



**RURAL CONSUMERS AND ELECTRIC VEHICLES: A NOVEL
CONTEMPORARY EXPLORATION OF AWARENESS, PERCEPTION
AND SATISFACTION INFLUENCING BUYING BEHAVIOUR IN
SELECTED DISTRICTS OF TAMIL NADU**

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ABSTRACT

The transition from conventional vehicles to electric vehicles (EVs) is increasingly important for sustainable mobility, energy security, and environmental protection. Although EV adoption is expanding in India, research has largely focused on urban consumers, with comparatively less attention to rural consumers in Tamil Nadu. This study examines rural consumers in selected districts of Tamil Nadu, focusing on their awareness, perceptions, adoption challenges, buying behaviour, and satisfaction with EVs. It considers awareness of EV features, purchase price, government incentives, charging infrastructure, and maintenance, as well as perceptions of performance, reliability, affordability, and environmental benefits. It also examines practical barriers, including charging availability, battery life and replacement cost, range anxiety, maintenance support, financing, and resale value. The study also considers post-purchase satisfaction among rural EV owners. By integrating awareness, perception, challenges, buying behaviour, actual usage, and satisfaction, the study presents a comprehensive view of the rural EV consumer journey. The findings aim to provide useful insights for policymakers, EV manufacturers, financial institutions, and other stakeholders promoting inclusive and sustainable electric mobility in rural areas.

Keywords: Electric Vehicles, Rural Consumers, Consumer Awareness, Consumer Perception, Charging Infrastructure and Environmental Sustainability.

1. Introduction

The transition from fossil-fuel-based transport to cleaner mobility has become an important part of the global sustainability agenda. Electric vehicles (EVs) are increasingly viewed as one component of this transition because they can reduce direct tailpipe emissions and dependence on petroleum-based fuels. Their environmental benefits, however, depend partly on the source of electricity used for charging and on the way batteries are produced, reused, and recycled. The recent expansion of EV sales reflects improvements in battery technology, wider product availability, policy support, and growing consumer interest in operating-cost savings and environmental concerns. India has introduced a series of policy measures to encourage electric mobility, including the National Electric Mobility Mission Plan (NEMMP), the Faster Adoption and Manufacturing of Electric Vehicles (FAME) schemes, and PM E-DRIVE. Tamil Nadu has also introduced the Tamil Nadu Electric Vehicle Policy 2023. These initiatives have helped build an EV ecosystem covering manufacturing, incentives, charging infrastructure, and supporting services.

Despite this progress, rural consumers' experience can differ substantially from that of urban consumers. Rural households often depend on two-wheelers for education, employment,

agricultural activities, and access to markets, healthcare, and other routine travel. Lower running costs may make EVs attractive for such journeys, but concerns about purchase price, charging availability, range, battery replacement, service facilities, financing, and resale value may influence adoption decisions. These concerns make the rural context important for understanding inclusive EV adoption.

The existing literature provides useful evidence on EV adoption intention, perceived benefits, technological acceptance, government support, and adoption barriers. However, the literature has given relatively little attention to the full consumer journey in rural Tamil Nadu—from awareness and perception to adoption challenges, buying behavior, actual usage, and post-purchase satisfaction. This study addresses this gap by focusing on rural consumers in selected districts of Tamil Nadu. The study therefore seeks to move beyond a narrow focus on purchase intention and provide a broader understanding of the factors shaping rural EV adoption and ownership experiences.

2. Scope of the Study

This descriptive study focuses on eight selected districts of Tamil Nadu—Erode, Tiruppur, Coimbatore, Salem, Namakkal, Karur, Dharmapuri and Krishnagiri—representing the western and north-western regions of the state. Based on secondary data, the total population of



the selected districts is 17,848,643. Of this, 9,366,545 are rural residents, representing approximately 52.48% of the total population. Therefore, the rural population averages 52.48% of the population across the selected study area. These districts were purposively selected because of their substantial rural population and the prominence of agriculture, allied activities, and small businesses. Dependence on transportation for agricultural, commercial, and livelihood activities provides a relevant context for examining the potential role of electric vehicles in rural mobility and for assessing awareness, perceptions, buying behavior, and satisfaction with electric vehicles. It covers awareness of EV features, purchase costs, government incentives, charging infrastructure, maintenance, and operating advantages. It also considers perceptions of performance, reliability, affordability, environmental benefits, and economic benefits. It pays particular attention to challenges such as limited charging facilities, battery life and replacement costs, range anxiety, service availability, financing, and resale value. The study also considers post-purchase

satisfaction among existing rural EV owners. The intended contribution is to provide evidence that can support more inclusive and sustainable EV adoption in rural areas.

3. Objectives of the Study

- ✓ To assess rural consumers' awareness of electric vehicle features, prices, government incentives, charging facilities, and maintenance requirements.
- ✓ To identify and describe the major challenges encountered by rural consumers in adopting and using electric vehicles.
- ✓ To assess the level of satisfaction among rural electric vehicle owners and describe their post-purchase experiences
- ✓ To examine rural consumers' perceptions of electric vehicles in terms of price, reliability, performance, affordability, and environmental benefits.
- ✓ To suggest practical measures for promoting wider and more inclusive adoption of electric vehicles among rural consumers in TamilNadu

4. Development of Electric Vehicles in India

Electric mobility in India has progressed through a series of policy and market developments. This study presents the major milestones below.

Year	Major Development
1990	Early exploration of electric mobility in India.
2000	Expansion of electric two- and three-wheelers.
2011	National Mission on Electric Mobility.

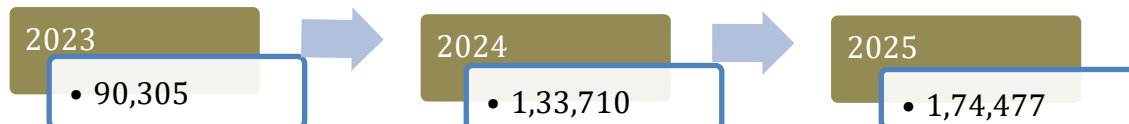
2013	National Electric Mobility Mission Plan 2020.
2015	FAME-I launched.
2019	FAME-II launched.
2020	Accelerated development of electric two- and three-wheeler categories.
2023	Tamil Nadu Electric Vehicle Policy 2023.
2024	PM E-DRIVE notified.
2025	Continued development of charging infrastructure and the wider EV ecosystem.
2026	Increasing attention to affordability, charging reliability, rural penetration, and ecosystem integration.

4.1 EV Sales in India: Recent Trend

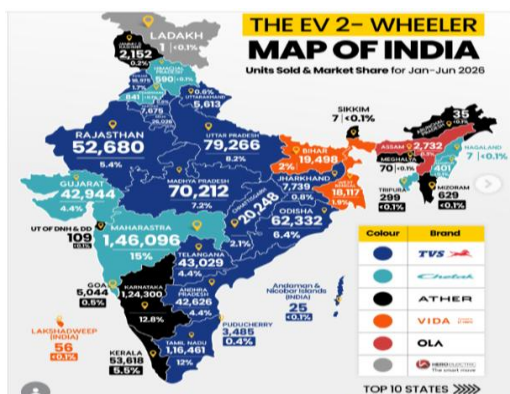
The manuscript reports strong growth in electric two-wheeler sales and identifies Tamil Nadu as one of the leading states. Retain the reported figures only after checking them against the relevant Vahan, Ministry of Heavy Industries, or other authoritative source, and cite that source directly in the text.

4.2 Tamil Nadu EV Registration Growth:

Tamil Nadu accounts for approximately 70% of India's electric two-wheeler output and 40% of electric four-wheelers, establishing itself as the leading electric vehicle (EV) manufacturing center in the nation



2026 Trend: Robust acceptance persists, driven by electric two-wheelers and metropolitan areas such as Chennai, Coimbatore, Chengalpattu, Tirupur, and Salem.



Many individuals view EV sales as if it's a single vast market. However, the state-specific distribution is where it becomes intriguing. Between January and June 2026, India documented 9,71,938 electric two-wheeler sales on Vahan. The top 10 states accounted for approximately 81% of that. That's crazy. Maharashtra is leading with 1,46,096 units. Then Karnataka with 1,24,300. Then Tamil Nadu has 1,16,461. These three states account for nearly 40% of the market.

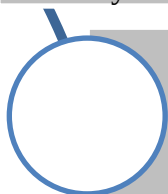


5. Impact of Electric Vehicles

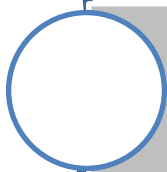
Electric vehicles can influence transport, household expenditure, employment, technology, and rural mobility. However, not all consumers experience the benefits equally. Their practical value depends on factors such as electricity access, charging availability, household income, travel distance, vehicle type, and technical support.



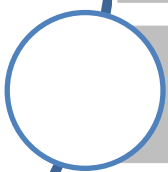
5.1 Environmental Impact: EVs produce no direct tailpipe emissions while driving, which can help reduce local air pollution. And their overall environmental benefit depends on how the electricity is generated and how batteries are manufactured, reused, and recycled. Therefore, the environmental impact of EVs should be considered across their wider life cycle rather than only at the point of vehicle use.



5.2 Economic Impact: A key appeal of EVs is their ability to lower daily travel costs. Electricity costs less per kilometer than petrol or diesel, and EVs have fewer mechanical parts needing upkeep. However, high upfront prices, battery replacement costs, and financing needs may deter budget-conscious buyers



5.3 Social Impact: EV growth can bring changes beyond personal transport. Electric mobility can create jobs in EV sales, charging infrastructure, battery production, servicing, software, and renewables. Cleaner transport can also improve community living by lowering local air and noise pollution



5.4 Technological Impact: EV growth is speeding up advances in batteries, motors, battery management, connected vehicles, AI, telematics, and smart charging. These are boosting range, charging speed, safety, and reliability



5.5 Impact on Rural Consumers: EVs matter greatly for rural users because their travel ties to jobs, education, farming, health, shopping, and family duties. For many rural homes, two-wheelers are vital for daily movement. Thus, EVs can offer big benefits if well-designed and backed by proper infrastructure

6. Electric Vehicles and Rural Consumer Behaviour

Rural consumers may evaluate EVs differently depending on their travel requirements, income, occupation, access to electricity and charging facilities, and exposure to information about EV technology. Lower operating costs and environmental benefits may encourage interest, while concerns about battery life, charging access, vehicle range, reliability, service support, and resale value may discourage adoption. Government incentives and information from family members, friends, existing users, dealers, and other trusted sources may also influence perceptions and purchase

decisions. For example, a rural consumer who regularly travels 30–40 km per day may find home charging and lower running costs attractive, but may hesitate if charging facilities and service centres are difficult to access. These practical considerations make rural consumer behaviour an important area of EV research.

7. Potential Benefits of Electric Vehicles For Rural Consumers

Area	Potential Benefit	Rural Example
Running Cost	Potentially lower daily transportation expenditure.	A farmer traveling regularly to a nearby market may reduce petrol expenditure.
Maintenance	Fewer conventional mechanical components may reduce routine maintenance requirements.	An electric two-wheeler may require less routine maintenance than a conventional petrol vehicle.
Charging	Home charging can be convenient where reliable electricity is available.	A household with a suitable electricity connection may charge the vehicle overnight.
Short-Distance Mobility	EVs can suit frequent local journeys.	Students, employees, and small traders may use EVs for village-to-town travel.
Agricultural Activities	Electric three-wheelers or utility vehicles may support local transport.	Suitable electric utility vehicles may move small quantities of agricultural products.
Environmental Benefit	EVs produce no direct tailpipe emissions during operation.	Greater EV use can contribute to cleaner local transportation.

8. Literature Review

- Khurana, Kumar, and Sidhpuria (2020) examined EV adoption in India and highlighted attitude's mediating role. Their work points to the relevance of economic benefits, environmental concerns, social influences, and self-perception in shaping adoption.
- Tarei, Chand, and Gupta (2021) examined barriers to EV adoption in India and identified issues related to technology, cost, infrastructure, policy support, and consumer awareness.
- Sanguesa et al. (2021) discussed the technological, social, and cultural dimensions of electric-mobility barriers, indicating that multiple interconnected factors influence EV adoption.
- Jaiswal et al. (2021) examined consumer adoption intention in India and reported the relevance of perceived usefulness, ease of use, risk, and policy-related factors.



- Varghese, Abhilash, and Pillai (2021) examined consumer perception and purchase intention and identified awareness, driving range, value for money, and infrastructure as relevant considerations.
- Jain, Bhaskar, and Jain (2022) used an integrated UTAUT-based approach and considered environmental concerns, perceived risk, and government support in explaining EV adoption intention in India.
- Recent Indian studies reported in the manuscript further indicate that awareness, perceived benefits, environmental concerns, incentives, infrastructure, trust, range anxiety, and purchase cost can influence EV adoption decisions.
- Studies published in 2024 and 2026 also extend the discussion to information interventions, knowledge-attitude-practice relationships, climate-mitigation perceptions, and post-purchase satisfaction among EV owners.

9. Research Gap

The literature reviewed in the manuscript reveals several areas that require further attention. First, much of the existing EV research has focused on urban and metropolitan consumers, leaving rural consumer experiences comparatively less examined. Second, district-level evidence from rural Tamil Nadu remains limited despite the state's growing EV ecosystem and policy support. Third, rural consumers may face distinctive concerns related to charging access, service availability, battery life, financing, and resale value. Fourth, many studies focus on purchase intention rather than the experiences of actual EV owners. Finally, relatively few studies bring together the complete consumer journey—awareness, perception, adoption-related challenges, buying behaviour, actual usage, and post-purchase satisfaction. This study addresses this gap by examining these dimensions in selected rural districts of Tamil Nadu.

10. Proposed Conceptual Framework

Construct	Key Dimensions	Role in the Study
Consumer Awareness	EV features, price, incentives, charging, maintenance	Assesses consumers' knowledge about EVs.
Consumer Perception	Performance, reliability, affordability, environmental benefits	Examines how consumers evaluate EVs.
Perceived Benefits and Risks	Running cost, maintenance, range, battery life, resale value	Captures expected advantages and concerns.
Infrastructure and Policy Factors	Charging facilities, service centres, government incentives, financing	Represents external factors that may influence adoption.

Buying Behaviour / Adoption Intention	Purchase decision, willingness to buy, recommendation	Represents consumer response towards EV adoption.
Actual EV Usage	Frequency, distance, charging pattern, purpose of use	Captures real-world EV experience.
Post-Purchase Satisfaction	Performance, economy, reliability, charging, maintenance, overall satisfaction	Measures consumers' experience after purchase.

11. Major Challenges For Rural EV Adoption

Major Challenge	Possible Effect on Rural Consumers	Illustrative Example
High Initial Cost	The purchase price may remain high for some rural households even when long-term operating costs are lower.	A consumer may choose a conventional two-wheeler because the initial investment is more manageable.
Limited Charging Facilities	Limited access to convenient charging can discourage adoption.	A consumer traveling from a village to a nearby town may worry about charging during the journey.
Range Anxiety	Consumers may worry that the battery will not provide sufficient range for their travel needs.	A person with a long daily commute may hesitate if charging facilities are unavailable along the route.
Battery Life and Replacement Cost	Battery life and future replacement expenditure may create uncertainty.	A potential buyer may seek clear information about battery warranty, life, and replacement cost.
Lack of Service Centres and Skilled Mechanics	Limited local technical support can increase inconvenience and repair time.	Owners may need to travel to a nearby town for specialized service.
Limited Awareness and Financing Support	Consumers may be unaware of incentives or may struggle to obtain suitable finance.	A consumer may postpone purchase because available financial support is not clearly understood.
Resale and Safety Concerns	Uncertainty about resale value, battery safety, and long-term reliability may reduce confidence.	A buyer may prefer a conventional vehicle when future resale value is uncertain.

12. Government Initiatives and Support For EVS in India

India's EV policy framework has developed from early demand incentives towards a broader ecosystem approach covering consumer support, manufacturing, technology,



and charging infrastructure. This manuscript discusses the following initiatives. Verify the exact period, financial allocation, and current status of each scheme against the latest official government notification before publication.

Government Initiative	Period / Status	Major Purpose	Benefit / Support
National Electric Mobility Mission Plan (NEMMP) 2020	2013 onward	Long-term roadmap for electric mobility	Encouraged EV adoption, domestic manufacturing, and technology development.
FAME-I	2015–2019	Initial EV promotion Programme	Demand incentives, technology development, pilot projects, and charging infrastructure.
FAME-II	2019–2024	Accelerated EV adoption	Demand incentives and support for public transport and charging infrastructure.
EMPS 2024	April–July 2024	Transition support before PM E-DRIVE	Support for eligible electric two- and three-wheelers.
SPMEPCI	2024 onward	Promote domestic manufacturing of electric passenger cars	Encourages global EV manufacturers to establish production in India.
PM E-DRIVE	October 2024–March 2026	Accelerate EV adoption and charging infrastructure	Financial support for eligible EV segments and charging infrastructure.
PM E-DRIVE Charging Infrastructure	2025 onward	Expand public charging	Government support for deployment of public EV charging stations.
PLI-Auto Scheme	FY 2022–23 to FY 2026–27	Promote advanced automotive manufacturing	Support for advanced automotive technology and localisation.

13. Suggestions For Promoting EV Adoption Among Rural Consumers

Based on the study context and literature reviewed, the following practical recommendations may help create a more supportive environment for rural EV adoption. These are presented as study-based recommendations and should not be described as statistically tested findings unless supported by the study data.

Key Recommendation	Proposed Action	Illustrative Example
Intensify Village-Level EV	Conduct awareness programmes in local languages	A village awareness camp can show the potential

Awareness	covering purchase price, running cost, incentives, charging, battery life, maintenance, and financing.	monthly fuel-cost savings of an EV.
Increase Rural Charging Facilities	Develop reliable charging points near Panchayat offices, weekly markets, bus stands, banks, and other frequently used locations.	A charging point near a weekly market could serve farmers, traders, employees, and other commuters.
Expand Rural Service and Maintenance Facilities	Manufacturers and service providers can train local technicians and develop mobile or decentralised service support.	A trained local technician could provide routine service and reduce the need to travel to a town.
Enhance Access to EV Financing	Banks, NBFCs, and cooperative institutions can explore affordable loans, flexible repayment schedules, and simplified documentation.	Repayment schedules could be designed to suit the income patterns of rural households.
Build Consumer Confidence through Battery Information	Provide clear information about warranty, expected battery life, replacement cost, safety, reuse, and recycling.	Transparent battery information at the time of purchase can reduce uncertainty about long-term ownership.
Promote Test Rides and Demonstration Programmes	Conduct village-level test rides and demonstrations for farmers, youth, women, employees, and other potential users.	Direct experience with vehicle performance, comfort, safety, and charging can help consumers make informed decisions.
Develop EVs Suited to Rural Conditions	Encourage vehicle designs with appropriate range, ground clearance, suspension, durability, and practical charging options.	Vehicles designed for rural road conditions and local travel needs may better match rural users' requirements.

14. Conclusion

Electric vehicles can contribute to cleaner mobility and lower operating costs, but access to EVs alone does not guarantee adoption, particularly in rural areas. Consumer awareness, purchase cost, charging availability, battery life, reliability, maintenance support, financing, incentives, and resale expectations can shape how rural consumers evaluate EVs.

Tamil Nadu provides a relevant context for examining these issues because of its developing EV ecosystem and policy support. By focusing on rural consumers as well as existing EV users, the study seeks to extend the discussion beyond urban purchase intention and consider the wider journey from awareness and perception to adoption, ownership challenges, and satisfaction. The study



therefore highlights the need for a rural EV ecosystem that combines appropriate products, reliable charging, accessible service, transparent battery information, suitable financing, and effective consumer awareness. Such an approach can support more inclusive and sustainable electric mobility in rural Tamil Nadu.

References

- A dataset on consumers' knowledge, attitude, and practice: Investigating electric two-wheeler vehicle adoption in the Indian automobile sector. (2024). Data in Brief, 55, 110605.
<https://doi.org/10.1016/j.dib.2024.110605>
- An empirical study on electric vehicle adoption in India: A step towards a greener environment. (2024). Transport Policy, 156, 112–125.
<https://doi.org/10.1016/j.tranpol.2024.07.018>
- Asthana, A. (2020). Electric vehicle in India and understanding the consumer perception. International Journal of Psychosocial Rehabilitation, 24(3), 7871–7880.
<https://doi.org/10.61841/z12w6p46>
- Determinants of electric vehicle (EV) satisfaction and the mediating role of government policies: Case study of Bengaluru, an Indian metropolitan city. (2026). Case Studies on Transport Policy.

Estimating personal electric vehicle demand and its adoption timeframe: A study on consumer perception in Indian metropolitan cities. (2024). Case Studies on Transport Policy, 17, 101246.
<https://doi.org/10.1016/j.cstp.2024.101246>

Government of India, Ministry of Heavy Industries. (2025). NEMMP and FAME scheme. Press Information Bureau.

Government of India, Ministry of Heavy Industries. (2026). Promotion of electric vehicles under FAME II and PM E-DRIVE. Rajya Sabha.

International Energy Agency. (2026). Global EV outlook 2026. IEA.

Jain, N. K., Bhaskar, K., & Jain, S. (2022). What drives adoption intention of electric vehicles in India? An integrated UTAUT model with environmental concerns, perceived risk and government support. Research in Transportation Business & Management, 42, 100730.
<https://doi.org/10.1016/j.rtbm.2021.100730>

Jaiswal, D., Kaushal, V., Kant, R., & Singh, P. K. (2021). Consumer adoption intention for electric vehicles: Insights and evidence from Indian sustainable transportation. Technological Forecasting and

- Social Change, 173, 121089.
<https://doi.org/10.1016/j.techfore.2021.121089>
- Kaur, R., & Reen, T. K. (2026). Determinants of electric vehicle adoption: A PRISMA-based systematic review of consumer perceptions and behavioral intentions in the Indian context. *ShodhPrabandhan: Journal of Management Studies*, 3(2).
<https://doi.org/10.29121/ShodhPrabandhan.v3.i2.2026.106>
- Khurana, A., Kumar, V. V. R., & Sidhpuria, M. (2020). A study on the adoption of electric vehicles in India: The mediating role of attitude. *Vision: The Journal of Business Perspective*, 24(1), 23–34.
<https://doi.org/10.1177/0972262919875548>
- Kumar, A., Lim, J. S., Rathee, V., Mittal, P., & Kakran, S. (2026). Consumer perceptions and behavior in driving electric vehicle adoption for climate change mitigation in India. *Discover Sustainability*, 7, 1213.
<https://doi.org/10.1007/s43621-026-03529-7>
- Kumar, et al. (2024). Are consumers ready to adopt electric vehicles? Analyzing the barriers and motivators associated with electric vehicle adoption in India: Policy implications for various stakeholders. *Energy Policy*, 190, 114173.
<https://doi.org/10.1016/j.enpol.2024.114173>
- Patel, M., Singh, R., Arora, P., & Mahapatra, D. (2024). EV adoption in India: Barriers and policy solutions from manufacturers' and consumers' perspectives. *Energy for Sustainable Development*, 83, 101583.
- Tamil Nadu Government. (2023). *Tamil Nadu Electric Vehicle Policy 2023*. Government of Tamil Nadu.
- Targeted information intervention among consumer clusters for electric vehicle penetration: A case study of Punjab, India. (2024). *Case Studies on Transport Policy*, 16, 101202.
<https://doi.org/10.1016/j.cstp.2024.101202>
- Tarei, P. K., Chand, P., & Gupta, H. (2021). Barriers to the adoption of electric vehicles in India: An exploratory study. *Transportation Research Part D: Transport and Environment*, 100, 103084.
<https://doi.org/10.1016/j.trd.2021.103084>
- Varghese, A. T., Abhilash, V. S., & Pillai, S. V. (2021). A study on consumer perception and purchase intention of electric vehicles in India. *Asian Journal of Economics, Finance and Management*, 3(1), 272–284.