

GIST OF DOWN TO EARTH MAGAZINE

FEBRUARY 2022 EDITION

PART-II

**Important Articles
Simplified!**

**5-G Forest Reforms
Natural Farming**

India's New Star Rating System

Karewas Under Threat

**Battery Technology To Power India's
Clean Energy Ambitions**

**WTO TRIPS Waiver &
COVID-19 Vaccine Equity**



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1. 5-G Forest Reforms

Relevance

"GS 1 & GS 3: Physical Geography, Forest Resources, Environment"

Introduction

- The recently released India State of Forest Report (ISFR) 2021 shows the total forest and tree cover in India is 80.9 million hectares, which is 24.62 per cent of the geographical area of the country.
- According to ISFR 2021, India's forest cover has increased between the last assessment in 2019 and the latest in 2021 by a minuscule 0.16 million ha—a rise of a mere 0.2 per cent.
- The increase in forest cover has happened outside recorded forest area, or forest land under the control of state government's forest department.
- The biggest takeaway is, therefore, that forests with forest departments are not growing; and one-third of their land is not even fit for assessment. Forest cover is growing in spite of the government, not because of it.
- So we need fifth-generation forest reforms (5-G forest reform), which will secure forests for growth and livelihood.

History of Forest Management in the country

Forest management started in India with the colonial British government, which took away community lands and nationalised them.

- **Phase 1:** The forests were meant for extraction to aid the colonial government's economic exploitation of the country's resources.
- **Phase 2:** Started in the 1980s, when the Forest Conservation Act and its subsequent amendments were passed, centralising the "diversion" of forest land. The push for this was the growing awareness of the rate of deforestation in mid 1980s.
- **Phase 3:** Came with the mission for afforestation—first it was about growing trees outside forests, in the wastelands that were thought to exist across the country.
- **Phase 4:** Continues till today where forests are a permanent battleground. The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act (fra), 2006, has corrected a historical injustice, giving communities rights over the land they have been living on.

What is Carbon Stock

- It calculates the amount of carbon stored in biomass—in woody growing stock, in vegetation, in leaf litter and soil.
- According to ISFR 2021, initially, the Forest Survey of India (FSI) had only calculated the woody growing stock and extrapolated the vegetation to estimate forest carbon.
- According to ISFR 2021, there is a net increase of 79.4 million tonnes in carbon stock between 2019 and 2021.
- The bulk of the carbon stock—56 per cent—is in the soil as per this assessment.
- Trees Outside Forest (TOF) is 8.94 per cent of the country's geographical area and nearly 38 per cent of the carbon stock.

What should be the 5-G Forest Reforms?

- The 5-G forest reforms should be based on the learning from the past—we must shed reticence to plant what will be cut.
- The fact is that while the first phase of forest management in the country was extractive and exploitative, this 4th phase continues to be based on conservation to the extent that felling trees planted on one's own land has become a crime.

What should be the Future agenda for forests?

- Protection of the remaining very dense and ecologically significant forests is critical.
- Plan to cut and plant again on forest land with communities.
- End the license-raj on trees outside forests.

Conclusion

This in times when, on the one hand, there is a need for enhanced protection of the remaining forests for ecological security, and on the other, there is a crucial need to build the resilience of communities who live in these habitats—all in the times of increased risk because of climate change.



2. Natural Farming

Relevance

"GS 1: Agricultural Resources"

"GS 2: Government Policies & Interventions"

"GS 3: E-Technology in the Aid of Farmers"

Introduction

- In her budget speech, Finance Minister Nirmala Sitharaman reaffirmed the **Centre's commitment to natural, chemical-free, organic and zero-budget farming**. It is the third time in the last four budget speeches where **(zero budget) natural farming** finds a mention.
- Currently, just 2.7 per cent of the country's net-sown area is under organic and natural farming despite two decades of government efforts to upscale the practices.

How to scale up chemical-free farming?

- Focus on promoting natural farming in rainfed areas **beyond the Gangetic basin**.
- Enable automatic enrolment of farmers transitioning to chemical-free farming into the government's crop insurance scheme, **PM Fasal Bima Yojana (PMFBY)**.
- Promote microenterprises that produce inputs for chemical-free agriculture.
- Leverage NGOs and champion farmers who have been promoting and practising sustainable agriculture across the country.
- Beyond evolving the curriculum in agricultural universities, upskill the agriculture extension workers on sustainable agriculture practices.
- The government should facilitate an ecosystem in which farmers learn from and support each other while making the transition.

Key Benefits of Natural Farming

- Many scientific studies suggest that in the case of natural farming, yields may not always be high for all crops, but the benefit-cost ratio is several times higher than inorganic.
- Along with the minimised cost of production and premium prices for the produce, incomes and profits under natural farming are higher than conventional farming.
- Produce from natural farming fetches twice the income of conventional farming.
- The use of cheaper eco-friendly bio fertilisers also makes organic farming a low-cost alternative to chemical methods.
- Natural farming also improves the overall resilience of crops to adverse climatic conditions and improves energy and water efficiency. It also has the potential to reduce carbon emissions.
- The studies suggest that zbnf can help prevent over-extraction of groundwater, enable aquifer recharge and contribute to increasing water table.

How Natural Farming Keeps Soil Healthy?

- Healthy soils are the basis for healthy food production.
- The organic approach is better at ensuring soil macro-and micro-nutrients, organic carbon and rhizosphere microbiome.

- While mean organic carbon is highest in 91 per cent cropping systems with an organic approach, macro-nutrients like nitrogen, phosphorus and potassium are higher in 42 per cent cropping systems.
- Soil micronutrients like iron, manganese, zinc and copper are also higher (by 76 per cent) with the organic approach.
- Organic farming may address both emissions avoidance and carbon sequestration.
- Soil health and fertility, macro and micronutrients, soil organic carbon, soil enzymes, earthworms, soil respiration and microbial biomass increase after the adoption of natural farming and Zero Budget Natural Farming.

Way Forward

- It is important that the **country's larger scientific community**, trained in chemical-based agriculture, does not outrightly reject the evidence in favour of natural farming, due to any bias and instead carefully review results of the work done by its scientific colleagues in different parts of the country.
- It is also important that the advantages of organic and natural farming should not be evaluated only on the basis of yield.
- The benefits of organic farming related to profitability and sustainability strongly outweigh those with inorganic approaches.
- The existing programmes to support organic and natural farming should therefore be scaled up, expanded and properly funded. Develop a roadmap that sets the long-term agenda for the **adoption of agro-ecological approaches** across different parts of the country in view of its holistic benefits such as nutrition, livelihood of farmers, natural resource conservation, biodiversity, resource efficiency, soil-health, disease resilience and mitigation of climate crisis.
- This roadmap should also consider mechanisms for incentivising farmers to adopt agro-ecological practices such as payments for ecosystem services, and specifically focus on supporting farmers during the transition to organic and natural farming through technical and financial support.
- There is an urgent need for a targeted, ambitious and well-funded nationwide programme to drive the change. This includes bringing together ministries and programmes; outlining the centre-state relationship in terms of funds.

3. India's New Star Rating System

Relevance

"GS 3: Environmental Impact Assessment (EIA)"

Introduction

- Recently, the Union Ministry of Environment, Forests and Climate Change has decided to rank states on the basis of efficiency and timelines in the grant of environmental clearances.
- According to the star rating system, the **State Environment Impact Assessment Authority (SEIAA)** which clears projects in the shortest period of time, has a high rate of clearance, and seeks fewer "essential details" will be ranked the highest.

What is the star rating system?

- The ranking system is based on the provisions of the **EIA (Environment Impact Assessment) Notification 2006** and various guidelines issued by the ministry from time to time, which are designed to encourage the SEIAAs to increase their efficiency in decision-making strictly as per provisions of the EIA Notification 2006 without diluting any regulatory safeguards.
- Under the proposed changes, **SEIAAs will be ranked for the average time taken to clear proposals.**
- If agencies, on average, clear proposals within 80 days, they will be awarded two marks. If they take over 105 days, they are awarded one mark, if they take 105-120 days, the state authority will be awarded 0.5 mark and if they take more than 120 days, they will get zero.
- However, the agencies will not be receiving any **negative marks** no matter the time taken.
- The agencies will also not count the time taken after clarifications regarding the proposal have been sought from the respective parties.
- Apart from the time taken, agencies will be marked on six other criteria, including the number of site visits, and the percentage of EC proposals disposed of within six months.
- The score will be compiled and a rating out of five stars, given.

About SEIAAs

- The SEIAAs are responsible for providing environmental clearance for a bulk of the infrastructure, developmental and industrial projects.
- Their main purpose is to assess the impact of the proposed project on the environment and people, and to try and minimise this impact.

Arguments in Favour

- The government says that this system will **incentivise state agencies** to process environmental clearances for projects in a fast and efficient manner without diluting any safeguards.
- This is intended as a mode of **recognition and encouragement** as well as for **promoting improvements** where needed.
- Star rating has been adopted to incentivise **self-environmental compliances.**

What are the drawbacks?

- Critics and environmentalists say that the pressure on state agencies for granting clearances faster will lead to **hasty actions and without proper review**.
- These changes along with the slew of legal amendments that the government has introduced to environmental laws over the past year have threatened to dilute **India's already fragile environmental protections**.
- Easier compliance requirements and faster processing of proposals can create a situation where projects can do **considerable harm to the environment**, say, critics.
- It creates a situation where you are not providing the time needed to make these decisions carefully.
- It also creates artificial competition between states, which may result in industries locating in states that offer environmental clearance quicker.
- According to critics, this pressure of speed, efficiency and incentivisation is going to skew **environmental governance** and make it pro-business.



4. Karewas Under Threat

Relevance

"GS 3: Climate Change, Environmental Pollution & Degradation"

Introduction

- The Kashmir valley is an **oval-shaped basin**.
- It is an **intermountain valley** fill, comprising of unconsolidated gravel and mud. A succession of plateaus is present above the Plains of Jhelum and its tributaries.
- These plateau-like terraces are called **Karewas or Vudr** in the local language.
- These plateaus are **13,000- 18,000 m-thick** deposits of **alluvial soil and sediments like sandstone and mudstone**.
- Anthropogenic erosion for a couple of years has reduced these plateau lands into ugly ravines.

Key Concern

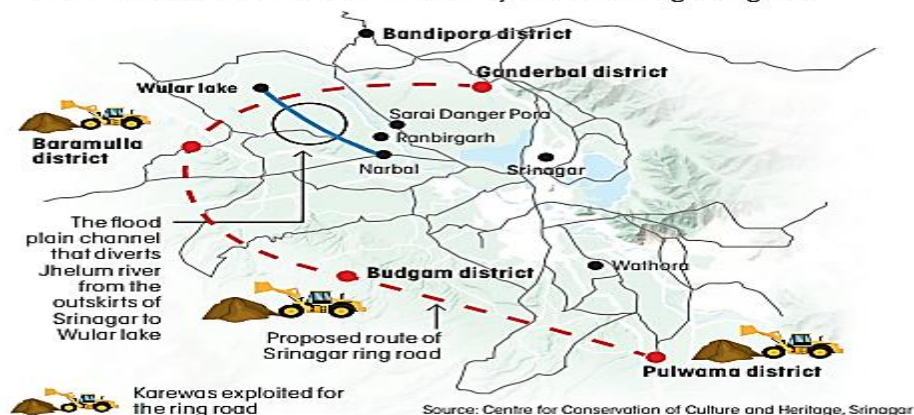
- People in the area destroying these **Karewa(highlands)/tablelands** at the cost of development ignoring the geological and aesthetic significance of these formations.
- The rich fertile soil is being used for landfill purposes at construction sites which is not only wastage of resource, but a threat taking into account the high **seismic zone** our Valley falls into.

Ecological Harm

- The destruction of the karewas has also led to the enormous accumulation of **silt in the Jhelum river**, which runs parallel to the **Pir Panjal**, and its 42-km-long flood spill channel that runs between **Padshahi Bagh** in the outskirts of Srinagar and **Wular lake** in north Kashmir through **Hokersar wetland reserve**.
- Siltation occurs due to the degradation of catchment areas, which is caused by deforestation and changes in land use, such as clay mining.
- This has reduced the capacity of the flood spill channel from 481,440 litres of water per second to 169,920 litres per second. As a result, the capital city experienced massive floods in 2014, after a break of almost nine decades.

POOR CALL

Instead of destroying karewas, the government should desilt the Wular lake and its flood channel and use the clay to build Srinagar ring road



Home To Unique Biodiversity

- The karewas are home to unique biodiversity.
- The famous **almond orchids** are best grown in the soils of karewas.
- In fact, the agriculture of the valley dominantly survives and sustains on **Karewa soils**.
- They are ideal for the cultivation of **saffron, almonds, apples** and several other cash crops.
- The world-famous **saffron from Pampore and apples from Shopian** are best examples.

Way Forward

- We can't afford to see our national heritage plundered and thus the Govt must immediately call upon NHA to ensure no soil excavation is done around Karewas during Ring Road construction.
- Let the Govt explore soil excavation from flood spill channel and wullar embankments which is the need of the hour.
- These places need immediate desilting as the same will save us from floods as well. Even if the muck or silt is having moisture content in it, let the same be dumped at various locations so that it gets dry and can be used later on.
- United Nations Educational, Scientific and Cultural Organization (UNESCO) has designated Srinagar as a part of UNESCO Creative Cities Network (UCCN), it is the duty of the Govt to ensure every bit of heritage in and around Srinagar is protected. This includes Karewas as well.

Conclusion

We need to preserve this geological treasure and legacy for generations to come. Government has to give special attention for preventing the destruction of these special treasures of Kashmir; else the results will be deleterious in the future.



5. Battery Technology To Power India's Clean Energy Ambitions

Relevance

"GS 3: Growth & Development, Government Policies & Interventions"

Introduction

Technologically sound Batteries (with greater storage capacity) can play a crucial role in helping India achieve its target of having **450 gigawatts of renewable energy from solar and wind by 2030**.

Types of Batteries

- Currently across the world, four types of batteries are in use: **lead-acid, lithium-ion (including variants), nickel-metal hydride and vanadium ion batteries**.
- While lead-acid and lithium-ion batteries are the only two currently available in the Indian market, several other technologies like **vanadium redox, metal-air, metal-ion and liquid metal batteries** are also being explored for application across sectors.

POWER PLAY

The myriad energy applications may require different battery types, resulting in a technology mix in the market



Note: *Costs estimated in relation to current costs of lithium-ion batteries * information on sodium-ion batteries from Faradion, aluminium-air from Phinergy, multi-ion from Gegadyne Energy, liquid-metal from Ambri and vanadium redox flow from Invinity
Sources: Company websites, scientific studies, expert comments

Lead-Acid Batteries harms the Environment

- Lead-acid batteries have been in use for long, and continue to be an economical option with supply chains already in place.
- However, they pose a potential threat to health and the environment if improperly discarded.
- According to the **World Health Organization**, lead is a naturally toxic metal, which if ingested or inhaled in large quantities can cause anaemia, brain and organ damage and even death.
- The **UN Environment Programme**, lead is also a pollutant, and improper disposal or recycling of batteries can dispel toxic fumes in the air, soil and water.

Qualities of Lithium-ion batteries

- It is considered a cleaner option when compared with lead-acid batteries.
- Lithium-ion batteries have a density of 100-265 Wh per kg.
- This ability to achieve higher energy densities allows its use in smaller batteries, making it attractive for electric vehicles.
- This is why the global battery market has been dominated by lithium-ion batteries.
- The Centre in 2021 approved Rs 18,100 crore Production Linked Incentive Scheme for manufacturing, export and storage of lithium-ion cells.

Limitations of lithium-ion battery

- The lithium-ion battery also has limitations. It is expensive, with reserves localised only in certain parts of **Chile, Australia, Argentina and China**.
- It has some environmental costs by way of mining.
- Also, these batteries run the risk of exploding if they overheat.
- China controls 80 per cent of the world's lithium refining and 77 per cent of the world's cell capacity.

Sodium Batteries

- Sodium-ion batteries have three essential components: a negatively charged anode made up of **hard carbons**; a **positively charged cathode constituting sodium-containing layered materials**; and an **electrolyte** that allows electrons to move.
- They work in a similar manner to lithium batteries.
- When the batteries are in a charging state, **sodium atoms in the cathode** become ions by releasing electrons.
- These ions flow through the electrolyte while the electrons move through an external circuit to reach the anode.
- During the discharge state, the reverse happens—from **anode to the cathode**.

Factors that influence the growing favourability of sodium over lithium

- The element is abundant in nature—the Earth's crust has 2.9 per cent of the element while lithium's share is only 0.01 per cent.
- Sodium can be found naturally in seawater and also mined from soda ash.
- The cost of extracting sodium is at least 20 per cent lower than lithium.
- Sodium is also relatively safer than lithium.

Limitations of sodium batteries

- Like lithium, sodium-ion batteries also use organic electrolytes that are flammable.
- It is possible to make the batteries safe by modifying their chemistry.
- Sodium also falls short in terms of energy density, thus making it difficult to make small batteries for use in electric vehicles.

Way Forward

- Now our focus should be on exploring **batteries' potential for stationary energy storage**.
- An element like **vanadium** will help here. Vanadium outperforms lithium in safety and scalability and can last for 15-20 years as against the latter's lifespan of four-five years.
- It is naturally present in 65 different minerals and makes up over 20-megawatt hours of installed storage capacity globally.
- Any new battery technology for storage, when introduced, will need to be evaluated in the real world.

Conclusion

India should strengthen its battery ecosystem by forging ties between scientists and industry and raising funding. The focus should also be on building a robust recycling system. The country can fulfil one-third of its future battery needs by recycling discarded lithium-based gadgets.



6. WTO TRIPS Waiver and COVID-19 Vaccine Equity

Relevance

"GS 3: Health, Intellectual Property Rights (IPRs)"

Introduction

- In **October 2020**, India and South Africa had submitted a proposal to the **World Trade Organization (WTO)**, suggesting a **waiver of certain provisions of the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement for the "prevention, containment and treatment of COVID-19"**.
- The proposal seeks the waiver of "the implementation, application, and enforcement of **sections 1, 4, 5 and 7 of part II of the TRIPS agreement**", which are stipulations referring to copyright, industrial design, patents, and undisclosed information (trade secrets).
- The proponents of the proposal argue that a waiver will enable timely and equitable access to affordable health products and technologies, including vaccines.

About TRIPS and exceptions

- TRIPS, a comprehensive multilateral agreement on Intellectual Property (IP), was an outcome of the **Uruguay Round (1986–94) of negotiations of the General Agreement on Tariffs and Trade (GATT)**.
- The Agreement came into force on **1 January 1995** and offers a minimum standard of protection for Intellectual Property Rights (IPR).
- In WTO, IPR are divided into two main categories. First, **copyright and related rights (Articles 9 to 14, Part II of the TRIPS Agreement)**.
- Second, **industrial property** that includes trademarks, geographical indications, industrial designs, patents, integrated circuit layout designs, and undisclosed information (**Articles 15 to 38, Part II of the TRIPS Agreement**).
- **Article IX.3 and IX.4 of the Marrakesh Agreement** establishing the WTO deals with TRIPS waivers. Article IX.3 says that in "exceptional circumstances" the Ministerial Conference may waive off an obligation imposed on WTO member countries.
- Such a decision requires the support of three-fourths of the WTO membership.
- According to Article IX.4, any waiver granted for more than one year will be reviewed by the **Ministerial Conference**.
- The TRIPS Agreement provides some flexibility primarily in the form of compulsory licensing and research exceptions through **Articles 30 and 31**.
- While Article 30 permits WTO members to make limited exceptions to patent rights, Article 31 provides a detailed exception, provided certain conditions are met.
- Compulsory licensing is the process of granting a license by a government to use a patent without the patent holder's consent.
- Article 31 permits granting a compulsory license under circumstances such as "**national emergencies**", "other circumstances of extreme urgency", "**public non-commercial use**", or against "**anti-competitive**" practices.
- In addition to these original waivers, the Declaration on the TRIPS Agreement and Public Health, adopted at the 2001 Doha Ministerial Meeting, also recognises some exceptions, for instance, in situations of a public health emergency, member countries have the freedom to determine the grounds upon which compulsory licenses are granted.
- Similarly, under Article 66.1, the **least developed countries (LDCs)** are given waivers for implementing TRIPS on pharmaceuticals till **1 January 2033**.

COVID-19 and Need of a TRIPS Waiver

- Two significant factors rekindled the debate on TRIPS waiver for essential medical products—first, vaccine inequity, and second, the insufficiency of existing waiver provisions in fighting the COVID-19 pandemic.
- COVID-19 is an exceptional circumstance, and equitable global access to the vaccine is necessary to bring the pandemic under control. However, the world is witnessing quite the reverse, i.e., **vaccine nationalism**.
- Vaccine nationalism is “**my nation first**” approach to securing and stockpiling vaccines before making them available in other countries.
- A TRIPS waiver would be instrumental in addressing the growing inequality in the production, distribution, and pricing of the COVID-19 vaccines.

How Vaccine Inequity can weaken the fight against Covid-19?

- Vaccine inequity is not only morally indefensible but also clinically counter-productive.
- Allowing most of the world’s population to go unvaccinated will also spawn new virus mutations, more contagious viruses leading to a steep rise in COVID-19 cases.
- Such a scenario could cause twice as many deaths as against distributing them globally, on a priority basis.
- Preventing this humanitarian catastrophe requires removing all barriers to the production and distribution of vaccines. TRIPS is one such barrier that prevents vaccine production in LMICs and hence its equitable distribution.

Argument Against the Proposed TRIPS Waiver

- The TRIPS Agreement includes several provisions which mandate the promotion of technology transfer from developed countries to LDCs.
- Another argument against the proposed TRIPS waiver is that a waiver would not increase the manufacturing of COVID-19 vaccines.
- Further, a TRIPS waiver will not automatically translate into improved manufacturing capacity.
- A mere patent waiver may not be enough to address the issues related to its production and distribution. What is more important here is to share the technical know-how and information such as trade secrets.

Conclusion

In short, the proposed waiver, if agreed, will help India in addressing the public health crisis by producing more vaccines and distributing them at home; economically, by boosting its generic pharmaceutical industry, and diplomatically, providing vaccines to the developing and least-developed countries. Therefore, India should use all available means and methods, from trade-offs to pressurising, to make the waiver happen.

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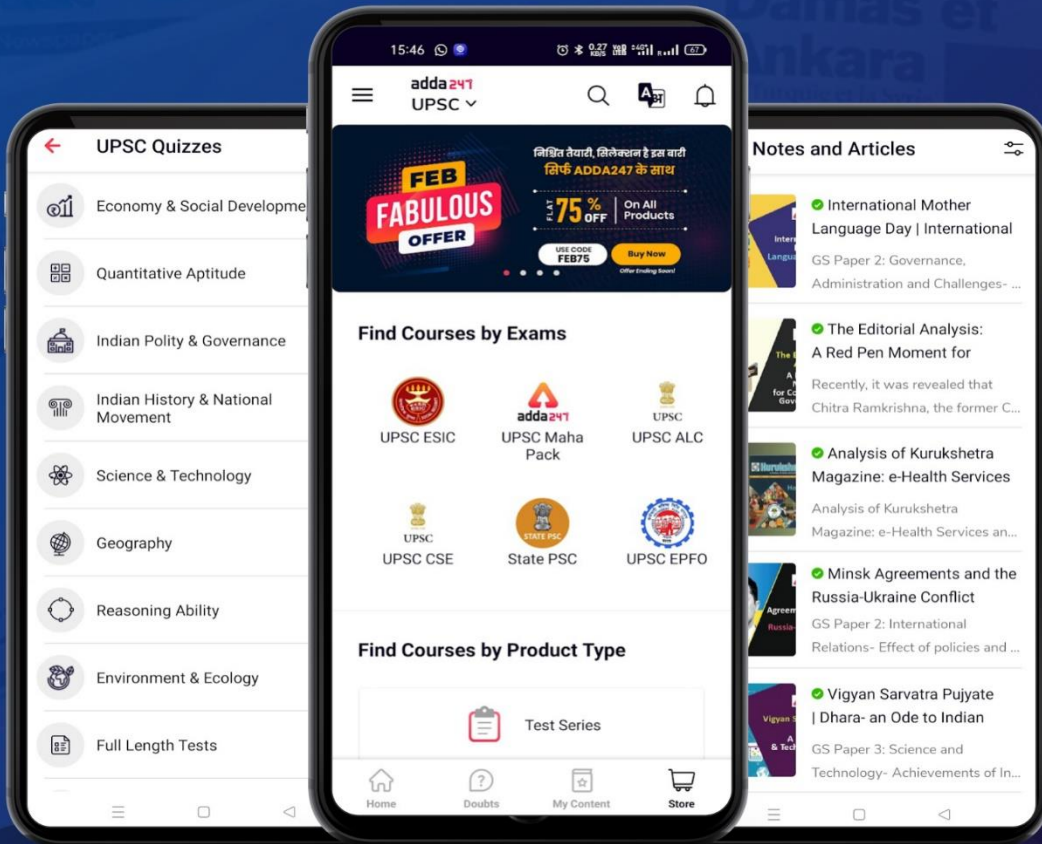
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