

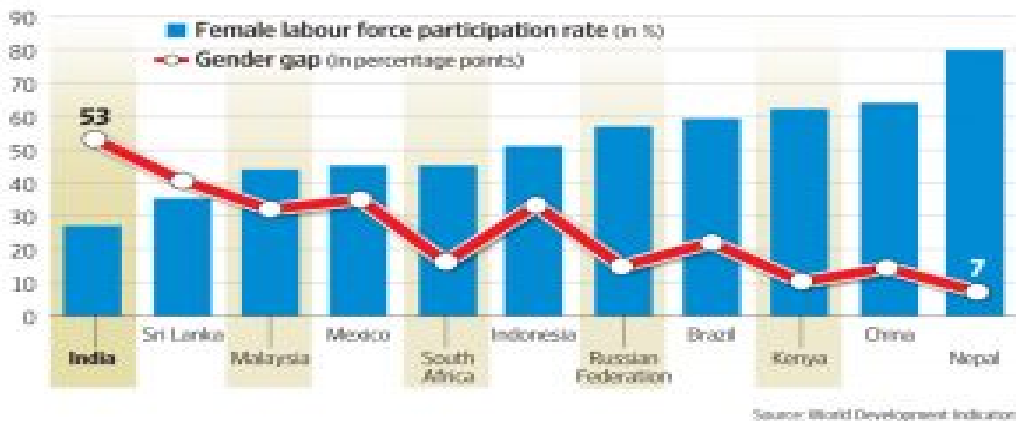
UPSC CURRENT AFFAIRS NOTES 26-10-2023

Women, Marriage and Labour Force Participation

Participation in the labour market by women is correlated with improved economic prospects and increased decision-making power at home.

Macroeconomically, women's intra- and inter-household bargaining power as well as the country's overall economic growth are significantly impacted by a lower level of women's labour force participation rate (LFPR).

MISSING WOMEN



Labour Force Participation Rate (LFPR)

LFPR is defined as the percentage of persons in labour force (working or seeking or available for work) in the population.

The female labour force participation rate (FLFPR) is the percentage of working-age women currently employed or seeking employment.

Worldwide Trend in Female Labour Force Participation

Globally the level of female labour force participation remains relatively low.

World Bank estimates (2022) show that the worldwide LFPR for women was **47.3%** in 2022. Despite the remarkable advancements observed in the global economies, there has been a persistent decline in the LFPR of women in developing nations.

Hence, a significant disparity in labour market participation based on gender continues to persist worldwide.

The Periodic Labour Force Survey (PLFS) Data for Women in India

The PLFS data indicates that for women in the working age group (15-59 years), LFPR is only **35.6** per cent in India.

The participation rate stands at 39.3 per cent and 26.5 per cent, respectively, in rural and urban areas in 2021-22. However, from 2017 to 2021, women's LFPR increased relative to men, particularly in rural areas.

The estimations also indicate that female labour force participation in India between 1990 and 2022 has decreased from 28% to 24%.

This fall has obstructed their growth and hindered their ability to achieve their maximum capabilities.

Reason Behind the Decline/Low Participation Rate of Women in Labour Force

Movement of Production

Economist Goldin (1994) highlights that LFPR of adult women exhibits a U-shaped pattern during economic growth.

Further, she added that the initial decline in the participation rate is due to the movement of production from the household, family farm, and small business to the wider market.

Marriage

The issue becomes worse when married women express a desire to participate in the labour market.

After marriage, there is a tendency for women's LFPR to decrease due to many variables.

According to the PLFS data (25 to 49 years), it becomes apparent that married women show a considerably lower employment proportion under the Usual Principal Status (UPS) when compared to the Usual Principal and Subsidiary Status (UPSS).



The decline in the female LFPR is primarily concentrated within the age group of 25-29.

Problems Faced by Married Women

Increasing Family Obligations: Women's limited educational qualification and less mobility result in increasing family obligations, and societal disapproval associated with women in employment outside the domestic sphere.

Marriage Further Amplifies Domestic Obligations: The institution of marriage amplifies domestic obligations for women, at the same time imposing many social and cultural barriers that affect their participation in the workforce.

Societal Factors

Several other societal factors contribute to limited labour participation for women, such as their religious and caste affiliations, geographical location.

The wealth of their household, and prevailing societal norms surrounding women's employment outside the house also have effect on women's participation in the labour market.

Some Other Challenges Faced by Married Women

When women decide to resume their professional careers upon marriage, they tend to exhibit a preference for some employment opportunities that offer enhanced flexibility and are situated near their residences.

Women also encounter gender-asymmetrical professional costs as a result of several societal constraints.

It leads to gender disparities in premarital career selections, income inequality, age at marriage, and decisions about fertility.

It has been observed that women of the upper strata tend to adhere to stringent societal standards by predominantly assuming domestic roles.

Women from the lower strata are more inclined to engage in the labour market, primarily driven by economic constraints that stem from poverty.

Women lacking literacy skills demonstrate a greater inclination to participate in the labour force after getting married, as opposed to their well-educated counterparts.



Empirical analysis that relates to the allocation of female labour across diverse industry sectors in India demonstrates that agriculture remains the prevailing sector in terms of female employment.

Solutions to Promote Greater Participation of Female in Labour Market

Enhance the Quality Day Care Services

The absence of adequate day-care services frequently acts as a disincentive for female labour force participation.

Therefore, it is imperative to enhance the quality and accessibility of day-care services/crèches for employed women across various socio-economic strata, encompassing both formal and informal sectors.

The government has launched initiatives such as the National Creche Scheme for The Children of Working Mothers.

The implementation of such schemes is imperative in both the public and private sectors.

This is particularly important in increasing the involvement of married women in the labour field.

Also, the implementation of work settings that prioritise the needs and well-being of women, the provision of secure transportation options, and the expansion of part-time job possibilities would serve as catalysts for the greater participation of women in the labour market within India.

Vajra mushti kalaga

Vajra mushti kalaga, a martial art form, has gone extinct and takes place only during Dasara. It is a unique Indian martial art that incorporates various techniques of hand-to-hand combat like grappling, wrestling, and striking.

Vajra Mushti, which literally means **Thunderbolt Fist**, is characterised by the utilization of a knuckleduster, a small metal weapon.

The knuckleduster, also known as Vajra Mushti, is usually made of animal horns and worn on the knuckles of the fighter.

The main objective of this Indian martial art form is to neutralise the opponent and counter his weapon.



It is a form of wrestling different from conventional grappling and entails two jettys taking a swipe at each other's heads with a knuckleduster.

Whoever draws the blood from the opponent's head first is declared the winner.

This form of wrestling was popular during the period of the Vijayanagar rulers, who reigned between the 14th and the 17th centuries.

The fight is real, and the jetty's make all efforts to draw blood from the opponent's head, and a referee intervenes upon noticing the first drop.

Mediaeval travellers from Portugal noticed this form of wrestling during the Navaratri celebrations in Vijayanagar empire and have left detailed accounts of it.

PRAGATI

The 43rd edition of PRAGATI, chaired by the Prime Minister, involved a review of eight projects that are crucial for various states in India.

Eight projects were reviewed during the meeting, falling into the following categories:

Four projects related to water supply and irrigation.

Two projects focused on expanding national highways and connectivity.

Two projects involved rail and metro rail connectivity.

These projects spanned across seven states in India, namely Bihar, Jharkhand, Haryana, Odisha, West Bengal, Gujarat, and Maharashtra. The cumulative cost of these projects amounted to approximately Rs. 31,000 crore.

The Prime Minister highlighted the importance of using technology, particularly the PM Gati Shakti National Master Plan Portal and satellite imagery, to address issues related to project implementation and land requirements.

In high population-density urban areas, the Prime Minister advised stakeholders to appoint nodal officers and establish teams to enhance coordination among various parties involved in project execution.



The Prime Minister reviewed the progress of 'Mobile Towers and 4G Coverage' under the Universal Service Obligation Fund (USOF) projects. The goal is to provide mobile coverage to 33,573 villages with 24,149 mobile towers.

The Prime Minister emphasized the need to set up mobile towers in all uncovered villages within the current financial year, ensuring comprehensive mobile coverage in remote areas.

PRAGATI

PRAGATI, which stands for "Pro-Active Governance and Timely Implementation," is an ICT-based platform that serves as a tool for intergovernmental coordination and project monitoring.

The platform was launched by the Government of India in 2015, and its primary purpose is to streamline governance and expedite the implementation of critical projects.

Key features and objectives of PRAGATI include:

Interdepartmental and Intergovernmental Coordination: PRAGATI facilitates discussions and coordination between various central and state government departments. It brings together top government officials to discuss and resolve issues related to projects and initiatives.

Timely Implementation: The platform's primary goal is to ensure that important projects are executed in a timely manner. It helps identify bottlenecks and challenges that might hinder project progress and works to address them promptly.

Monitoring Progress: PRAGATI provides a centralized dashboard that enables real-time monitoring of project progress. This helps in tracking the status of various projects and identifying areas where intervention is required.

Transparency and Accountability: PRAGATI promotes transparency in government operations by making information on project status and discussions accessible to concerned officials. It encourages accountability in meeting project deadlines and resolving issues.

Addressing Public Grievances: The platform can also be used to address grievances and complaints submitted by the public regarding government services and projects. It allows for swift resolution of such issues.

Paperless and Digital: PRAGATI is an ICT-based system, and it promotes a paperless approach to governance. It reduces the need for physical files and paperwork and streamlines communication through digital means.

PRAGATI is a valuable tool for the Government of India to enhance governance efficiency, foster collaboration between different levels of government, and expedite the implementation of key projects for the development of various regions in the country. It reflects the government's commitment to improving public administration and service delivery.

FERTILIZERS SUBSIDY

The Indian government has approved a subsidy of ₹22,303 crore for Phosphatic and Potassic (P&K) fertilizers for the Rabi season from 1st October 2023 until 31 March 2024. This subsidy is aimed at supporting farmers by ensuring the availability of essential fertilizers at affordable prices.



Fertiliser subsidy
(₹ trillion)



Average landed cost of import
(\$ tonne) y-o-y change



Source: Fertilizer ministry budget estimate



By subsidizing these essential fertilizers, the government aims to shield Indian farmers from the impact of rising international prices and ensure their continued access to these vital agricultural inputs.

Fertilizer Subsidy

Fertilizers are essential inputs for enhancing the productivity and profitability of agriculture. However, fertilizers are also costly and often unaffordable for small and marginal farmers. Therefore, the government provides subsidies for fertilizers to make them accessible and affordable for farmers.

A fertilizer subsidy is a financial support provided by the government to the agricultural sector for the purchase of fertilizers. In India, agriculture is a vital sector employing a significant portion of the population.

Background of Fertilizer Subsidy in India

The fertilizer subsidy in India has a long history, dating back to the 1960s when the Green Revolution was launched to boost food production and self-sufficiency.

Initially, the subsidy was given to the fertilizer industry to encourage domestic production and reduce import dependence. Later, the subsidy was shifted to the consumers, i.e., the farmers, to reduce the burden of high fertilizer prices.

The fertilizer subsidy in India has two components: urea subsidy and nutrient-based subsidy (NBS). Urea is the most widely used nitrogenous fertilizer in India, accounting for about 80% of the total consumption. Urea is sold at a statutorily notified uniform maximum retail price (MRP).

The Nutrient Subsidy (NBS) scheme was introduced in 2010 to replace the earlier administered pricing system for decontrolled phosphatic and potassic (P&K) fertilizers. Under the NBS scheme, the government fixes a per kg subsidy rate for each nutrient, i.e., nitrogen (N), phosphorus (P), potash (K) and sulphur (S), based on their nutrient content, international and domestic prices and exchange rate.

The manufacturers/importers/marketers are free to decide the MRP of P&K fertilizers at reasonable levels. The subsidy is paid to them on receipt of fertilizers in district warehouses.



Key features of the fertilizer subsidy

The fertilizer subsidy is one of the largest subsidies given by the central government, accounting for about 10% of its total expenditure on subsidies.

It is also one of the most volatile subsidies, as it depends on various factors such as international prices, exchange rates, domestic demand and supply, etc.

It is highly skewed towards urea, which accounts for about 70% of the total subsidy, while P&K fertilizers account for about 30%. This creates an imbalance in the use of NPK nutrients, leading to soil degradation and low crop response.

The government provides subsidies either directly to farmers or fertilizer manufacturers. This direct support aims to reduce the overall cost of fertilizers for farmers, making them more affordable and accessible.

Subsidies play a crucial role in stabilizing fertilizer prices. By reducing the cost burden on farmers, subsidized fertilizers become more affordable, ensuring price stability. This stability is essential for farmers' financial planning and agricultural productivity.

The government regulates both the distribution and pricing of fertilizers. Regulation helps prevent hoarding and black marketing, ensuring that subsidized fertilizers reach the farmers without market distortions.

Significance of Fertilizer Subsidy

The fertilizer subsidy has played a crucial role in enhancing food security and agricultural growth in India by increasing crop yields and reducing dependence on imports.

It has contributed to poverty reduction and rural development by improving farm incomes and the livelihoods of millions of farmers.

It has helped to maintain macroeconomic stability by reducing the fiscal deficit and current account deficit through lower imports and higher exports of agricultural commodities.

It has supported the domestic fertilizer industry by providing incentives for production, investment and innovation.



Impact of Fertilizer Subsidy

Fiscal Impact

The fertilizer subsidy puts immense pressure on the government's finances, as it accounts for about 0.7% of GDP. This strain can lead to fiscal deficits, impacting overall economic stability.

Often, the actual subsidy payout surpasses the budgeted amount due to various factors, causing fiscal slippages. This can lead to unplanned expenditures and financial instability.

The heavy allocation to fertilizer subsidies can crowd out investments in crucial sectors like irrigation, research, and agricultural extension services. This affects the overall development of the agricultural sector.

Economic Impact

Subsidies can distort market prices by artificially lowering the cost of fertilizers. This distortion affects the efficient allocation of resources, leading to imbalances in supply and demand in the agricultural sector.

Subsidies can create inefficiencies in the market by encouraging smuggling, adulteration, and hoarding. These activities disrupt the market equilibrium and hinder fair competition.

Heavy subsidies can discourage innovation in fertilizers and related technologies. The lack of competition due to subsidized products can stifle advancements in the agricultural input industry.

Social Impact

The subsidy benefits large and medium-scale farmers' more than small and marginal farmers due to better access and awareness. This creates disparities among farmers, exacerbating existing social inequalities.

While subsidies reduce input costs for farmers, they can increase food prices for consumers. This occurs as farmers, facing lower input costs, might not reduce the prices of their produce, leading to inflated food prices.



Environmental Impact

Excessive use of certain fertilizers, especially urea, can lead to soil degradation, reducing soil fertility and productivity in the long term.

Overemphasis on certain types of fertilizers due to subsidies can create nutrient imbalances in the soil, adversely affecting crop health and yield.

Runoff and leaching of excess fertilizers contaminate water bodies, leading to water pollution. This can harm aquatic life and impact human populations reliant on these water sources.

Certain fertilizers release greenhouse gases such as nitrous oxide, contributing to climate change and environmental degradation.

Steps Taken to Reform Fertilizer Subsidy

Introducing the Nutrient Based Subsidy (NBS) scheme in 2010 to rationalize the subsidy on P&K fertilizers and encourage balanced use of nutrients.

Implementing the neem coating of urea in 2015 to improve the efficiency and effectiveness of urea and reduce its diversion and black marketing.

Launching the direct benefit transfer (DBT) system for fertilizer subsidy in 2018 to ensure timely and transparent payment of subsidy to the manufacturers/importers based on actual sales to farmers through point of sale (PoS) devices.

Increasing the subsidy rates for NBS nutrients in 2021 and 2022 to ensure adequate availability and affordable prices for farmers despite the uptrend in the international market.

Converting the existing village, block/sub-district/taluk and district-level fertilizer retail outlets into model fertilizer retail outlets called Pradhan Mantri Kisan Samridhi Kendra (PMKSK) to act as “one-stop shop” for all agriculture-related inputs and services.

Challenges and Considerations in Fertilizer Subsidy Policies

The fertilizer subsidy issue is highly sensitive politically due to its impact on a significant voter base, primarily comprising farmers. Attempts to reduce or restructure the subsidy face vehement resistance from stakeholders, including farmers, industry players, and politicians.



The fertilizer subsidy system involves multiple complex processes such as production, import, distribution, and quality control. However, existing institutions suffer from deficiencies like data gaps, lack of transparency, and accountability, hindering effective coordination among these processes.

Generous fertilizer subsidies have fostered a dependency among farmers, making them accustomed to inexpensive fertilizers. Shifting their behaviour towards judicious fertilizer use requires extensive efforts in awareness, education, and providing incentives for adopting optimal practices.

Subsidy benefits primarily favour large and medium-scale farmers, leaving small and marginal farmers at a disadvantage due to limited availability and distribution challenges.

The current subsidy system promotes overuse and misuse of fertilizers, causing environmental issues like water pollution, greenhouse gas emissions, and soil health deterioration, necessitating a shift towards eco-friendly practices.

The subsidy disproportionately benefits states with higher irrigation coverage, neglecting rainfed and backward regions, thereby creating regional imbalances in agricultural development.

The provision of subsidies exerts a significant financial burden on the government, impacting fiscal stability and necessitating careful budgetary considerations.

Way Forward to Reform Fertilizer Subsidies in India

A phased reduction of urea subsidy by aligning its price with market value, easing the fiscal burden, encouraging balanced nutrient use, and curbing environmental degradation.

Precision targeting of subsidies to small and marginal farmers based on factors such as landholding size, income, and cropping patterns. This approach minimizes leaks, promotes equity, and ensures social welfare enhancement.

Shifting from product-centred subsidies to income-based support by directly transferring funds to eligible farmers' bank accounts. This empowers farmers to choose inputs according to their specific needs and preferences, fostering flexibility.



Reallocating funds into vital public goods like irrigation systems, research and development, extension services, and market connections. These investments enhance overall agricultural productivity, profitability, and sustainability.

Utilizing technology-driven solutions to precisely target subsidies for small and marginal farmers, ensuring that the support reaches those who need it the most efficiently.

Investing in research endeavours to develop fertilizers that are not only efficient and cost-effective but also environmentally friendly, aligning with sustainable agricultural practices.

Conducting comprehensive training programs and workshops to educate farmers about the judicious use of fertilizers. This knowledge empowers them to optimize fertilizer application, leading to improved crop yields and reduced environmental impact.

Actively promoting organic farming techniques and sustainable agricultural practices. By reducing reliance on chemical fertilizers, this approach fosters environmental conservation and ensures long-term soil fertility.

Engaging in collaborations with other nations to learn from their successful fertilizer management practices. International cooperation facilitates the exchange of knowledge and expertise, enabling India to implement effective strategies and policies.

GLOBAL SOLAR STOCK-TAKE REPORT

The International Solar Alliance (ISA), will for the first time compile and release a ‘Global Solar Stock-Take Report.’



ISA's initiative is inspired by the first ever 'Global Stocktake' of the United Nations Conference of Parties, scheduled in Dubai later this year.

What is the Global Stocktake of the United Nations Conference of Parties?

The global stocktake is an assessment of progress made toward mitigating global warming since the Paris Agreement in 2015.

Here countries are expected to give an account of the actions taken until now to transition their economies away from fossil fuel.

They are also expected to lay out plans to course correct if their commitments are insufficient to prevent runaway global warming. The Global Stocktake follows from the Paris Agreement signed in 2015.

The global stocktake is a two-year process scheduled to happen every five years.

The first global stocktake got underway in 2022 and will conclude at COP28; the next stocktake will occur in 2028 and again in 2033, etcetera.

The objective is to coordinate efforts on climate action, including measures to bridge the gaps in progress.

Early Findings

An early look at the findings from the global stocktake indicates that the global community is not on track to achieve the goals set out in the Paris Agreement.



The highest-level goal is to keep global warming under 2°C while pursuing efforts to stay within 1.5°C.

READ ABOUT THE FINDINGS OF 2023 GLOBAL STOCKTAKE REPORT:

COP which stands for Conference of the Parties—is an annual meeting where United Nations member states convene to assess progress in dealing with climate change and make a plan for climate action within the guidelines of the UNFCCC.

UNFCCC is the formal name for the meetings is the Conference of the Parties of the UN Framework Convention on Climate Change or the United Nations Climate Change Conference. The first COP was held in Berlin in 1995.

Every member state has equal voting power, and unanimous approval is needed for any COP agreement.

Among the most significant COP milestones are the Kyoto Protocol in 1997 and the Paris Agreement in 2015.

Kyoto Protocol and the Paris Agreement

The Kyoto Protocol, ratified in 1997, is a landmark international treaty in which signatories agreed to reduce greenhouse gas emissions to prevent human interference with the natural climate. The treaty, a result of COP3, is one of the most significant results of the COP meetings. In 2012, the agreement was extended to 2020.

The Paris Agreement, also known as the Paris Climate Accords, is an international treaty negotiated in 2015 at COP21. In Paris, participants agreed to limit the increase of global temperatures to 2°C while pursuing efforts to stay within 1.5°C.

According to the agreement, each country must track, record, and report their carbon emissions as well as their efforts to reduce and offset them.

COP27 (held in 2022)

COP27, in Sharm El Sheikh, reported on the significant roadblocks that remain on the path to net zero.



Specifically, they say, a 1.5°C pathway is not yet achievable. To reduce emissions to the extent required, leaders and their organizations will need to take additional, urgent action toward emissions reductions and removals.

Adaptation and loss and damage were major themes, particularly intended to increase resilience for the billions of people living in geographies that are more vulnerable to climate hazards.

Net-zero emissions remain a goal, but energy security, resilience, and affordability are equally important.

What is Net Zero?

A net-zero gain of greenhouse gases in the atmosphere would be achieved when annual greenhouse gas emissions are equal to the amount removed each year. The pathways to net zero, identified by the Intergovernmental Panel on Climate Change, involve both decarbonization and carbon removal.

Decarbonization is the reduction of carbon and other greenhouse gases in the atmosphere, achieved by reducing the use of high-carbon-emitting fossil fuels.

Carbon removal solutions remove carbon from the atmosphere and store it over the long term.

To achieve net zero, decarbonization would need to happen across all sectors, including energy, agriculture, and land use. And carbon removal would be needed to offset residual, hard-to-abate emissions from industries such as cement.

The 2023 COP28, will be held from November 30 until December 12, 2023, at the Expo City, Dubai.

This year's event will feature the first "global stocktake," which will provide a comprehensive assessment of progress since the Paris Agreement.

The objective is to align efforts on climate action, including measures to bridge the gaps in progress.

COP28 will also spotlight climate adaptation initiatives, as well as mitigation.

These will fall under four key themes: health, water, food, and nature.



And finally, COP28 will be the first to feature expanded stakeholder involvement, including high-emissions sectors and private sector oil and gas organizations.

READ ABOUT THE FINDINGS OF 2023 GLOBAL STOCKTAKE REPORT:

The first-ever Global Stocktake, released in October 2023, found that the world is not on track to achieve the goals set out in Paris in 2015.

At COP28, UN member states will negotiate their response to the stocktake's findings.

The global stocktake emphasizes the urgency of action to mitigate global warming.

It's clear that the time is now for international cooperation, equitable climate action, and sustainable transformation across all sectors.

New Made-in-India EV Charging Standard for Bikes and Scooters

The Bureau of Indian Standards (BIS) has approved an indigenously developed AC and DC combined charging connector standard for light electric vehicles (LEVs) such as scooters, bikes, and rickshaws.



Electric vehicle (EV) charging connector standards are conceptually similar to charging connector standards for mobile phones, such as the USB Type-C charger or Apple's lightning charger.

AC and DC are different forms of electrical power, and in the context of EV chargers, the difference between AC and DC is where the AC/alternating current gets converted to DC/direct current.

Most chargers and electrical appliances are AC powered, meaning the AC gets converted to DC outside of the car, right from the grid, and then goes into the car's battery.

On the other hand, DC converts in the charger plug-in itself.

Electric vehicle car batteries in North America will only accept DC and thus chargers are always AC/DC or DC. Meanwhile, in Europe and Japan, their EV batteries may be charged using AC only.

What is the New Made-in-India EV Charging Standard?

The new standard, ISI7017 (Part 2 / Sec 7): 2023, cleared by BIS, has been developed through collaboration among -

NITI Aayog,

- The Department of Science and Technology,
- Electric two-wheeler maker Ather Energy, and



- Various other government and industry stakeholders.

This indigenously developed charging standard is the first in the world that combines AC and DC for LEVs.

Combined AC and DC charging standards for electric 4-wheelers are already in use around the world, like the Combined Charging System (CCS) standard that is widely used in Europe.

A combined charging standard is attractive because of its interoperability - which means that it can be used by different kinds of EV models and charging infrastructure providers.

Although the new approved standard fixes the problem of different standards for AC and DC charging by creating a combined standard, it does not mandate EV makers to use a uniform standard.

This will lead to range anxiety (the fear that the vehicle would run out of charge, and there will be nowhere to recharge it) and hampers faster adoption of EVs.

Why is a National Standard Needed for India?

In India, EV makers are not mandated to follow a specific standard for charging connectors. Thus, electric 2-wheeler makers such as Ola Electric, Ather Energy, and Ultraviolette Automotive, all use different charging standards for their EVs.

This is much like how Apple phones until recently used a lightning port and Android phones use a USB Type-C port.

For instance, Ola's proprietary Hyperchargers are designed for charging Ola Electric scooters only.

Too many charging standards for EVs makes it difficult for public charging stations to cater to each individual type. This adds to range anxiety.

What is the Situation in Other Countries Around the World?



CHINA: The world's largest electric car market in terms of both sales and vehicles on the road, uses a national standard for EV charging connectors that is called **GB/T**.

The national standard, along with one of the densest networks of charging stations in the world, has allowed China to productively address concerns around range anxiety.

UNITED STATES: The US does not have a national standard, but EV makers have been collaborating to push for some degree of standardisation.

For instance, Ford and General Motors (GM) are adopting the North American Charging Standard (NACS) developed by Tesla, so that their EVs can access Tesla's network of fast chargers across North America.

EUROPE: In Europe, CCS is the predominant charging connector standard, and is also a European Union (EU) requirement for EV charging networks.

JAPAN: Japan's predominant charging standard is called CHAdeMO (developed in 2010).