J.B.BODA

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India's green push for second-generation bioethanol

Ethanol-blended petrol is regarded as one of the most acceptable alternative fuel blends for transportation. However, the use of molasses & broken grains for its production raises the question of food vs fuel. Second-generation (2G) bioethanol could help to secure long-term sustainability with improved economics for the Indian biofuel market. Indian Ministry of Science & Technology & Earth Sciences has announced the launch of the 'Innovation Roadmap of the Mission Integrated Biorefineries' in September 2022. The mission aims at greater international collaboration & the need for increased financing for energy research, development, & demonstration during the next five years through public-private investment.

The bio refineries aim to produce ethanol. Blended petrol with 20 per cent ethanol is also known as E20. India aims to sell only E20 blended petrol from 2025. In 2021, Indian Government has launched a report, '*Roadmap for Ethanol Blending in India by 2025',* to set a plan for the phase-wise rollout of E20 in the country.

As per the Indian Ministry of Petroleum & Natural Gas estimation, about 1,016 crore litres of ethanol will be required to achieve 20 per cent blending by 2025-26. Sugarcane-derived molasses & broken or surplus grains like rice & maize are primarily used to generate ethanol. Presently, these two feedstocks can generate about 684 crore litres/year of ethanol collectively, which is proposed to be expanded to 1,500 crore litres by 2025. This, in turn, will necessitate the production of about 165 lakh metric tonnes of grains & 60 lakh metric tonnes of sugar in the year 2025 for ethanol utilisation. Besides the food versus fuel debate, the move will also significantly increase the water footprint.

Sustainable options : Do we have any other sustainable options for producing ethanol? **Yes**, agricultural or lignocellulosic waste. India is the second-largest producer of agricultural waste in the world after China & generates about 500 million tonnes of agricultural waste per year, of which more than half is either discarded or burned. Inappropriate management of this agricultural waste generates greenhouse gases such as methane, carbon dioxide & nitrous oxide, endangering both people & the environment. Second-generation (2G) bioethanol production technology has the potential to tap this agricultural waste & convert it into ethanol.

Source: downtoearth.org.in

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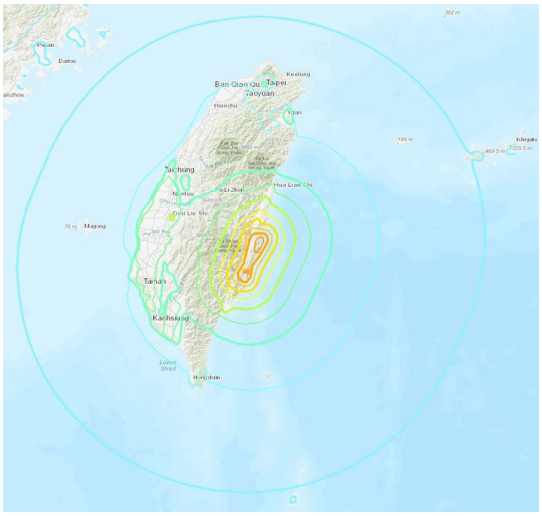
Earthquake Hit Taiwan



A strong earthquake of magnitude 6.9 shook southeastern Taiwan on Saturday, 18th September 2022 at 06:44:14 (UTC), 14.44 local time. The quake had a depth of 10 km (6.2 miles) with its epicentre in Taitung county, a sparsely populated part.

The quake could be felt across Taiwan. Buildings shook briefly in the capital Taipei. The science parks in the southern cities of Tainan and Kaohsiung, home to major semiconductor factories experienced no impact on operations.

There was no interruption to electricity supply on Taiwan's east coast.

Three carriages came off the rails at Dongli station in eastern Taiwan after part of the platform canopy collapsed & one person was injured.

Tectonic Summary

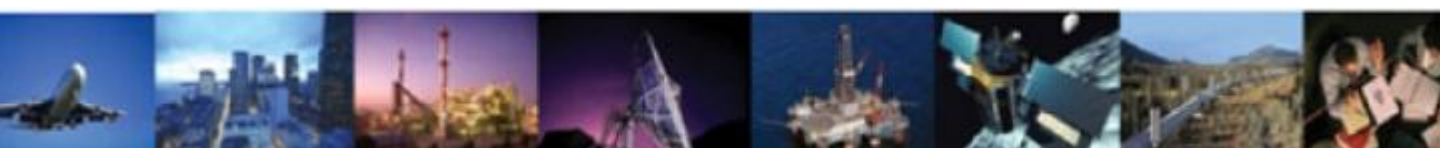
The September 18, 2022, M 6.9 earthquake south-east of Lugu, Taiwan, occurred as the result of strike-slip faulting at shallow depth, near the plate boundary between the Philippine Sea and Eurasia plates at the southeast coast of Taiwan.

The September 18, 2022, earthquake was preceded by an M6.5 earthquake in the same area 17 hours earlier. There have been 7 earthquakes of M5.0 and larger in the sequence (as of September 18, 2022, 20:00 UTC).

Because of its plate boundary location, Taiwan commonly experiences moderate-to-large earthquakes. The region within 250 km of this earthquake has hosted 239 other M 6+ earthquakes over the preceding century; 24 of these were M 7+.

In 1951 the east coast of Taiwan was rocked by a series of about 20 earthquakes M 6 and larger the largest being a M7.8 that was about 10 km to the southwest of the recent earthquake. In September 1999, the M 7.7 Chi Chi earthquake occurred in central Taiwan and resulted in at least 2,297 fatalities, and caused damage estimated at $14 billion.

Source: USGS



Safety Measures Against Earthquakes

Earlier, poor construction standards were blamed in Taiwan for the casualties in several major Earthquakes, including the 1921 Earthquake and the 1906 Meishan Earthquake.

However, now many modern buildings in Taiwan are being constructed with Earthquake safety in mind, including Taipei 101. It had to cope with a double challenge of being flexible enough to withstand the Earthquakes and yet rigid enough to resist wind shear.

Taiwan's High-Speed Rail System also incorporates an automatic safety device to safely bring all the trains to a stop in case a significant Earthquake is detected.

Economic Impact of Earthquakes

Table below shows insured losses caused by some past events.

Event / Location Name	Event Date	Magnitude (M_L)	Insured losses (USD) million
Chi-Chi	21/09/1999	7.3	863
Tainan	6/2/2016	6.4	618

Source: USGS, Swiss Re Sigma

World Meteorological Organization (WMO) predicts first "triple-dip" La Niña of the century

El Niño is a climate pattern that describes the unusual warming of surface waters in the eastern tropical Pacific Ocean. El Niño is the "warm phase" of a larger phenomenon called the El Niño-Southern Oscillation (ENSO). La Niña, the "cool phase" of ENSO, is a pattern that describes the unusual cooling of the region's surface waters. El Niño and La Niña are considered the ocean part of ENSO, while the Southern Oscillation is its atmospheric changes.

What is 'Triple Dip' La Niña?

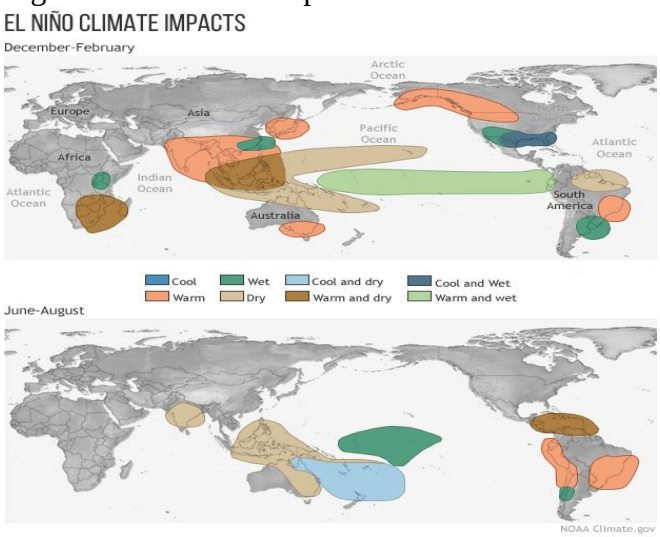
'Triple Dip' La Niña is a period where the La Niña period extends for up to three consecutive winters.

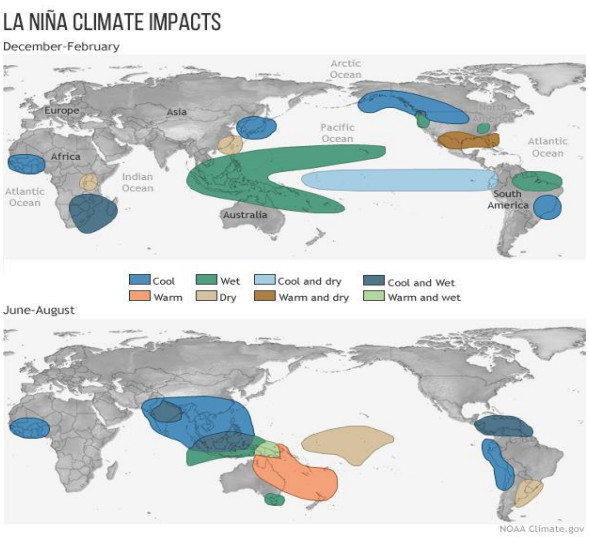
La Niña phenomenon started building up in September 2020 and will continue for another six months as reported by various meteorological agencies in late August and mid-September. The WMO has suggested that there is a 70% chance of this phenomenon to continue till September to November 2022 and a 55% chance of it continuing through December 2022 - February 2023.

The result of such extension would mean more variation in the temperatures in world and increase in the frequency of rain, floods and droughts in parts of the world.

It will be the first triple dip La Niña which of the 21st century and the third one since the 1950's. The experts are suggesting that as a result of this triple dip, the world will witness an overactive Atlantic Hurricane season in 2022.

Figures below show impact of EL Niño and La Niña:





Source: NOAA,WMO

According to WMO, the worsening drought in the Horn of Africa and southern South America bear the hallmarks of La Niña, as does the above average rainfall in South-East Asia and Australasia.

In most parts of the United States, for example, La Niña is associated with very dry winters. In Australia and Indonesia, and generally in the tropical region, La Niña is expected to bring more rainfall.

The widespread drought in the United States and flooding in eastern Australia this year could have been a result of the prolonged La Niña. The excessive rainfall in Pakistan, which experienced its worst flooding disaster, can also be blamed in part on La Niña.

The new La Niña Update of WMO confirmed regional climate projections that the devastating drought in the Horn of Africa will worsen and affect millions of people.

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- *https://www.weather.gov/*
- *Swiss Re Sigma*