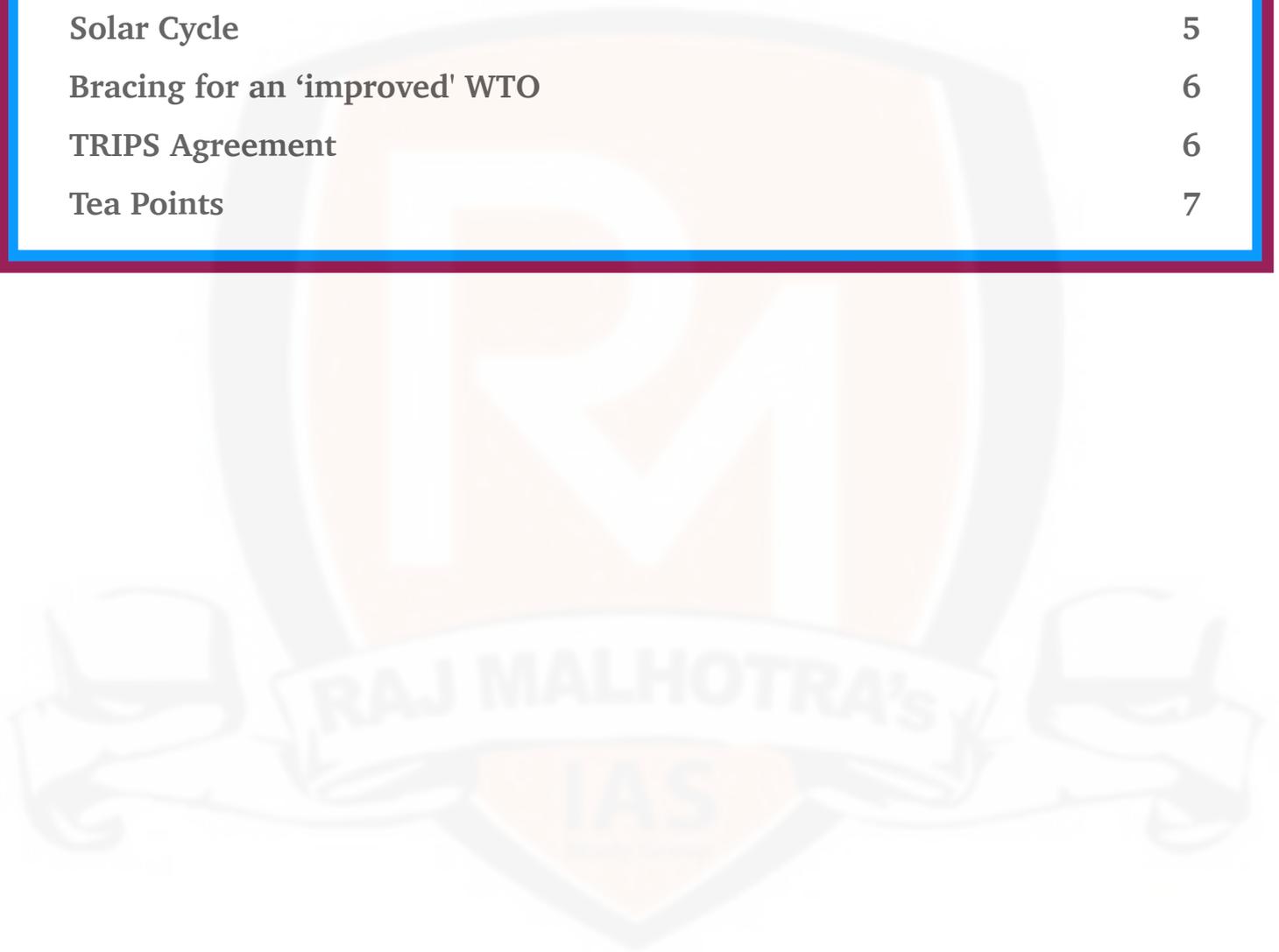


## RAJ MALHOTRA'S IAS ACADEMY, CHANDIGARH

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## A decadal decay

During its 65th session in 2010-11, the UN declared 2011-20 to be the Decade on Biodiversity. It did so to help implement the “**Strategic Plan for Biodiversity**” adopted at the 10th meeting of the Conference of Parties in Nagoya, Aichi Prefecture, Japan.

### What are the Aichi Biodiversity Targets?

The plan includes a set of 20 targets, named Aichi Biodiversity Targets, that are to be met by 2020. As the decade draws to a close, the UN on September 15 released its *Global Biodiversity Outlook 5* report on the progress in achieving the Aichi targets. None of the targets have been achieved, the report says, and only six have been partially met.

### Performance of the targets -

- The rate of **global deforestation has reduced by a third** (the target was to at least halve it), compared to the previous decade, and about 100 countries have incorporated biodiversity values into their national accounting systems.
- However, **national targets are generally poorly aligned with the Aichi Biodiversity Targets**, in terms of scope and the level of ambition. **Fewer than a quarter (23%) of the targets are well aligned with the Aichi Targets and only about a tenth of all national targets are both similar to the Aichi Biodiversity Targets**, and on track to be met,” says the report.
- The targets where there has been virtually no progress are: **minimising anthropogenic pressures on coral reefs and other vulnerable ecosystems** impacted by climate change or **ocean acidification** (Target 10) and **safeguarding ecosystems** that provide essential services including those related to water, and contribute to health, livelihoods and well-being (Target 14). Overall, the 20 targets are broken down into 60 elements. Of these, just seven have been achieved.
- Recently, international non-profit the World Wide Fund for Nature (WWF) too released its *Living Planet Report 2020* which says there was **an average 68 per cent fall in “monitored populations of mammals, birds, amphibians, reptiles and fish between 1970 and 2016”**.
- **Wildlife population in freshwater has fallen by a huge 84 per cent** in the same period. The report also says that biodiversity is declining at different rates across continents, with Europe being the least worst and Latin America the worst performer.
- The loss of grasslands, savannahs, forests and wetlands, the overexploitation of species, climate change and the introduction of alien species responsible for this loss.

### Limited progress -

- There has been significant expansion of the **protected area estate**, increasing over the 2000-2020 period from about 10% to at least 15% terrestrially, and from about 3% to at least 7% in marine areas,” says the report.
- Invasion of alien species too has been checked. This has also reduced the number of extinctions. Without such actions, extinctions of birds and mammals in the past decade would likely have been two to four times higher.

## Ready to swap?

Worldwide, pressure is mounting to close coal-fired power plants that are old, inefficient and spew more carbon emissions. Yet, in June this year when the Punjab government decided to dismantle its 43-year-old Guru Nanak Dev (gnd) thermal plant at Bathinda and sell the land, it raised quite a few eyebrows, expectedly.

### What is the issue?

- In 2018 a study by the Central Electricity Authority of India (CEA) and the Japan Coal Energy Centre (JCOAL), a Japanese institution, said the 440-megawatt plant, shut since 2017, **could be refurbished to generate clean power**.
- The plant would burn agro-residues, in addition to coal, and thereby not only emit less but also help avert the thick smog generated by stubble burning in the region. It can thus set an example

for reinventing utilisation of older coal power plants, suggested the study by CEA-JCOAL, working to ensure sustainable, low-carbon electricity supply in the country.

- **The Punjab State Power Corporation Limited (PSPCL) agreed to converting one of its 120MW units into a 60MW paddy straw-fired unit** after its committee estimated that the cost of conversion was lesser than establishing a new biomass plant.
- It also found that the conversion would **decrease the cost of power generation** and thus, reduce the burden on consumers.
- While it remains unknown what prompted the government to order against PSPCL's recommendation, the fact is biomass co-firing has failed to create a buzz in India even though it is among the largest producers of agro-residues.

#### **Potential of bio-energy in India -**

- In the absence of any consolidated figure with the government, estimates show that India produces some 550-650 million tonnes (mt) of agro-residues in a year; 160-180 mt of it is available for bio-energy.
- Under the technology, a part of the plant's base fuel, coal, is replaced with biomass and burnt either in the same boiler or in separate units. This results in a sharp decrease in pollution load, particularly in regions where stubble burning is prevalent.

#### **Benefits -**

- First, co-firing helps avoid these emissions by creating a market for stubble.
- Second, it avoids emissions from the coal that gets replaced.
- Third, agro-residues emit less when burnt in power plants in controlled conditions and in the presence of pollution control technologies.

#### **Significance of co-firing -**

- Estimates show that 85-100 mt of agro-residues are burnt across India every year. Punjab, Haryana and Uttar Pradesh contribute 60 per cent of it. Upon burning, 1 tonne of agro-residue releases 1,400 kg of carbon dioxide (CO<sub>2</sub>), 58 kg of carbon monoxide (CO), 11 kg of particulate matter (PM), 4.9 kg of nitrogen oxides (NO<sub>x</sub>) and 1.2 kg of sulphur dioxide (SO<sub>2</sub>).
- Co-firing helps reduce over 73 per cent PM, 47 per cent CO<sub>2</sub>, 5 per cent NO<sub>x</sub>, 98 per cent SO<sub>2</sub> and 99.6 per cent CO.
- It **creates business opportunity** for pellet and briquette manufacturers as coal plants prefer using biomass in compressed forms. Factory-gate price at these units varies between Rs 2,000 and Rs 2,500 a tonne. While farmers earn between Rs 500 and Rs 1,500, the rest goes to labourers engaged in collection, loading, unloading and transportation.
- Trials show **existing infrastructure in the country is sufficient for low blend ratio** of 5-10 per cent biomass. Even for higher blend ratios, the cost is just 10-20 per cent of the establishment cost of a standalone biomass power plant.
- Retrofitted boilers have another advantage: **they can fire biomass when supplies are plentiful and switch back to coal when supplies are low.**

#### **Challenges -**

- A major drawback for India is the **round-the-year availability of agro-residue; it can be procured in bulk only during the harvest time.** This is an impossible task for small industries and pellet and briquette manufacturers who do not have the capacity to buy or store biomass in such huge quantities. For the power plants, the cost will keep increasing as blend ratio goes up.
- Though the Ministry of New and Renewable Energy has last year included biomass in the list of renewable energy, it suffers the same fate as any other non-solar renewable energy. State regulators have a target to source a certain amount of electricity from these sources under renewable purchase obligation. But utilities have defaulted on these targets due to lack of enforcement mechanism and non-existent penalties.

#### **Way forward -**

- One way of promoting co-firing is to move the plants up the merit order—a ranking that enables distribution companies to buy from plants that offer electricity at cheaper rate.
- At present, coal power plants in Punjab and Haryana feature at the bottom of the merit order because they are located away from the coal mines. This makes coal expensive for them and their electricity costly. Since biomass is available in plenty in these regions, the government can

help them shift to co-firing on a priority basis and simultaneously push them up the merit order, suggests the official.

- The government should also fix a price for procurement. This will help stabilise the market faster.

## Flash drought

Quite unlike the conventional drought that takes months or even years to develop, the onset of a flash drought is sudden. It occurs during a dry spell in the monsoon season and has a devastating impact on agriculture.

### What is a 'flash drought'?

A flash drought is characterised by rapid onset and intensification caused by high evapotranspiration due to extreme heat, wind and high incoming solar radiation. It can develop in as little time as 10 to 15 days.

### Flash droughts in India -

- The country suffered 39 flash droughts between 1951 and 2018, four of which were major. The worst was in 1979 affecting north-central India and the Indo- Gangetic Plains, followed by 2001, 1958 and 1986, in the order of intensity, and affecting northern and central India.
- Each year, flash droughts have affected 10 to 15 per cent area under rice and maize since 1951.
- 82 per cent of the flash droughts occurred during monsoon and in central northeast, northeast, northwest, west central regions that fall in the core monsoon zone. Only the Himalayan and peninsular regions experienced more flash droughts in non-monsoon seasons.

### Recent flash droughts in India -

- Take the case of Madhya Pradesh. The state is India's largest soybean producer, but as per the Indian Institute of Soybean Research, Indore, it lost 15 per cent of the crop this July due to nearly a month-long dry spell. Though most districts here reported above the normal rainfall that month, some like Chhatarpur, Tikamgarh, Hoshangabad and Shivpuri recorded a deficit rainfall by 40 per cent.
- Similarly, nine of Odisha's 30 districts reported 40 per cent deficit rainfall. The dry spell ended in August, but by then farmers were already distraught.

### International mechanisms -

- The US first recognised the weather event in the early 2000s. It created the **US Drought Monitor**, and in 2012 recorded the expansion of abnormally dry conditions from 30 per cent of the continent in May to over 60 per cent by August. This had a significant impact on agriculture. Now, the US declares a flash drought if, within four weeks, the US Drought Monitor records changes in at least two of the five categories—**abnormally dry, moderate drought, severe drought, extreme drought and exceptional drought**. Meanwhile, China and Australia have shifted their focus of research on flash droughts.
- But India does not even recognise a flash drought. So when farmers suffer crop losses they cannot approach the government for compensation. Worse, India's drought management plan is outdated and does not take into account the changing rainfall patterns.

### What should be our response?

- The only solution to the problem is predicting flash droughts and developing an early warning system at the local level so that farmers can prepare themselves.
- There is the tendency to treat drought with relief schemes, adopted after crops are already destroyed. It is handled by the revenue department. This needs to change to a preventive model. All departments should work together to help farmers adapt.
- Insurance schemes like Fasal Bima Yojana must take flash drought into consideration.
- Since rapid depletion in soil moisture leads to flash drought, soil moisture should be the main indicator to identify a flash drought. At present, Indian Meteorological Department (IMD) uses Standardised Precipitation Index to measure drought, but it is related only to rainfall and does not consider wind speed, soil moisture, temperature and rainfall. IMD must come up with a localised index for agriculture.

- Further, efforts should be made to improve soil's water holding capacity. We talk about groundwater and surface water, but forget green water. The water transpired by plants that comes from rains and stored in soil is green water. Improving this requires steps such as arresting run-off or velocity of water so that it has more time to percolate, and improving soil quality and structure through additional biomass and green manure and compost. These can help plants withstand the dry spell.
- Changing cropping patterns can also curb quick setting of a drought. Farmers should sow drought-resistant plants that ensure a crop even if one flowering gets disrupted by a flash drought. Organic matter conservation and enhancement is also important to make farmlands resistant to drought.

## Solar Cycle

A new 11-year cycle of the Sun has begun. Scientists believe the Sun was at its weakest in 2019 in the last 100 years or so—known as the solar minimum—and 2020 marks the beginning of the 25th cycle.

But the odd thing is that solar activity—which is measured by the number of Sun spots at any given time—is pretty low even in 2020. **Sun spots are areas of strong magnetic forces on the surface of the Sun**—sometimes as large as planets—that appear as darker spots because they are cooler.

### Observations -

- The Sun had **no Sun spot for around 71 per cent of the time** till September 21, 2020, as compared to 77 per cent in 2019, according to the United States National Oceanic and Atmospheric Administration's (NOAA's) Space Environment Centre.
- In May this year, **it was as high as 78 per cent that sparked fears of a mini ice age.** Scientists say the Sun may be going through a long period of decreased activity known as the **Modern Grand Solar Minimum from 2020 to 2053.**
- The last time such an event occurred was **during the Maunder Minimum—from 1645 AD to 1710 AD**, which was part of what is now known as the **Little Ice Age**—when Earth went through a series of elongated cold periods during the medieval centuries.
- The alarm went off when a study predicted that the surface temperatures on Earth will go down noticeably during the Modern Grand Solar Minimum due to a 70 per cent reduction in solar magnetic activity.

### How the scientists have studied this phenomenon?

- The scientists have studied the complex magnetic activity in the interior of the Sun and how this impacts its total energy output measured as solar irradiance.
- Variations in solar irradiance lead to heating of the upper layer of the Earth's atmosphere and influence the transport of solar energy towards the planet's surface.
- They have studied the magnetic activity through the solar background magnetic field which occurs in the form of two magnetic waves inside the Sun.
- When the scientists combined these two waves for solar cycles 21-26, they found the Sun's magnitude going down in cycles 24-25 and becoming almost zero in cycle 26. They also found multiple grand solar minima events, including the current event from 2020-2053.

### What was its impact earlier?

- During the Maunder Minimum in the middle ages, the solar irradiance went down by 0.22 per cent or 3 W/sq m in 1710 AD when the period ended. This brought down temperatures in the Northern Hemisphere, especially in Europe, by 1 to 1.5 degrees celsius and led to frozen rivers, long cold winters and cold summers.
- This happened because of the complex impacts of decreased solar activity on the abundance of ozone in the Earth's atmosphere and on climatic cycles such as the North Atlantic Oscillation (NAO).
- The NAO—which is the balance between a permanent low-pressure system near Greenland and a permanent high-pressure system to its south—was in a negative phase during the Maunder Minimum. This basically plunged Europe into colder than usual temperatures.

### Why the Earth cooled down?

- There is another reason for the cooling, directly related to the sun's magnetic field, which shields the Earth from harmful cosmic and galactic rays.
- In the absence of the shielding more rays reaching the Earth and forming high clouds in the atmosphere, it is leading to the cooling.
- The scientists predict that the planet's temperature might plummet by 1oC during the current grand solar minimum. The possible decrease in temperatures has led to people, even some scientists, to predict that the solar minimum cooling might cause a mini ice age and offset the rising temperatures due to global warming.

## Bracing for an 'improved' WTO

The Covid-19 pandemic has tested the ability of the world to act in concert to tackle an unprecedented challenge, and found it wanting. The disruption of global supply chains and the growing gravity of the economic downturn have spurred widespread trade protectionism, deepening a trend that set in two years ago. WTO finds trade restrictions by member governments have affected global imports valued at US \$747 billion in 2019 alone.

### US-China trade war -

- A WTO panel found the US had illegally imposed tariffs on more than \$350 billion worth of Chinese imports. Since he unleashed a trade war against China in 2018, Trump had threatened tariffs on nearly all Chinese imports but stepped back from the brink in January when he signed an initial trade deal with China.
- The US had claimed its tariffs were justified because China was stealing intellectual property and forcing American companies to transfer technology to Chinese firms. WTO's three-member panel did not accept the argument. It said that such unilateral responses are themselves both unfair and illicit under the WTO agreement.

### Bypassing the WTO -

- Some members have initiated a bypass operation to circumvent the blockage of the dispute settlement proceedings. In April, 18 members including the EU, Australia, China, Canada, Singapore and Brazil, notified the setting up of a Multi-Party Interim Appeal Arbitration Arrangement. Arbitration is not mandated by WTO and how far it will succeed is an open question.
- That's the reason the panel which ruled on the US-China dispute wrote in justification that "it is very much aware of the wider context in which the WTO system currently operates," reflecting "a range of un-precedented global trade tensions".

### Boosting reforms -

- While the European Commission has published a revised paper on modernising WTO to "make international trade rules fit for the challenges of the global economy", more than a dozen like-minded members have organised minister-level meetings to chart the way forward.
- Besides the US, the EU and Japan have issued scoping papers on strengthening WTO disciplines on industrial subsidies and state-owned enterprises, initiatives that are aimed at reining in China.
- A word of caution is required at this juncture on the extension of the frontiers of the trading system into new areas. The use of the trade rules as a mechanism for imposing disciplines in non-trade areas would create heavy strains on the system.

## TRIPS Agreement

The draft proposal of India and South Africa to the **World Trade Organization (WTO) for a waiver of certain provisions of its TRIPS Agreement on intellectual property (IP) protection** to fight the covid-19 pandemic may be a good move, but it begs some questions.

### What is the argument?

- Recently, the WTO published the text of a joint submission by the two countries to the WTO TRIPS Council seeking the waiver **for the prevention, containment and treatment of covid-19, and it was welcomed by public health activists** who have been in the vanguard of

the struggle to provide access to medicines. They have always held that patents are the major block to providing inexpensive medicines.

- With SARS-COV-2 virus wreaking havoc across the world, the World Health Organization had put together the covid-19 Technology Access Pool (C-TAP) an initiative of Costa Rica aimed at making vaccines, tests, treatments and other health technologies accessible to all to fight the pandemic.

### **Why TRIPS agreement become significant here?**

- The fact is that the controversial TRIPS Agreement which embedded IP rights into the trade discourse in 1995 already offers flexibilities that countries can avail to bypass to meet public health needs.
- In November 2001, WTO members adopted the Doha Declaration on the TRIPS Agreement and Public Health, which is categorical that “*every member has the right to grant compulsory licences (CLs) and the freedom to determine the grounds upon which such licences are granted.*”
- The Doha Declaration did not require any amendment to the text of the TRIPS accord because the grounds for CLs were listed in the original text. The Declaration merely served to reinforce that logic.
- After issuing one CL in 2008 India has stepped back and refused to issue any more despite the urgent need to provide life-saving drugs at reasonable cost to a people who are forced to bear the brunt of medical expenses.

## **Tea Points**

Though Uttarakhand is not known as a tea-growing state, it has a long tryst with the evergreen shrub, named *Camellia sinensis* in scientific lexicon. Over 150 years ago when tea cultivation began in the hills of Himachal Pradesh, Assam, West Bengal and several other states in south India, a consignment of 20,000 tea seedlings from Kolkata had also reached the Uttarakhand region.

### **Decline in tea-cultivation -**

Despite the glorious beginning, tea industry in Uttarakhand faced a steady decline towards the beginning of the 20th century. Arcadia today manufactures just 70,000 kg of green tea in a season, compared to 3,500,000 kg a few decades ago.

### **Reasons -**

The industry's decline became particularly evident after Independence due to factors including migration of skilled labour, poor technical knowledge among the local people, rampant encroachment on tea estates, market competition, shortage of fuel for tea processing, the absence of good transport facilities, lack of silvicultural management of tea gardens and invasion of weeds like *Lantana*.

### **Government response -**

The government reintroduced tea in the Uttarakhand hills in 1987 by taking culturable wastelands on lease and reviving the abandoned British-era tea gardens. In 2004, soon after Uttarakhand was created a separate state, the Uttarakhand Tea Development Board (UTDB) was set up with the job to promote eco-friendly, organic and quality tea plantations over 9,000 ha. This target, if pursued in the right manner, can help change the fate of Uttarakhand's ghost villages.

### **Geographical constraints -**

The agro-climatic conditions of Uttarakhand are not as suitable as that in the northeast for growing tea. So, most plantations are located at an altitude of 1,400-1,700 metres above the sea level, where they suffer from two main constraints: **poor soil fertility and low soil moisture** for most parts of the year.

### **Way forward -**

- Firstly, it is important for the government to promote tea clones suitable for various agro-climatic regions of Uttarakhand.

- The second step is to identify locally produced tea varieties like Nandadevi and promote them in a way that they can compete with the other established brands. One way of doing this is to promote local varieties as organic.
- Tea plantations in Uttarakhand gain their full potential only after seven years and profitable yields are harvested after 12 years. To ensure that plantations are remunerative right from the initial years, intercropping must be promoted with legumes, ginger and turmeric. The researchers estimate that these crops can help the farmers earn 54-115 per cent of the income from tea.

