

## Are the unemployment numbers reliable?

(GS Paper 3, Indian Economy)

### Why in news?

- Recently, the National Statistical Office (NSO), which functions under the Union Ministry of Statistics and Programme Implementation, released the annual report on the basis of the Periodic Labour Force Survey (PLFS) conducted during July 2020-June 2021.



### Key Highlights:

- Though conducted amid the first lockdown, the survey said **unemployment rate saw a decrease from 4.8% in 2019-20 to 4.2% in 2020-21**, meaning that 4.2% of adults who looked out for jobs could not get any work in rural and urban areas of the country in 2020-21.
- In rural areas, the rate is 3.3% while in urban areas the unemployment rate was recorded at 6.7%.
- This report, which also gave details of internal migration, said 11.8 people out of 100 samples migrated to other States during the period of survey.

### What is the methodology of the PLFS?

- The fieldwork of PLFS was suspended twice during the survey in March 2020 and in April 2021 due to COVID-19.
- A **rotational panel sampling design** has been used in urban areas, which means each selected household in urban areas is visited four times. There was, however, no revisit in rural areas and the samples were drawn randomly in the form of two independent sub-samples.
- The PLFS gives estimates of key employment and unemployment indicators like, the Labour Force Participation Rates (LFPR), Worker Population Ratio (WPR) and Unemployment Rate (UR)

### Are there problem areas?

- Experts have raised questions over the approach and methodology of the PLFS.
- It is said that the PLFS or any such survey cannot produce decent data on migration. Only the 2021 Census, which has been delayed, is the correct method to find out the migration status of people.
- Another issue which is being flagged is that the PLFS cannot compare a normal year with an abnormal, pandemic-hit year.

- A second visit to the rural households could have provided a bigger and larger picture of unemployment that was not captured by the PLFS.
- By comparing the lower rate of economic growth during 2020-21 to the PLFS report on unemployment presents a contradiction as according to the Central Statistics Office, India's GDP growth fell over 7.3% during 2020-21.

### Why does the data matter?

- Historically, data collated by the Indian government agencies were well accepted globally. Though, of late, several questions have been posed on the data released by the Centre and various State governments.
- The country needs reasonable good data for evidence-based policies to address issues such as unemployment and farmers' distress. Governments need data to understand economic and social behaviour of the people.
- For example, if the survey says unemployment has decreased, there are chances that the government systems become lethargic in addressing the situation. According to researchers, even empirically, the employment and the quality of employment have come down.

### What happens next?

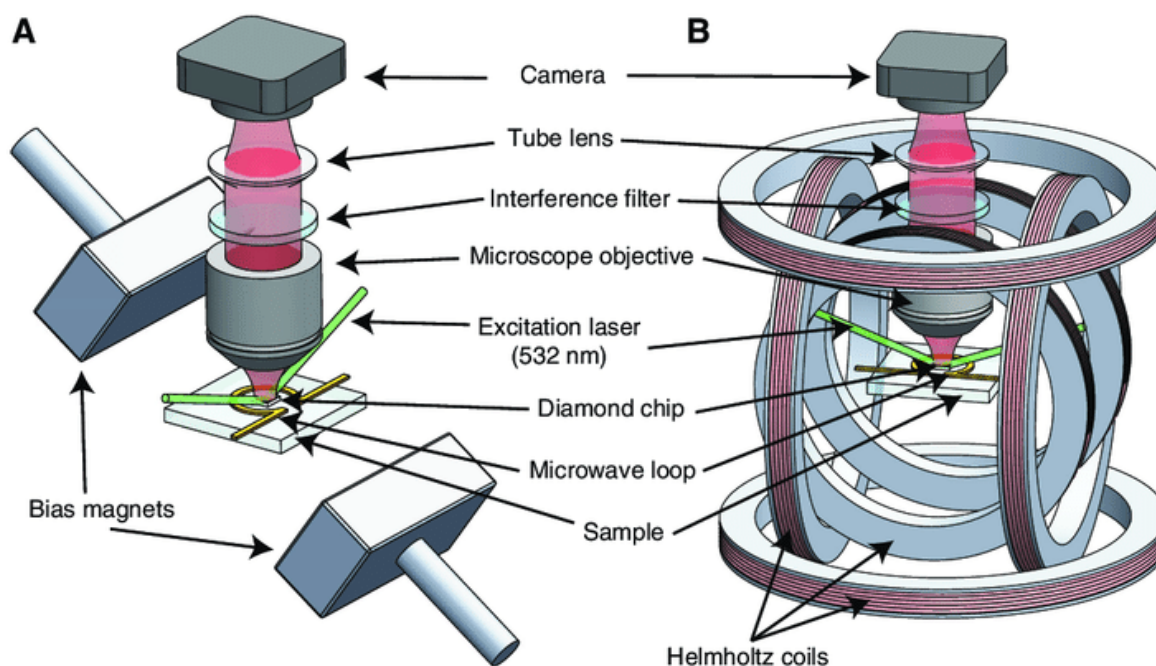
- The data is used basically for planning governmental intervention in various sectors such as agriculture, infrastructure, animal husbandry etc. For drafting any policy, data has to be used in a context. If the reality is not reflected in data, public may reject such data.
- In classical Keynesian terms, any rate of unemployment below 5% is not considered as unemployment.
- The report raised questions among experts and critics about its efficacy in formulating policies against unemployment and for creating quality employment.

## Quantum diamond microscope to image magnetic fields

(GS Paper 3, Science and Tech)

### Why in news?

- Researchers from the Indian Institutes of Technology (IIT) at Mumbai and Kharagpur have built a **microscope that can image magnetic fields** within **microscopic two-dimensional samples** that change over milliseconds.



### Potential:

- This has a huge potential for scientific applications, such as in **measuring biological activity of neurons and dynamics of vortices** in superconductors.
- This is the first time that such a tool has been built to image magnetic fields that change within milliseconds.

### **Capturing change:**

- The ideal frame rate to capture a changing magnetic field is one that captures data at twice the frequency of the changing field.
- Signals in nature exhibit a range of frequencies — magnetism in geological rock samples and rare earth magnets can be constant over months; magnetic nanoparticle aggregation inside living cells takes place in minutes; action potentials in neurons are fast, taking milliseconds, whereas precession of atomic spins in complex molecules takes only microseconds.
- The instrument that this team has built works in the millisecond range.

### **Nitrogen vacancy (NV) defect centre:**

- The key aspect of this sensor is a “nitrogen vacancy (NV) defect centre” in a diamond crystal.
- Such NV centres act as pseudo atoms with electronic states that are sensitive to the fields and gradients around them (magnetic fields, temperature, electric field and strain).
- During the measurement of ultra-small magnetic fields, the change in the fluorescence levels is extremely small and therefore, limits the imaging frame rate and degrades the signal-to-noise ratio of the measurement.
- In order to overcome this limitation, the researchers employed a “lock-in detection scheme” which selects light fluctuations of a small frequency range, rejecting others, and thereby improving the sensitivity to small changes in fluorescence.

### **Improved frame rates:**

- Earlier reported magnetic field imaging frame rates were close to 1-10 minutes per frame. This would increase to about half an hour per frame for challenging samples like biological cells.
- The instrument built by this group exhibits an imaging frame rate of about 50-200 frames per second, which would translate into a frame acquisition time of about 2-5 milliseconds.
- A special diamond crystal, one micrometre thick, embedded with a high density of such NV centres is created. This acts as a sensor when a thin two-dimensional sample is brought close to it — less than 10 micrometre.
- Using this technique, the researchers can image a 150 micrometre by 150 micrometre field of view, which is quite an achievement.

### **Way Forward:**

- The NV centre imaging technique is a unique tool in the context of imaging microscale magnetic field variations in any sample.

## **5G spectrum bands & telcos** **(GS Paper 3, Science and Tech)**

### **Why in news?**

- Recently, the Union Cabinet approved auction of 5G spectrum bands, and has **reserved a portion of airwaves for captive private networks**, a proposal opposed by telecom service providers.
- The auction of over 72 GHz of airwaves is set to be held by the end of July.

### **What set the ball rolling for 5G technology in India?**

- The Union government’s delay in auctioning off spectrum bands is a result of its rounds of consultations with various stakeholders to decide on bands that can be sold, block sizes, and the reserve price.
- The telecom service providers are ready to commercially roll out 5G to customers. In January, Reliance Jio said it completed next generation network coverage planning for nearly 1,000 cities in the country.
- A year ago, Airtel demonstrated 5G over a live commercial network in Hyderabad. Vodafone, before its merger with Idea, in 2017 said it had “upgraded entire radio network to all-IP technology, ready even for 5G”.

### **What are captive private networks and why do they need spectrum bands?**

- Private wireless networks are cellular networks built specifically for individual enterprises. These networks are often deployed at a single unit, for example a factory. They can also be used in a wide-area setting, for instance to monitor a mine in real-time.



- Airports and ports can also have their own private 5G cellular network to process imaging data coming from surveillance cameras to manage the facility. Several enterprises around the world are working on setting up private 5G networks as they offer reliable, fast, and secure wireless communication.
- According to an Economist Impact survey of 216 technology executives in Germany, Japan, the U.K. and the U.S., over half said they plan to deploy a private 5G network within six-24 months.
- The key reason driving this adoption is the need for greater data privacy and security. Unlike unlicensed Wi-Fi service available at several private places, licensed spectrum bands offer greater data privacy, security and faster connection speeds.

**Take the Call**

**WHAT TELCOS WANT**

**Adequate 5G spectrum supply at affordable rates**

**Min 100 units/ operator of 3.5Ghz spectrum, 800 units/ operator of millimetre waves**

**Speedy 5G trials, fast-track tower fiberisation & uniform RoW rules**

**Licence fees, SUC reduced**

**Telecom Sector debt at over ₹8.55 lakh cr**

**Govt to auction E & V spectrum bands to cut backhaul costs**

#### How does Industry 4.0 relate to 5G?

- Cellular technology has come a long way in the last four decades. Each generation has added a layer of sophistication over another starting with voice. Over the years, three generations of cellular airwaves enabled users to text, use Internet and view live-streaming video all at the same time.
- Unlike its predecessors, the latest wireless iteration opens a new paradigm in cellular connectivity. That's because the true benefits of 5G largely apply to industrial enterprises than individual users.
- Think about industrial AI-enabled robots on shop floors and warehouses, autonomous vehicles on the road, and mixed-reality headsets with advanced mobile applications that train workers.
- Each of these scenarios require high-speed computing using real-time data at low latency. This is at the core of the fourth industrial revolution where devices talk to each other to perform various tasks.
- Big tech firms like Google have been seeking direct allocation of spectrum to use in machine learning applications, connected devices and general AI advancement.

#### How does the government plan to set aside spectrum for private network operators?

- The Department of Telecommunications (DoT) has said that private firms can set up a 5G network by either getting a slice of public network from a licensed telecom company, establishing an isolated on premises network from the telecom service provider's spectrum, or obtaining spectrum directly from the Department of Telecom or by sub-leasing it from telcos.

- The notice inviting the offer also states that spectrum auction to private enterprises will follow after a demand study and based on TRAI's recommendation on pricing and modalities of block allocations.
- The telecom regulator expects its recommendations to result in increased sharing of network resources.

**Is it a setback for telcos?**

- The Cellular Operators Association of India (COAI) is of the firm view that “there is no justification whatsoever for allocating spectrum to industry verticals for operating private captive networks.”
- This stems from their concern that 5G technology has more industry use case than for individual consumers.
- So, telcos worry that providing industries 5G spectrum allocation to set up private networks will diminish their own revenue from the next generation of cellular services.