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More Palestinians flee Rafah as Israel steps up strikes after evacuation order

CONTEXT: Gazans flooded towards coastal areas of the Gaza Strip's southern city of Rafah on Sunday, fleeing heavy bombardment in eastern zones. Israel shifted its focus to the heavily populated area to destroy the last bastion of Hamas, despite international opposition to any major military operation in Rafah.



Heavy bombardment

Israel sent tanks and ground troops into the areas in "targeted raids", heavily bombarding eastern parts of the city in recent days. Rafah's population had swelled to around 1.4 million after hundreds of thousands of Palestinians fled fighting in other areas of the Gaza Strip and sought shelter there during more than seven months of war. Israel has designated Al-Mawasi as a "humanitarian zone" despite aid groups warning site unprepared for such an influx.

'No chance to organise'

The war began with Hamas's unprecedented October 7 attack on Israel, which resulted in the deaths of more than 1,170 people, mostly civilians. According to Gaza's Health Ministry, at least 35,034 people, mostly women and children, have been killed in Israeli strikes on the Hamas-run territory since the war began.

POLITY & GOVERNANCE

Fourth phase of election today with polling in 96 constituencies

CONTEXT: The fourth phase of the Lok Sabha election will see 96 Lok Sabha constituencies across 10 States and Union Territories going to the polls on Monday. The EC said that 1,717 contestants from 10 States and Union Territories are in the fray in the fourth phase.



Prominent candidates in the fray include Union Ministers Giriraj Singh (Begusarai, Bihar), Nityanand Rai (Ujjarpur, Bihar), Arjun Munda (Khunti, Jharkhand), and Ajay Mishra Teni (Kheri, Uttar Pradesh); five-time Congress MP Adhir Ranjan Chowdhury (Baharampur, West Bengal), Samajwadi Party chief Akhilesh Yadav (Kannauj, U.P.), and All India Majlis-E-Ittehadul Muslimeen (AIMIM) chief Asaduddin Owaisi (Hyderabad, Telangana).

Andhra Pradesh Congress president Y.S. Sharmila (Kadapa), and Trinamool Congress leaders Mahua Moitra (Krishnanagar, West Bengal) and Shatrughan Sinha (Asansol, West Bengal) are also among the key candidates.

The constituencies that will vote on Monday have 8.97 Cr. male and 8.73 Cr. female electors. The 175 Assembly seats of Andhra Pradesh and 28 of Odisha will also go to the polls.

The weather forecast indicates that the parliamentary constituencies going to the polls are likely to experience normal to below normal temperatures (± 20 C) and there will be no heat wave-like condition in these areas on the polling day. There is no significant concern regarding hot weather conditions during the polling on Monday.

The average number of contesting candidates in a Lok Sabha constituency is 18. As part of the arrangements, 122 air sorties have been done in three States (two in Andhra Pradesh, 108 in Jharkhand, and 12 in Odisha) to ferry election and security officials. Over 19 lakh poll officials will be deployed across 1.92 lakh polling stations. Over 12.49 lakh voters of age 85 and above and 19.99 lakh with disabilities have been provided the option to vote



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from home in this phase. The optional facility is already receiving tremendous appreciation and response.

The EC has deployed 4,661 flying squads, 4,438 static surveillance teams, 1,710 video surveillance teams, and 934 video viewing teams to deal strictly and swiftly with any form of inducement of voters. A total of 1,016 inter-State and 121 international border check posts are keeping a strict vigil on any illicit flow of liquor, drugs, cash, and freebies. Strict surveillance has been kept at sea and air routes.

INTERNAL SECURITY

Govt. to spend ₹2 cr. per km on roads along China border

CONTEXT: In the past five months, the Ministry of Home Affairs (MHA) has sanctioned 113 roads under the VVP in Arunachal Pradesh, Uttarakhand, and Sikkim to improve connectivity in areas along the China border.



There are at least 168 villages along the border with China that do not have any road connectivity. The government is likely to spend over ₹2 Cr on each kilometre of road to be constructed along the China border in Uttarakhand and Sikkim under the Vibrant Village Programme (VVP).

According to the Ministry of Home Affairs (MHA), 43.96 km of roads is to be built at a cost of ₹ 119 Cr. at Pithoragarh district in Uttarakhand. In Sikkim, around 18.73 km of roads and 350 metres of steel bridges have been sanctioned under the VVP at the Chungthang and Mangan block in north Sikkim at a cost of ₹ 96 Cr.

The Union Cabinet approved the VVP programme on February 15, 2023, to cover 2,967 villages in 46 border blocks of 19 districts in Arunachal Pradesh, Himachal Pradesh, Sikkim, Uttarakhand, and Ladakh. One of the stated objectives of the VVP is to stop migration in the population residing along the border.

The Ministry has also asked State governments to monitor construction activity by installing GPS-enabled vehicle tracking devices. States shall ensure the installation of GPS system in key machinery and equipment engaged during the execution of road works under VVP.

The MHA's report on demands for grants tabled in Parliament on March 20, 2023, stated that the objective is to motivate people to continue to stay there and "help to gather intelligence from the people of border villages".

Around 68 % of the total villages that will be covered in the first phase of the VVP are in Arunachal Pradesh. The number of villages that will benefit from the scheme in Ladakh is 35, while 75 villages in Himachal Pradesh, 46 villages in Sikkim, and 51 villages in Uttarakhand have been identified.

Of the ₹ 4,800 Cr. budget allotted for the VVP for the financial years 2023-24, 2024-25 and 2025-26, more than half, that is, about ₹ 2,500 Cr., is to be spent on road construction.

China is expanding its chain of model villages or Xiaokang ('moderately prosperous') villages close to the Line of Actual Control opposite Uttarakhand, Sikkim, and Arunachal Pradesh.

POLITY AND GOVERNANCE

Panel flags poor progress in reversing coal mining damage in Meghalaya

CONTEXT: A one-member panel appointed by the High Court of Meghalaya to handle coal-related issues has flagged the lack of progress in restoring the environment damaged by rat-hole coal mining in the north-eastern State.



The High Court appointed Justice Katakey in April 2022 to recommend measures to the Meghalaya government in compliance with the directions issued by the Supreme Court and the National Green Tribunal (NGT), which had banned the hazardous rat-hole coal mining in April 2014. Justice Brojendra Prasad Katakey (retired) underlined the non-utilisation of the Meghalaya Environment Protection and Restoration Fund (MEPRF), apart from the sanctioning of a few projects.

Rat-hole mining involves digging small tunnels large enough for a person to crawl through to extract coal. In its 22nd interim report submitted to the court last week, the panel said necessary steps need to be taken by the departments concerned for restoring the mining-affected ecology of Meghalaya with ₹ 400 Cr. in the MEPRF and another ₹ 100 Cr. with the Central Pollution Control Board.

People living in areas around the mines — most of them abandoned — continue to suffer due to continued acid mine drainage from the mine pits that have not been closed yet. The committee also said that auditing the source of coal used in the coke oven, ferroalloy, and captive power plants of cement factories

was under way and expected to be completed within three weeks.

An audit committee formed for this purpose considered the representations from two coke plants. It appraised the Katakey panel of ₹ 2.24 Cr to be paid by these two plants toward royalty and cess for using unaccounted coal.

The panel recommended the conduct of the drone survey (to locate deposits of coal illegally mined) immediately after the completion of the transportation of re-assessed or re-verified inventoried coal to the Coal India Limited-designated depots.

SCIENCE AND TECHNOLOGY

This worm develops food habits and its offspring 'inherit' them

CONTEXT: On March 28, researchers from Princeton University in the U.S. reported that after *C. elegans* worms ate a disease-causing strain of bacteria, its children inherited the 'knowledge' to avoid making the same mistake — up to four generations. *C. elegans* grows within 3-5 days from a fertilised egg to a millimetre-long adult, and it has informed profound insights into the human body, as well as biology more broadly.



Message in a bottle

Pseudomonas vranovensis is a disease-causing bacterium found in *C. elegans*'s natural environment. The researchers found that *P. vranovensis* makes a small RNA molecule called sRNA. When the worms ingest this strain, they also take in the sRNA. The sRNA then altered the worm's feeding behaviour such that, from that point on, the worms 'know' to avoid feeding on this bacterium and save themselves from getting sick.

Remarkably, this learned avoidance behaviour was found to be transmitted to the trained worm's progeny, grand-progeny, great-grand progeny, and great-great-grand progeny. The ability decayed only from the fifth generation.

The same team of researchers had previously discovered this trans-generational ability in *C. elegans* worms against *P. aeruginosa* bacteria (which also cause disease in humans). In the new study, they were able to confirm *C. elegans* worms in the wild had the same ability.

Understanding RNA, large and small

A DNA molecule is like a big ladder. Its two side rails, or strands, are made of a long series of alternating units of phosphate and the sugar deoxyribose molecules. Each sugar unit is attached to

one of four chemical bases: adenine (A), cytosine (C), guanine (G), and thymine (T). The As and Cs on one strand are bonded with Ts and Cs on the other by hydrogen bonds. These bonds form the rungs that hold the strands together.

A single *P. vranovensis* bacterium has 6-7 million rungs in its DNA, coding for about 5,500 genes. A gene is a segment of a few thousand base-pairs of the DNA molecule. Every gene is instructions that tell a cell how to make a protein.

In contrast to DNA, the RNA molecule is like a half-ladder or a comb. Its spine is made up of alternating units of phosphate and the sugar ribose. Each ribose molecule is attached to one of four bases: A, C, G or uridine (U), which jut out from the strand like the comb's tines. A cell copies the sequence of As, Ts, Cs, and Gs in a gene in the DNA into the sequence of Us, As, Gs, and Cs in an RNA molecule. This RNA is called the messenger (mRNA). The length of this mRNA is comparable to that of the gene from which it is derived. The mRNA moves to structures called ribosomes, where the cell assembles the corresponding protein.

Diet control

But not all genes encode mRNAs and proteins. The end product of some genes, especially small genes that are only about a tenth as long (~100-200 rungs), is sRNA. These sRNA bind to other proteins and RNAs, and either enhance or reduce the expression of other genes.

The Princeton University researchers showed that a *C. elegans* worm took up a 124-tine sRNA from an ingested *P. vranovensis*. This sRNA reduced the expression of a gene in the worm called *maco-1*, which plays an important neurological role. As it happens, *maco-1* is also found in humans.

In the laboratory, the researchers reared *C. elegans* worms on a diet of *Escherichia coli* bacteria. When the researchers engineered the *E. coli* to express the *P. vranovensis* sRNA and fed them to the worms, the worms learned to avoid the pathogenic strains of *P. vranovensis*. When these worms had children, the latter also had the ability to avoid pathogenic *P. vranovensis*.

Good 'memory loss'

Another *Pseudomonas* bacterium, *P. mendocina*, is also present in the worm's habitat but it doesn't cause disease. Instead, *P. mendocina* is a source of nutrition. *C. elegans* worms trained to avoid the pathogenic *P. vranovensis* strain avoided feeding on the non-pathogenic *P. mendocina* as well. The researchers have speculated that this is perhaps why the 'loss of memory' happens around the fifth generation — so they can re-remember the advantage of consuming *P. mendocina*.

The sRNA that triggered learned avoidance behaviour came initially from the bacteria and was taken up by the worm that fed on them. Thereafter, the sRNA was maintained in the worms' bodies, transmitted to their descendants, and maintained in them. This happened through a mechanism called RNA interference — which scientists first discovered by studying *C. elegans* worms.

Food for thought

In fact, discoveries based on studying *C. elegans* were recognised by Nobel Prizes in 2002, 2006, and 2008. This tiny worm has played an outsized role in the advancement of scientific and medical research.

For example, a gene that triggers a process during *C. elegans*'s development has been found in the human genome, and mutations in it have been associated with limb deformities.

INTERNATIONAL RELATIONS

Investment lessons from the India-EFTA trade deal

CONTEXT: India's Free Trade Agreement (FTA) negotiations with countries such as the United Kingdom and the European Union (EU) seem to be on ice due to the ongoing parliamentary elections in India. India managed to clinch a historic trade deal, in March, with the European Free Trade Association (EFTA), comprising Iceland, Liechtenstein, Norway and Switzerland.

The newly minted Trade and Economic Partnership Agreement (which we refer to as FTA) between India and EFTA is expected to give a much-needed leg-up to the low levels of extant trade between the two sides. The FTA between India and EFTA is also important because, as economist Biswajit Dhar has argued, India has agreed to include issues such as environment and labour, which it has traditionally opposed incorporating in trade agreements.

On investment

Another reason sets this FTA apart from those India signed recently with countries such as Australia, the United Arab Emirates (UAE), and Mauritius. The India-EFTA FTA includes a somewhat detailed investment chapter, which is missing in the other recent Indian FTAs. This chapter focuses on investment facilitation issues, not investment protection. But it has a remarkable and unprecedented characteristic. India has managed to extract a promise from the EFTA countries that they shall "aim to" increase foreign direct investment (FDI) to India to \$50 billion within 10 years of the FTA coming into force, followed by another \$50 billion in the succeeding five years. Likewise, Article 7.1(3)(b) of the investment chapter provides that the EFTA states shall "aim to" facilitate the generation of one million jobs in India. In legal terms, these articles codify what is known as an obligation of conduct — an obligation to make an honest endeavour towards achieving a goal, notwithstanding the outcome or the result. This differs from an obligation of result, which would require achieving a specified outcome. In other words, the EFTA countries are legally obligated to make an honest effort to invest \$100 billion and generate one million jobs in India. They are not required to realise these outcomes. Nonetheless, the Indian negotiators need to be complimented for incorporating such path-breaking specified obligations of conduct in the investment chapter, which are typically not found in FTAs or investment treaties. Notably, this creates a template worth emulating in the ongoing negotiations with the U.K., the EU, and other countries.

Trade and investment

Economic theory has long demonstrated the inextricable linkage between trade and investment. This is truer in a world where the production process is scattered along global supply/value chains, a function of trade and investment. Thus, unsurprisingly, FTAs routinely contain binding rules on both trade and investment. India's FTAs signed in the first decade of this century with countries such as Japan, Korea, Malaysia and Singapore are based on this economic logic. In addition to binding trade rules, they all contain an investment chapter with provisions for protecting investment. However, India departed from this model as part of its FTA 2.0 approach. In other words, India decoupled international trade law from international investment law. This is evident in its FTAs with Australia, Mauritius, and the UAE which contain binding trade but not investment rules.

India's approach seems to be to have separate agreements on trade and investment with the same country. This is most markedly seen in the case of the UAE. After signing the FTA with the UAE in 2022, New Delhi and Abu Dhabi entered into a bilateral investment treaty earlier this year. India follows a similar decoupling approach to the U.K., where trade and investment agreements are seemingly negotiated as two disparate treaties.

In this context, the India-EFTA FTA, which contains an investment chapter within the trade agreement, assumes pivotal significance. Can it be said that India has decided to move away from the decoupling of trade and investment law in its FTAs and is going back to the template followed in the early 2000s? It is too early to say that the India-EFTA FTA will be a bellwether for future FTAs.

FTA 3.0

India needs a clear FTA policy, especially in dealing with international trade and foreign investment laws. Suppose India expects not just trade but also higher investment flows from a particular country, which is undoubtedly true with most of its FTA-negotiating partners. In that case, two critical elements must be incorporated into its FTA policy. First, India should negotiate trade and investment as part of one comprehensive economic treaty. Decoupling trade from investment is not a good idea. Combining the two would give India a clear negotiating leverage to strike a beneficial deal. For example, India can argue that it needs more concessions in trade in return for offering something on investment or vice-versa.

Second, India should consider expanding the scope of investment issues from mere facilitation to effective protection, with an efficacious dispute settlement mechanism under international law. Providing enforceable legal protection to foreign investors under international law will boost their confidence.



"Education is the ability to listen to almost anything without losing your temper or your self-confidence." - Robert Frost

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ECONOMICS AND DEVELOPMENT

Modest rebound

CONTEXT: India's factory output growth slowed to 4.9% in March from a downgraded 5.6 % uptick in February, despite benevolent base effects from the previous year when the Index of Industrial Production (IIP) had shrunk 1.9 % .

Output from mines slid to a 19-month low growth of 1.2 %, while manufacturing growth picked up from 4.9 % in February to 5.2 %, still marking a five month-high. Electricity generation rose 8.6 % but over a contraction in March 2023. The National Statistical Office, which will release fresh GDP growth estimates for 2023-24 this month end, will thus factor in a 5.8 % uptick in industrial output through FY2023-24, moderately higher than the 5.2 % rise recorded in the previous year. Most of this annual increase came from mining, up 7.5 %, while manufacturing saw a milder pick up to 5.5 % from 4.7 % in 2022-23 and electricity generation growth eased to 7.1 %. Production growth was strongest for capital goods as well as infrastructure and construction goods for the second straight year — not surprising given the ramp up in government infrastructure spends to pump prime the economy till private capex recovers.

However, for private investments to take over the economy's growth engine, household consumption signals are critical and there is little comfort here for the second year in a row. Production of

consumer durables and non-durables rose just 3.6 % and 4 %, respectively, on top of a meagre 0.6 % and 0.7 % uptick in 2022-23. This matches with the 3 % growth estimated in private consumption spends over last year, and their production this March was still below pre-COVID levels. Hopes of an above-normal monsoon may prop up rural demand dented by last year's erratic rainfall, although tight credit conditions could impair urban consumption. As some economists have stressed, consumption recovery since the pandemic has been uneven, driven by demand for higher-end goods and services from upper-income households, while lower-income homes have turned reluctant spenders even for fast-moving consumer goods. Job creation and real wage growth for those already employed are imperative for a broad-based demand recovery that triggers private capex. The concern here is that employment-intensive manufacturing segments such as apparel, computers and electronics, furniture and leather products, have contracted in 2023-24, with weaker exports only explaining part of this downturn. The latest IIP data also reflect flagging momentum — growth slid to a three-quarter low of 4.9 % between January and March. The next government must prioritise addressing the broader challenges haunting hesitant consumers and reviving platforms for reticent investors to voice their concerns freely.



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POLITY AND GOVERNANCE

The poll promise of affordable housing

CONTEXT: India has around 1.7 million homeless people, as per the 2011 Census. Even for people with houses, the quality of build, congestion, and inadequate infrastructure remain major concerns.

Does India have a housing crisis?

According to a Government of India report in 2012, an estimated 18.78 million more houses were required to cater to the housing demand in the country. Post this, a study by the Indian Council for Research on International Economic Relations (ICRIER) in 2020 found that India's urban housing shortage rose by 54 % from 2012 to become 29 million in 2018. This included homeless populations, inadequate houses that could not be upgraded, obsolete houses and congested households. However, an analysis by the Centre for Social and Economic Progress of the 2011 Census data noted that coexisting with an urban housing shortage of 19 million units were 11 million vacant units. Seemingly, while houses are built, none of these cater to the class which needs it the most.

Per the government's definition, affordable housing properties are those with an area not more than 60 sq.m, with the price capped at ₹ 45 lakh.

In the first quarter of 2024, housing sales were at an all-time quarterly high, with 1.30 lakh units sold across the top seven cities. But in the new housing supply, it was mid-segment homes that continued to dominate with a 33 % share. Affordable housing was at a mere 18 % share. As reported by The Hindu, the share of affordable housing in overall sales during the first half of 2023 saw a sharp decline, to approximately 20 % — an 11-percentage point decrease as compared to the first half of 2022. In an interview with Al Jazeera, Abdul Shakeel, member of a housing civil society group in New Delhi, said, given the high cost of land and construction materials, "building low-cost houses for low-income people is not economically viable. The low-income class cannot afford the house unless the charges are subsidised." Urban congestion and lack of proper housing create another issue — slums. The 2011 census found that over 65 million people, about 5 % of India's total population, lived in slums.

What policies have been implemented?

A right to housing has been held to be a part of the fundamental right to life under Article 21 of the Constitution by the Supreme Court. The first policy intervention from the Government came in 1985, with the Indira Awaas Yojana, which was focused on rural housing. After 2004, urban housing came into focus with

programmes such as the Jawaharlal Nehru National Urban Renewal Mission (JNNURM), launched in 2005. In 2008, the Parekh Committee report on housing led to urban housing interventions such as the Rajiv Awas Yojana and Rajiv Rinn Yojna. The Housing for All schemes (2015-22) were launched once the Modi government came to power. The two wings under these are Pradhan Mantri Awas Yojana (Gramin) and Pradhan Mantri Awas Yojana (Urban).

What are PMAY-U and PMAY-G?

The Pradhan Mantri Awas Yojana-Urban was launched by Prime Minister Narendra Modi in June 2015 to tackle urban homelessness. The PMAY-U promised houses for 1.18 Cr. families by December 2024. As of March 2024, it has only achieved around 67 % of its target, that is, around 80 lakh.

The duration of the PMAY-U was initially seven years, from FY 2015-16 to FY 2021-22. It has now been extended up to December 31, 2024 — with all verticals except Credit Linked Subsidy Scheme — to complete houses sanctioned up to March 31, 2022. Around 83 % of the houses to be constructed under PMAY-U are not meant for the urban landless poor, but rather for families having access to capital and land. The slum rehabilitation scheme within PMAY-U has sanctioned only 2.96 lakh homes.

The PMAY-G was launched by the Modi government in 2016 with the aim of constructing 2.95 Cr. houses. The scheme offers ₹ 1.3 lakh for each unit constructed under the scheme, with a 60:40 funding split between the Centre and State. According to the PMAY-G dashboard, as of April 30, 2024, a total of 2.6 Cr. houses have been completed. According to data shared by the government, as of September 29, 2022, over 69 % of houses constructed under PMAY-G were either wholly or jointly owned by women. Both components of the PMAY combined received ₹ 80,671 Cr. in the interim budget.

What about State schemes?

States too have sought to introduce housing schemes. In the run-up to the polls, the Andhra Pradesh government has undertaken schemes such as the Navaratnalu-Pedalandariki Illu. Under this, the State had taken up construction of 21.76 lakh houses, with an outlay of ₹56,700 Cr. Of these, the construction of 7.43 lakh houses was completed as of October 2023, with the State reportedly acquiring more than 77,000 acres of land. The State was chasing a target of building 1.79 lakh homes by a deadline of March 2024. In a press release, it specifically mentioned that the government would register the houses in the names of women beneficiaries to empower them. This is in line with the increasing focus on women as an important voting bloc.

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