Prelim Bits 24-09-2022 | UPSC Daily Current Affairs

Tourist Tax

Bhutan has reopened its borders to tourists, but with a catch: a $200-per-night tax.

- A tourist tax is any revenue-generating measure targeted at tourists.
- It is a means of combating overtourism and a form of tax exporting.
- It is usually **levied indirectly** through accommodation providers or holiday companies, and typically aimed at overnight visitors.
- It is separate from value-added tax and other taxes that tourists may pay, but are also paid by residents.
- Tourist taxes could limit tourist numbers, raise prices or reduce the pressure on public services.

Reference

1. https://www.business-standard.com/article/international/bhutan-reopens-to-those-willing-to-pay-200-per-day-visitor-tax-report-122092301405_html
2. https://www.responsibletravel.com/copy/tourist-taxes
3. https://www.government.nl/topics/municipalities/municipal-taxes/paying-tourist-tax

Machilipatnam Seaport

The seaport proposed at Machilipatnam in Krishna district got Coastal Regulation Zone (CRZ) clearance from the National Centre for Sustainable Coastal Management recently.

- Machilipatnam or Masulipatnam or Bandar is located in Krishna district, Andhra Pradesh.
- Machilipatnam is a municipal corporation and the administrative headquarters of Krishna district.
- The **ancient port town** served as the settlement of European traders from the 16th century, and it was a major trading port for the Portuguese, British, Dutch and French in the 17th century.
- The foundation for the Machilipatnam Seaport was laid in 2008.
- It is a proposed deep sea port on the coast of Bay of Bengal.
- It is located 65 km from the trading hub of Vijayawada.
- The Andhra Pradesh Maritime Board (APMB) has planned to build the Port in two phases.
- **Related Links** - Coastal Regulation Zone Regime

Reference

1. https://www.thehindu.com/todays-paper/machilipatnam-port-gets-crz-nod/article6592943ece
2. https://swarajyamag.com/infrastructure/andhra-pradesh-high-court-approves-construction-of-machilipatnam-port

3. https://www.thehindu.com/news/national/andhra-pradesh/machilipatnam-port-gets-crz-clearance-from-national-centre-for-sustainable-coastal-management/article65921548.ece

Fridays for Future

Thousands of young activists took to the streets across the world for the Fridays for Future, demanding stronger policies for loss and damage as well as climate reparation from governments in their countries.

- The Fridays for Future (FFF) campaign is a youth-led and youth-organised global climate justice movement that started in 2018, when 15-year-old Greta Thunberg began a school strike for climate.
- These are Global Climate Strikes that focuses on providing a platform for the most affected people and areas (MAPA) to voice their demands.
- The four major demands that were raised during the strike included
    1. Strengthening of environmental laws,
    2. Providing and safeguarding the rights of the communities at the forefront of environmental conservation,
    3. Implementation of democratic decisions for climate justice and
    4. Empowerment of healthy public commons for everyone in the city.
- The global team of FFF members and volunteers used social media to inform and mobilise the youth in every corner of the world.

Reference

1. https://www.downtoearth.org.in/news/climate-change/fridays-for-future-it-isn-t-too-late-say-young-activists-demanding-climate-reparations-justice-85105
2. https://fridaysforfuture.org/what-we-do/who-we-are/
3. https://www.thehindu.com/news/national/karnataka/fridays-for-future-organises-bengaluru-climate-strike-held-at-freedom-park/article65927486.ece

Carbon Dating

A district court in Varanasi allowed a petition seeking carbon dating of the structure inside the Gyanvapi mosque that the Hindus claim as a 'Shivling'.

- Carbon-14 dating or radiocarbon dating is a widely-used method applied to **establish the age of organic material**, things that once lived.
- The dating method makes use of the fact that the isotope of carbon called C-14, which is radioactive, decays at a rate that is well known.
- The most abundant isotope of carbon in the atmosphere is carbon-12. A very small amount of carbon-14 is also present.
- Plants and animals get their carbon-12 and carbon-14 isotopes in roughly the same proportion as is available in the atmosphere.
- When they die, the interactions with the atmosphere stops. There is no further intake of carbon (and no outgo either, as metabolism stops).

  Carbon-12 is stable and does not decay, while carbon-14 is radioactive.

- Carbon-14 reduces to one-half of itself in about 5,730 years.

- This is what is known as its '**half-life**'.

The ratio of C-12 to C-14 in the atmosphere is almost static, and is known.

- After a plant or animal dies, the ratio of C-12 to C-14 in the body begins to change.
- This change can be measured and can be used to deduce the approximate time when the organism died. This is called carbon dating.



- **Things that cannot be dated** - Carbon dating cannot be used to determine the age of non-living things, like rocks, for example.
- Also, the age of things that are more than 40,000-50,000 years cannot be arrived at through carbon dating.
- This is because after eight to ten cycles of half-lives have been crossed, the amount of carbon-14 becomes almost negligible and undetectable.
- **Exception** - There are other methods to calculate the age of inanimate things, but C-dating can be used in indirectly in certain circumstances.
- For example, the age of the ice cores in glaciers and Polar Regions is determined using carbon dating by studying the carbon dioxide molecules trapped inside large ice sheets.
- The trapped molecules have no interaction with the outside atmosphere and are found in the same state as when they were trapped.

Reference

1. https://indianexpress.com/article/explained/explained-sci-tech/explained-carbon-dating-gyanvapi-mosque-shivling-8168720/
2. https://www.nature.com/articles/d41586-020-01499-y
3. https://www.britannica.com/science/carbon-14-dating

Algae Biofuels

India's Reliance Industries Ltd has developed the catalytic hydrothermal liquefaction technology to convert algae biomass to oil.

The benefits of the catalytic hydrothermal liquefaction technology include direct utilisation of wet biomass without any need for drying and conversion of every organic fragment of biomass into oil and without any wastage.

- Algae is a group of predominantly aquatic, photosynthetic, and nucleus-bearing organisms that lack the true roots, stems, leaves, and specialized multicellular reproductive structures of plants.
- They can
    1. Synthesize large volumes of oil (20 times more than that of mustard per acre),
    2. Grow fast (10 times quicker than terrestrial plants) and
    3. Capture carbon dioxide (CO2).
- S0, global industries have been working to commercialize algae-based biofuel processes to reduce dependence on conventional fossil fuels.

The biofuel made from microalgae is known as algal fuel, algal biofuel, or algal oil.

The biofuel made from seaweed (macroalgae) is known as seaweed fuel or seaweed oil.

- **Microalgae** are excellent at converting CO2 and sunlight into oil-rich biomass, especially when compared to land-based crop plants like soy.
- By adapting microalgae to function as cell factories producing energy-dense oils that can easily be refined into renewable diesel and jet fuel, we can reduce greenhouse gas emissions by 70%.
- However, reports on "algae oil bubble" point to a disappointing reality to production of algal biofuel.
- **Challenges** - The major challenges associated with algae biofuel include
    1. Large water requirements,
    2. High cost of growth nutrients,
    3. Expensive biomass harvesting, and
    4. Difficult oil extraction from algae cells.
- Producing a kilogram of biodiesel requires 3.73 tonnes of water, 0.33 kg of nitrogen and 0.71 kg of phosphate, according to estimates.
- Additionally, the energy cost of extracting oil from algae biomass is 10 times higher than the energy cost of extracting soybean oil.

Energy return on investment

- Energy return on investment (EROI), an indicator of sustainability assessment, is the proportion of energy produced by a given source to the energy required to produce it.
- When the EROI is less than 1, more energy is needed to create a fuel than is found in the fuel and coproducts.
- For a fuel to be a sustainable energy source, it should have an EROI greater than 3.
- For algal biofuels produced in open ponds or photobioreactors, the predicted EROI ranges from 0.13 to 0.71.

Reference

1. https://www.downtoearth.org.in/blog/renewable-energy/will-algae-biofuels-become-viable--85096
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3. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3152439/

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