution and waste.
- **Priorities and Policies:** It prioritizes global environmental policies and the development of international environmental law to address pressing issues.
- **The 2030 Agenda:** The 2030 Agenda for Sustainable Development underscores the importance of comprehending environmental challenges and fostering preservation efforts.
- **History:** Originating from the 2012 United Nations Conference on Sustainable Development, the UNEA emerged from the reformation of the UNEP Governing Council.
- **Universal Membership:** The UNEA expanded its membership to include all 193 United Nations Member States, ensuring universal representation.
- **Roles and Functions:** The Environment Assembly establishes the global environmental agenda, provides policy guidance, conducts policy reviews, and fosters partnerships for environmental goals.

UNEP

- **About:** UNEP operates as a specialized agency within the United Nations system.
- **Origin:** UNEP was established following the United Nations Conference on the Human Environment in 1972.
- **Headquarters:** Nairobi, Kenya.
- **Function:** To facilitate and coordinate environmental efforts across the United Nations.

WHAT IS GOOGLE'S AI 'GENIE' THAT CAN TURN IMAGES INTO VIDEO GAMES?

BIJIN JOSE
NEW DELHI, FEBRUARY 27

GOOGLE'S AI venture DeepMind on Monday introduced Genie, a new generative AI (GenAI) model that can create interactive video games from just a text or image prompt. Genie can generate these games without prior training on game mechanics, which are essentially rules that make up a game.

What is Genie?

According to the official Google DeepMind blog post, Genie is a foundation world model — GenAI that can produce output from one or two inputs or prompts in the form of text, pictures, etc. — that is trained on videos sourced from the Internet.

The model can "generate an endless variety of playable (action-controllable) worlds from synthetic images, photographs, and even sketches".

Genie is the first generative interactive environment that has been trained in an unsupervised manner from unlabelled Internet videos, according to a research paper, *Genie: Generative Interactive Environments*, published by the team which has developed the model.

What does Genie do?

The research paper says that Genie is a new kind of GenAI that enables anyone to conjure up and step into generated worlds similar to human-designed simulated environments. Although it is trained on video-only data, Genie can be prompted to generate a diverse set of interactive and controllable environments.

Simply put, there are numerous GenAI models that produce creative content with language, images and even videos. Genie, however, can create playable environments from a single image prompt.

Why is it important?

The standout aspect of Genie is its ability to learn and reproduce controls for in-game characters exclusively from Internet videos. This is noteworthy as such videos do not have labels about the action that is performed in the video, or even about which part of the image should be controlled.

The model's ability to create an entire new interactive environment from a single image opens up many possibilities, especially new ways to create and step into virtual worlds. Genie is also a significant leap towards general AI agents — an independent programme or entity that interacts with its environments by perceiving its surroundings via sensors.

Context: Google DeepMind has just introduced Genie, a new model that can generate interactive video games from just a text or image prompt.

Genie

- **About:** It is a groundbreaking world model trained on internet-sourced videos, as stated in the official Google DeepMind blog post.
- **Unsupervised Learning:** The research paper 'Genie: Generative Interactive Environments' highlights Genie as the first generative interactive environment trained unsupervisedly from unlabelled internet videos.
- **Technical Specifications:** With 11B parameters, Genie comprises a spatiotemporal video tokenizer, autoregressive dynamics model, and a scalable latent action model.
- **Frame-by-frame Interaction:** Genie operates in generated environments on a frame-by-frame basis, independent of training, labels, or specific requirements.

What Does Genie Do?

- **Generative AI for All:** The research paper suggests that Genie is a revolutionary generative AI, allowing anyone, including children, to immerse themselves in generated worlds resembling human-designed environments. Genie can generate a diverse range of interactive and controllable environments despite being trained solely on video data.
- **Playable Environments from Images:** In simpler terms, unlike traditional generative AI models that focus on language, images, or videos separately, Genie stands out by creating playable environments from a single image prompt.

Why is Genie Important?

- Genie's standout feature lies in its ability to learn and replicate controls for in-game characters exclusively from internet videos.
- This is significant as internet videos lack labels indicating the actions performed or specifying which part of the image should be controlled.

Similipal seeks more female tigers from other regions

Odisha govt. writes to NTCA over the high number of melanistic tigers in the reserve forest, flags inbreeding concerns

Satvasundar Barik
BHUBANESWAR

Concerned over the sizeable number of pseudo-melanistic tigers in its Similipal Tiger Reserve (STR), largely due to inbreeding, the Odisha government has written to the National Tiger Conservation Authority (NTCA) to consider introducing female tigers from other landscapes to the reserve.

According to the All Odisha Tiger Estimation (AOTE 2023-24) report, which was released on Monday, 30 tigers were found in the State's forests. With 24 adult tigers, the STR currently



A Royal Bengal tiger at the Nandankanan Zoological Park in Bhubaneswar. BISWANANJAN ROUT

holds the largest share of the State's tiger population. It also houses all adult female tigers in the State.

"A total of 13 adult tigers (seven females and six

males) were found to be pseudo-melanistic in Similipal. No other wild habitat in the world has pseudo-melanistic tigers," the report said.

"The presence of

melanistic [almost black] tigers is surely a result of inbreeding in the present tiger population of the reserve. However, it is not a cause of concern. We want to increase genetic diversity in Similipal, for which we want to introduce female tigers from other regions," said Susant Nanda, Principal Chief Conservator of Forest (Wildlife).

He added that the process of introducing female tigers from other regions would "take time and be done after conducting proper studies".

Melanistic tigers
According to a study

conducted by multiple authors, including molecular ecologist Uma Ramkrishnan, approximately 37% of the tigers in STR are pseudo-melanistic – a condition characterised by wide, merged stripes.

Similipal's tigers are also found to move within an isolated habitat, although it has one of the largest tract of contiguous forest.

In 2018, the State government had initiated a programme in Satkosia to introduce three pairs of tigers from Madhya Pradesh. While one pair was successfully relocated, another tiger fell victim to poachers' traps.

ODHISHA TIGER ESTIMATION

(Syllabus: GS Paper 3 – Env and Eco)

Context: Concerned over the sizeable number of pseudo-melanistic tigers in its Similipal Tiger Reserve (STR), largely due to inbreeding, the Odisha government has recently written to the National Tiger Conservation Authority (NTCA) to consider introducing female tigers from other landscapes to the reserve.

Odisha Tiger Estimation (AOTE 2023-24) Report Highlights

- **Tiger Population:** The AOTE 2023-24 report revealed that 30 tigers were found in Odisha's forests.
- **Dominance:** Sunderbans Tiger Reserve (STR) houses the largest share of the State's tiger population, with 24 adult tigers, including all adult female tigers.
- **Pseudo-Melanistic Tigers in Similipal:** The report identified 13 adult tigers, seven females, and six males, as pseudo-melanistic in Similipal, a unique occurrence not found elsewhere in the world.
- **Addressing Genetic Diversity:** Principal Chief Conservator of Forest (Wildlife), emphasized the need to increase genetic diversity in Similipal by introducing female tigers from other regions. This process will be undertaken after proper studies, ensuring the stability of the tiger population.
- **Melanistic Tigers Study:** Approximately 37% of tigers in Sunderbans Tiger Reserve (STR) exhibit pseudo-melanistic traits, characterized by wide, merged stripes, as per a study led by molecular ecologist Uma Ramkrishnan.
- **Habitat Isolation and Movement:** Similipal's tiger population, despite residing in one of the largest contiguous forest tracts, exhibits movement within an isolated habitat, hinting at ecological complexities.
- **Tiger Relocation Challenges:** Despite efforts to introduce tigers from Madhya Pradesh to Satkosia in 2018, challenges persist, including the threat of poachers' traps, highlighting the delicate balance in conservation efforts.

Similipal Tiger Reserve

- **About:** Similipal is a tiger reserve in the Mayurbhanj district in the Indian state of Odisha covering 2,750 km² (1,060 sq mi).
- **Located:** In the Mayurbhanj District of Odisha's northernmost region.
- **Declared as:** Tiger Reserve in the year 1956 under Project Tiger in May 1973.
- **UNESCO Biosphere Reserve:** Declared in 1994 by the government of India
- **Fauna:** Sambar, Chital, Barking deer, Leopard cat, Fishing Cat, Jungle Cat, Flying squirrel, Mongoose, and Pangolin
- **Flora:** Eastern Highlands moist deciduous forests ecoregion, tropical moist broadleaf forest and tropical moist deciduous forests with dry deciduous hill forest and high-level Sal forests
- **River:** Budhabalanga, Salandi, and many tributaries of the Baitarani river

Shri Dharmendra Pradhan launches SWAYAM Plus platform

Context: Union Minister of Education and Skill Development & Entrepreneurship,, launched the **SWAYAM Plus Platform** in New Delhi.

SWAYAM Plus Platform

- **About:** It is a progressive extension aligned with NEP 2020, integrates industry-relevant courses to bolster learners' employability, fostered through collaborations with industry giants like L&T, Microsoft, and CISCO.
 - **SWAYAM:** Initiated by the Ministry of Education in 2017, emerged as a Massive Open Online Course (MOOC) platform, democratizing educational access for learners nationwide.
- **Key Objectives:** Establishing an inclusive ecosystem for professional development, encompassing learners, providers, industry, academia, and strategic partners.
 - Implementing a credit recognition system for esteemed certifications and courses, bridging the gap between academia and industry standards.
- **Integration with NEP 2020:** SWAYAM offers a flexible learning avenue for working professionals, aligning with the NEP 2020's ethos of multiple-entry-multiple-exit options, facilitating continuous skill enhancement.
- **Expanding Educational Horizons:** With the inclusion of 43 million higher education students and professionals, SWAYAM extends the boundaries of traditional classrooms, catering to diverse learning needs and aspirations.
- **Fostering Industry-Relevant Education:** SWAYAM Plus emphasizes futuristic courses like semiconductors, Artificial Intelligence, and other job-centric training modules, fortifying youth's readiness for the evolving job market.
- **Empowerment through Local Languages:** SWAYAM integrates courses in local languages, empowering every student and fostering innovation, irrespective of linguistic backgrounds.
- **Promoting Holistic Development:** Beyond STEM education, SWAYAM incorporates diverse disciplines such as music, painting, humanities, and liberal arts, nurturing holistic development and creativity among the youth.

Advances by Myanmar's anti-junta forces mount pressure on port developed by India

Context: Advances by Myanmar's anti-junta forces mount pressure on Sittwe port developed by India.

Sittwe Port:

- **About:** Located in Myanmar's Rakhine state, Sittwe Port is a deep-sea port on the Bay of Bengal, jointly inaugurated by India and Myanmar.
- **Kaladan Multimodal Project:** Sittwe Port forms a crucial part of the ambitious Kaladan Multimodal Project. The port is expected to enhance trade connectivity and foster people-to-people relations between India, Myanmar, and the wider South Asian region.
- **Stimulating Economic Growth:** The port is also anticipated to stimulate economic growth in India's North Eastern region, aligning with the government's Act East policy.
- **Gateway to South East Asia:** Moreover, Sittwe Port is poised to serve as India's gateway to South East Asia, which could catalyze regional growth and development.
- **Financing and Construction:** Constructed with the objective of creating an alternate connectivity route to North East India, the port was financed through a grant from India and forms part of the \$484 million Kaladan Multimodal Transit Transport Project (KMTTP).
- **Connectivity Components:** From Sittwe Port, the route extends to Paletwa in Myanmar through an inland waterway and from Paletwa to Zorinpui in Mizoram via a road component.
- **Development Under KMTTP:** Sittwe Port has been developed as a part of the Kaladan Multimodal Transit Transport Project (KMTTP), funded under grant-in-aid assistance from the Government of India.
- **Operational Significance:** Once fully operationalized, the waterway and road components of KMTTP will link the East coast of India to the North-eastern states through the Sittwe port.
- **Alternative Connectivity Route:** This project was conceptualized to provide an alternative connectivity of Mizoram with Haldia / Kolkata / any Indian ports through Kaladan River in Myanmar.



Union Minister Rajeev Chandrasekhar Launches 'Investor Information and Analytics Platform' Developed by IIT Madras

Context: Recently, the union Minister of State for Electronics and IT, Skill Development and Entrepreneurship launched '**Investor Information and Analytics Platform**'.

Investor Information and Analytics Platform

- **About:** This platform serves as a comprehensive hub, offering startups convenient **access to Venture Capitalists (VCs), investor networks, government schemes, and other vital components** of the startup ecosystem.
- **Integration of Diverse Information:** Entrepreneurs can efficiently explore information on various entities such as government agencies, incubators, investors, VCs, and banks investing in startups, thanks to the platform's integration of data at different levels.
- **Development by:** The platform is the brainchild of the Researchers at the Centre for Research on Start-ups and Risk Financing (CREST) of IIT Madras, ensuring credibility and expertise in its design and functionality.
- **Empowering Startup Ecosystem:** It is poised to significantly empower startup founders, entrepreneurs, and aspiring individuals, enabling them to create innovative products and services not only for India but also for global markets.
- **Innovative AI-based Assistance:** One of its standout features is "StartupGPT," an AI-driven conversational platform designed to simplify information retrieval for users grappling with extensive data.
- **Real-time Information Retrieval:** Users can effortlessly inquire about relevant information in plain language, facilitating real-time access to the data they need to make informed decisions.
- **Accessibility and Affordability:** To ensure sustainability and inclusivity, the platform offers full access at a nominal cost, maximizing the benefit for aspiring entrepreneurs and stakeholders alike.

Green Credit Rules will negatively impact forest ecology, say experts

IN FOCUS

Areas which will be part of the credit system

- Tree plantation
- Water
- Sustainable agriculture
- Waste management
- Air pollution reduction
- Mangrove conservation and restoration
- Ecomark
- Sustainable building and infrastructure

■ The mechanism will be implemented in a phased manner

■ Initially, two to three activities from the eight sectors are under consideration for designing and piloting the Programme

■ Further, more activities will be added from the selected sectors

Context: The recently published Green Credit Rules are “disastrous” and “detrimental” to ecological aspects of forests, experts have pointed out.

Key Points

- **Ministry's Directive on Land Identification:** The Union Ministry of Environment Forest and Climate Change (MoEFCC) has issued rules mandating state forest departments to identify degraded land parcels.
- **Scope of Land Identification:** The directive encompasses various types of land, including open forests, scrublands, wastelands, and catchment areas.
- **Concerns Regarding Terminology:** Describing areas like scrubland, open forests, and catchment areas as “degraded” is considered vague and potentially misleading.

Green Credit

- **About:** It represents a unit of incentive granted to individuals and entities involved in activities that yield positive environmental impacts.
- **Programme:** This program is a voluntary initiative introduced by the government to encourage diverse stakeholders to actively participate in activities promoting environmental preservation and sustainable practices.
- **Part of:** Mission LiFE

Green Credit Rules 2023

- **About:** Established on October 12, 2023, signal India's dedication to sustainable practices.
- **Initiated by:** Ministry of Environment, Forest and Climate Change (MoEFCC).
- **Objective:** To launch a Green Credit (GC) programme on a national level to leverage a competitive market-based approach for GC and incentivise voluntary environmental actions by stakeholders.
- **Eligibility criteria for Green Credit**
 - **Tree plantation:** Planting trees to combat deforestation and increase green cover.
 - **Water management:** Implementing water conservation techniques like rainwater harvesting.
 - **Sustainable agriculture:** Adopting eco-friendly farming practices.
 - **Waste management:** Promoting waste reduction, recycling, and composting.
 - **Air pollution reduction:** Initiatives that improve air quality.
 - **Mangrove conservation and restoration:** Protecting and reviving mangrove ecosystems.
 - **Others:** Eco-mark labelling, and Sustainable building and infrastructure.

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